

Original Article

Factors Associated with Delayed Initiation of Insulin Among Patients with Type 2 Diabetes Mellitus at the Diabetes Clinic of a Tertiary Hospital in Ethiopia: A Qualitative Study

Elham Reshid¹, Bruck M. Habte^{1*}, Tedla Kebede², Teferi G. Fenta¹

Abstract

Background: Guidelines recommend the initiation of insulin in patients with type 2 diabetes mellitus who failed on maximum doses of oral medication. However, time of initiation is inconsistent due to different barriers resulting in a delay which leads to failure to achieve glycemic control which in turn may lead to different complications. The aim of this study was to explore factors influencing the delayed initiation of insulin among patients with type 2 diabetes being managed at the Diabetes Clinic of Tikur Anbessa Specialized Hospital.

Methods: A qualitative descriptive study design was employed. Data was collected using in-depth interviews with 27 participants, including patients and healthcare providers. Audio-recorded data was transcribed and then thematically analyzed.

Results: Different factors influencing the delayed initiation of insulin in patients with type 2 diabetes mellitus were revealed. Patient factors included beliefs about the necessity of insulin and concerns related to starting insulin like fear of injections, non-amenability to religious practices, and perceived difficulty in its administration among others. Physician factors included patients' perceived situation and the lack of clinical competency as it is residents who play a major role in providing the diagnosis and treatment while also maintaining their attachment to the clinic. Health institution factors included inadequate laboratory set ups which only provided increased blood glucose tests and the absence of contextual guidelines for diabetes management including insulin initiation.

Conclusions: The study findings indicated different influencing factors some of which were similar to those reported in other studies while there were others like perceived resistance to insulin which somehow were unique to the present study. These are indicative of the need to implement interventions such as strengthening the patients' diabetes health education program that is considerate of the religious, cultural, and social aspects of the society. [*Ethiop. J. Health Dev.* 2022; 36(2):000-000]

Key words: Delay in insulin initiation, Ethiopia, qualitative study, Tertiary Hospital, Type 2 Diabetes Mellitus

Introduction

According to the 2021 report from the International Diabetes Federation, diabetes mellitus has become one of the major conditions of public health importance in developing countries that stemmed from the combined effect of globalization and epidemiological transition among other factors. Ethiopia had a diabetes prevalence rate of 3.3% in 2021. This report places Ethiopia among the top five African countries in terms of the number of people with diabetes that is estimated to be at 1.9 million (1). However, research conducted in different parts of the country already revealed a higher prevalence of diabetes up to 5.1% in 2014 (2). As the overall global picture predicts, the predominant type of diabetes in the Ethiopian setting is type 2 diabetes mellitus (T2DM) (3,4). Metformin remains to be the mainstay therapy with a recommended shift to insulin therapy when treatment fails with maximum doses of oral anti-diabetic medications (OAMs) (5). However, the time to initiation of insulin remains inconsistent mainly due to patient, and healthcare provider factors, which presents both behavioral (lifestyle) and therapeutic challenges (4). Failure to achieve glycemic control in those patients with compromised timely initiation of insulin will result in hyperglycemia and different diabetes related complications (3,6).

Evidence indicates that nearly one-third of Ethiopian patients with diabetes face one or the other form of acute complications and approximately half face at least one chronic complication. According to a systematic review conducted in Ethiopia, the prevalence of neuropathy, retinopathy, and nephropathy was estimated to be approximately 35%, 25%, and 15%, respectively (7). In a similar study at the current study setting, it was found that the main causes of admission for T2DM were diabetic foot ulcer (39%) and cardiovascular disease (21%). Hypertension, neuropathy, nephropathy, retinopathy, and diabetic foot ulcers accounted for 85% of the 756 existing complications. Overall inpatient mortality was 21% and of the 89 deaths, 77 occurred in patients with T2DM (3). Another study also reported that the direct hospital cost for patients with diabetes was significantly higher and cost incurred from this to treat diabetes-related complications was reported to be significant (8).

The few studies from Ethiopia report unacceptably low levels of adherence to recommended medications as one factor compromising the successful therapeutic outcome (9). Among those, one study mentioned being on non-insulin therapy as one factor contributing to

¹School of Pharmacy, College of Health Sciences (CHS), Addis Ababa University (AAU), Addis Ababa Ethiopia

²School of Medicine, CHS, AAU, Addis Ababa, Ethiopia

non-adherence and compromised therapeutic outcomes (9). The experience of working with the local population has indicated a great deal of reluctance to commence insulin therapy among patients in the Ethiopian setting. We have in fact reported in a larger study involving 385 patients whereby 64.2% were found to have delayed initiation of insulin in their course of treatment. Those patients were left with a combination of OAMs of maximum dose instead of insulin therapy despite not achieving optimum fasting plasma glucose (FPG) levels (9,10). Studies have indicated that immediate initiation of insulin has led to increases in life expectancy and significant decreases in incidence and time of onset of diabetes-related complications (11). There is no study reported in the Ethiopian setting that has explored the influencing factors on the observed delayed initiation of insulin among patients with type 2 diabetes. Thus, the aim of the current study was to explore influencing factors among patients with type 2 diabetes mellitus from the perspectives of the patients and healthcare providers at the diabetes clinic of Tikur Anbessa Specialized Hospital (TASH).

Methods

A qualitative descriptive design was employed to explore factors influencing delayed initiation of insulin from January to March 2017. The authors believed that this approach would enable them to gain an in-depth understanding of the issue at hand from different perspectives. Furthermore, this specific qualitative design has been described as simple and flexible and can be used in diverse healthcare contexts (12).

Study setting

The study was conducted at the diabetes clinic of TASH, which is the largest well-organized diabetes clinic running in the country. Its clinical staff at the time included five endocrinologists, two internists attending an endocrinology fellowship program, five residents in the Internal Medicine specialty program, and five nurses. There was also a pharmacy at the clinic which consisted of three pharmacists (P.C, 2016).

Study participants

Study participants were purposively selected adult patients with type 2 diabetes and healthcare providers serving these patients. Patient participants were those who had a history of delayed insulin initiation and were purposively recruited from a quantitative study (10) that the first author conducted as part of her master's thesis. Delayed insulin initiation was operationally defined as, "patients who were on a maximum dose of two OAMs and failed to achieve optimum FPG levels but were not prescribed with insulin after three consecutive visits to the clinic for a minimum duration of six months" or "patients who refused to take insulin when prescribed in their third visit" (5). The additional criteria used in the larger study included age of 18 and above, being on follow up with oral medications at the diabetes clinic and switching to insulin or supposed to be switched to insulin but refused to take insulin when prescribed on the third visit. The study excluded patient charts with incomplete information regarding their oral

hypoglycemic medication and their insulin initiation status. Patients with a history of gestational diabetes were also excluded. For the in-depth interview additional exclusion criteria to recruit patient participants included being healthcare providers, and not being able to orally communicate in Amharic (the official language that was also widely spoken). In this manner, 15 participants were enrolled for the study. Criteria to enroll healthcare provider participants include serving in the diabetes clinic at the time of the study. Accordingly, three endocrinologists, two internists attending the endocrinology fellowship program, two senior residents, three nurses and two pharmacists working in the diabetes clinic were enrolled for the study.

Data collection methods

For the in-depth interview, a semi-structured interview guide based on the objectives of the study and based on literature reviews (13-15) was prepared. The interview guide was then translated to Amharic. The first author conducted interviews that ranged from 30 to 60 minutes long after obtaining consent from participants to be audio-recorded. Study participants were asked to discuss introductory subjects and then moved on to factors related to the patient, the healthcare providers, and the health institution. The in-depth interviews with patients and healthcare providers were conducted at convenient locations such as cafés, hospital compounds, hospitals and academic offices, and other environments that were suitable for the healthcare providers.

Data analysis

Interview data passed through a process of preliminary analysis whereby audio-recordings and field notes were first transcribed. Sections of original transcripts and key quotes, which were illustrative of the emerging themes, were translated to English. However, the process of data collection, transcription, and analysis was done simultaneously to allow room for flexibility of the interview questions and to indicate the point of saturation. Finally, the data was analyzed using thematic analysis (16) which is one of the common approaches followed when using qualitative descriptive approaches (12). Open coding was used at the beginning where each distinct code was developed into subthemes and then themes. While developing in this procedure, previous research (17,18) was reviewed and applied while rearranging subthemes under themes.

Ethical considerations

Ethical approvals were obtained from the Institutional Review Boards of the School of Pharmacy (ERB/SOP/02/09/16) and the Department of Internal Medicine, School of Medicine (IMD/169/09), College of Health Sciences, Addis Ababa University. All study participants provided informed oral consent prior to the data collection. Participants were assured of anonymity and that their responses would remain confidential. They were also reassured that the report of the findings would not identify them and only the aggregate data would be reported.

Results

Characteristics of participants: Out of the 30 participants approached, 15 patients with type 2 diabetes and 12 healthcare providers; 7 physicians, 3 nurse, and 2 pharmacists participated in the study. Three of the patients who met the eligibility criteria did not participate for personal reasons. As shown in Table 1, most of patient participants were in the age range of 40-50 years old, and were female, with an illness duration of less than 5 years and with more than half having no formal or primary level education. The healthcare provider participants were mostly female and had work experiences ranging from 2 years to 20 years and had an entry-level professional degree except for the medical doctors as illustrated in Table 2.

initiation of insulin. The main influencing factors that have been implicated in the delayed initiation of insulin were related to the patients, physicians and the healthcare institution as presented below.

Thematic areas

The study findings indicated issues related to timely

Table 1: Profiles of the patient participants with delayed initiation of insulin interviewed at the diabetes clinic of TASH, Addis Ababa, Ethiopia, 2017. (N=15)

Socio-demographic and other patient characteristics	Number
Age	
30-40	3
41-50	6
51-60	3
Above 60	3
Gender	
Male	5
Female	10
Religion	
Orthodox Christian	13
Muslim	2
Educational level	
No formal education (can't write or read/ can read and write)	4
Primary level education (1-8 th grade)	4
Secondary level education (9-12 th grade)	4
Diploma/Certificate	3
Type of Job	
Housewife	8
Pensioner	1
Guard	2
Merchant	3
Company Driver	1
Duration of Illness	
< 5 years	5
5-10 years	4
10-15 years	2
>15 years	4
Initiated Insulin	
Yes	6
No	9
Source of payment for medication	
Self-Paying	9
Government- Paying	6

Patient factors

Perceived adherence problems to prescribed insulin therapy: Patients who already had adherence problem to the prescribed OAMs due to religious or stressful conditions think the same will happen with insulin. Thus, patients want to stick with OAMs with perceived better adherence. This finding is illustrated by the following quote:

I also think I have adherence problem and I don't think taking insulin will make any difference taking my lifestyle into consideration. I would be happy if I can see it with oral medications of more doses. Patient, Female, 41 years

Table 2: Profiles of the healthcare providers interviewed at the Diabetes Clinic of TASH, Addis Ababa, Ethiopia, 2017. (N=12)

Sociodemographic and background profiles	Number
Sex	
Male	5
Female	7
Year of practice at the diabetes clinic	
< 5 years	7
5-10 years	4
>10 years	1
Type of profession	
Physician	7
Nurse	3
Pharmacist	2
Academic qualification	
Doctor of Medicine/ Bachelor's Degree	7
Internal Medicine Specialty (CSIM)	2
Endocrinology Sub-specialty certificate	3

Beliefs about the necessity of insulin

Patients believe that OAMs and insulin are the same about efficacy except that insulin requires complicated monitoring and management.

I have one question though. Does taking insulin really change the blood glucose level better than the oral medications? I am taking the tablets and I think I am not sick, and I do not think I need to be shifted to insulin if I am walking healthy.

Patient, F, 41 yrs. Old

Patients also lack awareness of the natural course of the disease where they believe insulin is prescribed when the disease reaches advanced levels. However, the present study has observed beliefs towards the necessity of insulin increased in patients who already started insulin. In fact, they promote timely initiation of insulin therapy as prescribed.

I found insulin to be a good medicine now [...] I advise others to start insulin as soon as they are told. If I started insulin the day I was told, I wouldn't have faced such problem with my kidney [I am having kidney problem due to the diabetes]. Patient, F, 41 yrs. Old

Concerns related to starting insulin

Fear of side effects and complications: The Fear of side effects like hypoglycemia and weight gain were reported to be among the reasons for patients resisting insulin treatment. Patients also think that insulin results in complications and is thus, lethal. Patients usually perceive complications as part of taking the insulin but not part of the disease process.

I know of a patient who died because of infection that occurred from insulin at the injection sites. I still have a concern of infection and then death. Patient, F, 41 yrs. Old

Fear of injections

Patients' past exposure to injections and having undergone some form of blood extraction at regular levels resulted in a fear of injections.

I have a fear of needle. I even have a fear to take dust out of my eye or take a splinter out from my hands leave alone to inject myself with needle.

Patient, F, 41 yrs. Old

Poor socioeconomic conditions

Self-paying patients who must buy the medication out of pocket cannot afford to buy insulin and patients think that shifting to insulin will incur other additional costs.

Insulin is expensive. It depends on the brand you are buying. For example, the oral medication cost them a maximum of 60 birr when they take 2 tablet 2 times a day but when we come to insulin taking the average usage of 50 unit per day, they need 2 vials which is around 112 birr. It is more than this since we only considered with the average usage. Pharmacist, F

To enroll into the free government medical service, a patient is required to obtain a letter from the local administration (*Kebele/Woreda*) every four months or every year indicating that they are unable to pay for their medication. Given the bureaucracy and time required to process these letters, many find it difficult to obtain these letters at the required intervals.

The hospital requires letter from Kebele every month and I could not renew my ID for a free service at Tikur Anbessa Hospital and that is my problem not to start insulin. You don't always go to Kebele begging that you cannot afford, and it is difficult. I cannot afford the oral medicines and it is going to be more expensive with insulin. Patient, F, 48 yrs. old

Perceived difficulty in insulin administration and loss of independence/reliance on others

Older patients with visual impairments and/or those patients who cannot read or write had trouble in self-administration of the drug at home. Some of the patients who did not begin their treatments during the study period, did not have anyone available at home who could assist with administering the insulin injections.

But it would be impossible for me to take it with the prescribed dose [...] what if I take it with the wrong dose than the prescribed one and that might kill me...That is my problem. I am illiterate and can't read or write well..... Patient, F, 70 yrs. old

Even, some of them are frail to inject themselves even though they can read and write. I remember from my experience where patients in the same neighborhood were injecting each other with only the same dose that one patient was prescribed with. Nurse, F

Few patients also mentioned a lack of trust, where same patients who are dependent on their caregivers for administration considered insulin to be an inconvenience in the future if caregiver support were to become diminished or compromised due to different changes.

I don't trust myself with anyone [...] you can't trust anyone; I should prepare and do it myself, but my eye sights are getting weak. For example: this girl is a student, and it might get late until she comes home and inject me. Patient, F, 68 yrs. Old

Not amenable to religious healing (e.g. holy water use) and practices (e.g. fasting)

Patients put down "holy water" as an alternative means to lower their glucose levels instead of shifting to insulin therapy.

I said to the doctor "I need some time". I am trying to lower the blood glucose level with "holy water". I believe it is better to lower it down with this instead of going to insulin. Patient, F, 50 yrs. Old

In addition, the interference of shifting to insulin therapy with the fasting season was also a concern among patients who had Orthodox Christian beliefs. Patients were informed that insulin requires having proper meals and they do not think that they can avoid the fasting period; they were overwhelmed with various religious practices. This is more evident among older patients who observe various religious practices and ceremonies daily. This was reflected as follows.

I do not take my medication regularly. I go to church early in the morning and attend "mass" services. The "mass" ends around 9 am and the medicine should be taken by then.

So, this is one problem for me which will be worse if I start insulin. Patient, F, 68 yrs. Old

Similarly, one patient explained that fasting decreases the blood glucose levels and thus, prefer it instead of following a proper meal and uninterrupted medication schedule.

I am fasting even; the fasting decreases the glucose level, and it is good. Patient, F, 70 yrs. Old

One of the patients also reported the belief regarding mixing religious practices, such as drinking or bathing with holy water and performing "Holy Communion", with OAMs, which she believed did not agree with their religious beliefs. And they thought the same would happen with insulin therapy.

Religious leaders insist that we should take our medicines properly even if we are taking "holy water" or doing the "Holy Communion" procedure. But I believe it is not right. It is my belief that restricts me from taking the medicines during those procedures. I don't want to mix the medicine with the body and blood of Christ. What happens if I start insulin? Patient, F, 68 yrs. Old

Social factors

One aspect is the fear associated with the stigma of using insulin when out and about, patients have a fear of being stigmatized due to their use of the drug. In addition, patients may be busy with social engagements like weddings, funerals, "Idir" (a traditional social institution to support each other in times of need, in most cases funerals), and "Iqub" (traditional saving institution). Some patients reported that insulin requires refrigeration and is not convenient to carry when moving from place to place during these occasions.

It even gets late when taking the tablet, I don't follow it properly. I might have to go somewhere early in the morning [friend's house or relative or some things I wish to accomplish]. So, I take the meal and then the medicine sequentially at once thinking that it might get late by the time, I get home. That is because of my tight schedule, and it will be worse with insulin. Insulin needs refrigeration to carry it with me and I am not expected to take it with the meal at once, right? I need to wait some minute. So, it will be difficult. Patient, F, 41 yrs. Old

Similarly, entertaining guests was found to keep patients busy. They believe that insulin takes time to inject, and it is against the norm and culture to leave the guest unattended.

I may have a wedding, a funeral, or a guest might come to my place unexpectedly. Some might come to

my house to seek for advice. In such cases, I cannot interrupt my conversation to take insulin since it takes time. It is against our culture to get up from a conversation. So, I do not think I can do that for the sake of taking insulin. Patient, F, 68 yrs. Old

Perceived resistance to insulin

Resistance to the medication was another concern related to insulin therapy. It was believed that patients with diabetes would develop resistance to insulin just like the oral medications that have failed to help over time.

The main reason is that I had a fear thinking what if my body adapts to the insulin as well? It should not be stopped right? It means I am going to stop the medication if my body adapts to it and it will have no alternative medicine. That is my fear. What am I going to take after that? Patient, M, 60 yrs. old

Physician barriers

Perceived Patient's Situation: The fears that patients have in terms of the side effects associated with the use of insulin, create a reluctance among physicians to prescribe insulin for their patients. The physician fears that the patient will resist or go through unexpected events, such as hypoglycemia and weight gain or might not return to the clinic for follow ups if prescribed with insulin therapy. Some of the physicians also perceived that some of their patients may have memory problems or may not be able to read or write to initiate the treatment with them.

Lack of expertise and experience

Residents' lack expertise/lingering experience and are not comfortable or familiar with communication regarding the appropriate pattern of insulin initiation and titration for patients.

There might be limited knowledge/experience on the indications. There is also lack of experience on the target FPG numbers and insulin initiation. Physician, M

Lack of motivation and confidence

The lack of motivation and confidence among some residents (frontlines to diagnose and treat patients) who rotate frequently as part of their residency program and their avoidance of responsibility was found to be a factor that delayed the uptake of insulin.

To tell the truth, practically, residents are coming to diabetes clinic for short period of time as part of their rotation and they don't want to take the responsibility to initiate insulin therapy in this time. They just want to see and send the patient with the present medication he/she is taking. Physician, M

Lack of communication skill

Physicians mainly the residents lack communication skills that are required to interact with patients regarding the disease and the required medications. The communication in most cases follows a paternalistic approach where the physician dictates to the patient instead of taking time to gather information from the patients and then find the best possible way of advising the patient in terms of the best possible approach, based on the patients' needs and the medication that is available.

While initiating insulin therapy, I do a simple run down on the symptoms they will encounter and on how to treat the hypoglycemia. But the details are given by nurses. Physician, F

Some of the doctors take time to explain and some do not even listen to what you are complaining let alone explaining the situation.... the second ones just write your results, and he/she doesn't take your points into consideration. Personality of doctor's matters. The first doctor I have seen was so good to explain on initiation of insulin and titrate my dose and the second replaced physician was so fast that I couldn't catch her advice. Patient, F, 41 yrs. old

Physicians also fail to effectively communicate regarding the disease and the necessity or inevitable need of insulin. Furthermore, insulin is a prescription that is treated as a punishment for patients who are unable to manage their blood glucose levels.

The physician used to tell me that I should behave with oral medications and otherwise it will be changed to the injection. Maybe he wants me to behave and do things right, but he was trying to scare me with the injection thing at the same time. Patient, F, 38 yrs. Old

Health institution barriers

Absence of HbA1c test: The HbA1c test is not available at the hospital laboratory and the test, according to physicians who were interviewed, is not accessible and affordable to patients. This forces the physicians to only use the FPG results to make decisions pertaining to the initiation of insulin therapy. Physicians, thus, demand a series of records of results to decide on whether to shift to insulin therapy despite the present indications.

Lack of Continuity of Care

Meeting different physicians at different times and appointment dates, patients display a lack of trust and frustration regarding the rotation of residents who prescribe their insulin therapy.

Since I started my follow up here, I was being checked up by different doctors. And some of them are young

and I am sure they are taught well to do that and I have no problem with their knowledge. But we see different face of doctors each time we come for clinic visit and it is difficult.
Patient, F, 68 yrs. old

Absence of guidelines for diabetes management including insulin initiation

There were no national guidelines at the time and treatment guidelines and titration systems in use in the diabetes center were designed for developed countries, while the system operates in the context of a developing country in which the setup is different.

Lack of health educational resources

The absence of adequate teaching and learning materials prepared for the patient in the local language (Amharic and others) on the general concept of diabetes and insulin presents a problem.

In my follow up at this clinic thus far, I have never encountered a patient education material prepared in Amharic. I bought one prepared material today in years. And attention should be given to assist the patient. Patient, F, 38 yrs. Old

Inadequate staff for diabetes care and education

Nurses are required to have a regular health education system and counseling sessions regarding insulin at the diabetes clinic, but their low numbers resulted in irregular schedules at the clinic.

Nurses are leaving the clinic for further education or personal reasons. And there is shortage of nurses in our setting. Sometimes, we are only two nurses to fulfill the overall activities. It is tough. Nurse, F

Time barrier- High patient load and long appointment periods

Follow up appointments are prolonged in the diabetes clinic, which can extend up to six months due to high patient flow. Creating a difficulty in terms of patient follow ups and the timely prescription insulin therapy.

In my earlier year of experiences, the number of patients seen per day was 25 and now the number is high since they cannot shift to Menelik or Ras Desta Hospital as Tikur Anbessa is known to have better supply of medicines. Nurse, F

The appointment system is one factor. The physician has a fear of initiating insulin therapy thinking that it is impossible to see the patient in a short-day appointment and follow him accordingly. The system does not allow appointing the patient whenever you want and that is a challenge to the physician to start insulin. Physician, F

Discussion

The present study is the first to explore the factors influencing the delayed initiation of insulin among patients with type 2 diabetes in the Ethiopian setting. Findings revealed different factors related to patients, physicians, and the health institution. The main findings under patient factors included the fear of injections, clashes with religious practices, and perceived difficulty of insulin administration. Physician factors incorporated physician's inertia, where lack of clinical competency takes priority. Health institution factors included inadequate laboratory set ups and time barriers.

One of the main concerns mentioned was the effect of religious practices and beliefs with regards to insulin therapy, which was mentioned, in another study in Ethiopia which identified religious practices as barriers to anti-diabetic medication adherence (9). The involvement of religious leaders when tackling religious concerns will improve patient's adherence as displayed in the case of HIV/AIDS, where religious leaders endorsed and encouraged the use of anti-HIV medication to patients while safely practicing their religious believes (20).

Perceived difficulty in insulin administration and loss of independence/reliance on others was also a finding in the present study, which was consistent to what was documented by another qualitative study on healthcare providers (21), where low self-efficacy presented a problem for those who could not inject themselves or did not have someone to inject them. Thus, the involvement of family members or caregivers in the overall care of diabetes or the health education sessions might produce effective results.

A unique finding to the present study, however, was the perception that patients would develop a resistance to insulin, like with other oral medications. Considering these and other factors that have been discussed, the findings indicate the necessity of strengthening awareness programs for patients, as well as providing residents and physicians with more training in terms of communication and administration of insulin, so as to provide them with the necessary skills and experience to be able to help ease the patients transition into insulin injections from oral medications.. The present study also found that those patients who had already begun using insulin had a good perception regarding insulin.

The health education program at the diabetes clinic was found to be suboptimal where the low number of nurses was mentioned as the leading cause. One factor that could strengthen the education program would be by increasing the number of available programs. However, involving trained nurse educators would play an important role in the current setting as physicians usually refer patients to the nurses for instructions and assistance with administration after prescribing insulin. This was also reported in another study where trained nurse educators with experience in diabetes education assisted patients to overcome psychological insulin resistance, and thus, filled the gap (18,21). Moreover,

the nurses could work collaboratively with pharmacist to capitalize on the education regarding insulin therapy and to focus on continued diabetes treatment and care. The impact of health education whether given in groups or on a one-to-one basis is tremendous which was also stressed by another local study (9). But it is essential to take into consideration patients' religious and socio-economic backgrounds.

The lack of experience and motivation was a factor according to the current findings indicating the physician's inertia. This was reported in a systematic review(22) which indicated that about one-half (49%) of the respondents reported that physicians lack experience with types of insulin that are available. Hence, educating patients regarding disease progression would take too much time. Limited experience was a key problem attached to the residents who are mostly staying at the diabetes clinic for one month as reported from the present research. The study also found that they are not motivated to start patients on insulin therapy and the decision would be referred for other residents or endocrinologists as also described by another study(21). This in turn was mentioned as one factor, as residents were believed to have poor communication skills in the clinic.

Another physician factor was the type of communication, which was reported to be weak and unilateral, in most cases. Although the low educational level of some patients might not allow for proper interaction, low communication skills by residents and a high patient flow in the system was found to affect the communication between the providers and the patients. Though this was one case, the inherent low communication skill among the residents is something that needs to be strengthened during interaction with patients. The physician should develop such skills through designed communication skill trainings, seminars, and courses and create a habit of gathering information from the patient and providing information or preparing the patient regarding the course of treatment.

The problem of high patient flow and long appointment periods which affected the communication process between healthcare workers and patients was also a factor for research conducted in Cape Town, where a poorly managed appointment system and long waiting times because of excessive patient loads contributed to a lack of continuity of care and other problems (23). The diabetes clinic is operating under the teaching and referral hospital where plenty of patients are being referred and followed in the clinic by a referral system. Patients are primarily treated in this clinic as opposed to visiting other primary healthcare facilities or private hospitals. The reasons for this effect could be due to an uninterrupted supply of insulin in the current study setting, a lack of well organized health centers to titrate and manage patients with insulin, and also the low socioeconomic status of the patients who can only afford public medical services.

However, the hospital along with the relevant bodies should include efforts aimed at adjusting the referral

system by creating a path to refer well performing patients back to the health center where they are referred from. In addition, task shifting from physicians to trained nurse educators and/or pharmacists regarding dose titration might allow for room to strengthen the interaction between the patient and the physician.

Another major interaction between the institution and physician inertia, which might be unique to this study was the use of FPG instead of HbA1c, which is in contraindication to several guidelines including the ADA, which recommend using HbA1c (5). Thus, the physician's decision can be postponed and/or delayed since a series of FPG results are required from the patient. This is also magnified by the long patient appointment system, which relies on a single result of patient's measurement taken prior to the appointment dates. The physician might not be certain about a single result and send the patient home with another 3-6month appointment. Thus, it results in postponed decisions by the physician, which in turn, results in a delayed initiation of insulin. Thus, either there must be such guidelines within a local context, or the system should thrive to create a well-designed system that can be to use with available guidelines from developed countries.

Overall, the study indicated the relationship among various factors, which indicated a combined intervention which is required from the perspectives of patient, physician, and health care institutions to tackle the current study problem.

Strengths and limitations

This study is the first of its kind in the country and used different measures to enhance trustworthiness such as member checking, participant triangulation, the use of an audio recorder and detailed field notes among others. However, there could be different issues that may affect trustworthiness. One of these is the transferability issue as findings may be limited to public, tertiary settings and not to primary healthcare settings or private institutions. Furthermore, the authors were health professionals from different disciplines which is considered as a strength in terms of researcher triangulation. This fact may have resulted in a form of bias in terms of design and implementation of the biomedical aspects of the research, with limitations towards the patients' perspectives. However, the first author as well as the coauthors were conscious about their biomedical backgrounds from the outset and tried to minimize such biases through researcher reflexivity.

Conclusion

The present study found different influencing factors that were related to the delayed initiation of insulin among patients with type 2 diabetes mellitus. These factors were related to patients, physician, and the healthcare institution. Although most of the findings share a similarity to other settings, some of the findings like the religious and social factors, perceived difficulty of insulin administration, and perceived insulin resistance were found to be distinctive to the current study setting. Similarly, factors from the physician and healthcare institution were similar to

other studies but lack of communication skills among the healthcare providers, inadequate laboratory set ups with the absence of HbA1c, the absence of national guidelines for diabetic management, low number of nurses and long appointment periods were found to be relatively unique and important findings of the current study. The impact of the health education programs either in group or on one-to-one counseling sessions, which can be used to address most of the problems arising from the patient is important and should be tailored to the socio-cultural and religious backgrounds of the society.

Abbreviations:

FPG: Fasting Plasma Glucose; OAM: Oral Anti-diabetic Medications; TASH: Tikur Anbessa Specialized Hospital; T2DM: Type 2 Diabetes Mellitus

Competing interest

The authors declare that they have no competing interest

Author's contribution

ER, BMH, and TGF were involved in the conceptualization and the design of the study. ER carried out the interviews. ER and BMH were involved in the analysis of the interviews with TK and TGF commenting on their analysis. ER drafted the manuscript and all the others revised it. All authors read and approved the final manuscript.

References

- International Diabetes Federation. Diabetes Atlas, Brussels, Karkas Print 2021 https://diabetesatlas.org/idfawp/resource-files/2021/07/IDF_Atlas_10th_Edition_2021.pdf. Accessed on 11/05/2021
- Abebe SM, Berhane Y, Worku A, & Assefa A. Diabetes mellitus in North West Ethiopia: a community based study. *BMC Public Health*. 2014; 14:97
- Gizaw M, Harries DA, Ade S, Smith TA, Ali E, Firdu N, & Yifter H. Diabetes Mellitus In Addis Ababa, Ethiopia: Admissions, complications and outcomes in a large Referral Hospital. *Public Health Action*. 2015; 5: 74-78
- Owens RD. Clinical Evidence for The Earlier Initiation Of Insulin Therapy In Type 2 Diabetes. *Diabetes Technology & Therapeutics*. 2013; 15:776-785.
- American Diabetes Association (2018). Classification and Diagnosis Of Diabetes. *Diabetes Care*. 2018; 41:1-144
- Lovre D. & Fonseca V. Benefits Of Timely Basal Insulin Control In Patients With Type 2 Diabetes. *Journal Of Diabetes And Its Complications*. 2015; 29:295–301.
- Nigatu T. Epidemiology, Complications And Management of Diabetes In Ethiopia: A Systematic Review. *Journal Of Diabetes*. 2012; 174-180.
- Feleke Y & Enquesselassie F. Cost of hospitalization of diabetic patients admitted at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. *Ethiop Med J*. 2007; 45:275 – 82
- Habte BM, Kebede T, Fenta TG, & Boon H. Ethiopian patients' perceptions of anti-diabetic medications: implications for diabetes education. *Journal of Pharmaceutical Policy and Practice*. 2017; 10:1-9
- Reshid E. Prevalence of delayed initiation of insulin and the associated factors among patients with type 2 diabetes mellitus. [dissertation on the internet] Addis Ababa University. 2017. [cited 2017, March]. Available from: <http://etd.aau.edu.et/handle/123456789/13076>
- Goodall G, Sarpong EM, Hayes C, & Valentine WJ. The consequences of delaying insulin initiation in UK type 2 diabetes patients failing oral hyperglycemic agents: a modeling study. *BMC Endocr Disord*. 2009 October; 9 (19) Available from: <https://doi.org/10.1186/1472-6823-9-19s>
- Doyle L, McCabe C, Keogh B, Brady A & McCann M. An overview of the qualitative descriptive design within nursing research. *J Res Nurs*. 2020;25:443–455.
- Khan H, Lasker SS, & Chowdhury TA. Prevalence and reasons for insulin refusal in Bangladeshi patients with poorly controlled Type 2 diabetes in East London. *Diabetes Medicine*. 2008; 25: 1108–1111
- Polonsky WH, Hajos TR, Dain MP, & Snoek FJ. Are Patients with Type 2 Diabetes Reluctant To Start Insulin Therapy? An Examination of the Scope and Underpinnings of Psychological Insulin Resistance in a Large, International Population. *Curr Med Res Opin*. 2011; 27(6):1169-1174.
- Tan WL, Asahar SF, & Harun LN. Insulin therapy refusal among type II diabetes mellitus patients in Kubang Pasu district, Kedah, Malaysia. *Singapore Med J*. 2015; 56: 224-227
- Braun V & Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology*. 2006; 3(2):77-101
- Tan AM, Muthusamy L, Ng CC, Phoon KY, Ow JH, & Tan NC. Initiation Of Insulin For Type 2 Diabetes Mellitus Patients: What Are The Issues? A Qualitative Study. *Singapore Med J*. 2011; 52:801-809.
- Ng CJ, Lai PSM, Lee YK, Azmi SA, & Teo CH. Barriers and facilitators to starting insulin in patients with type 2 diabetes: A systematic review. *International Journal of Clinical Practice*. 2015; 69(10):1050–1070. doi:10.1111/ijcp.12691
- Polosky WH, Fisher L, Guzman S, Caballero VL, & Edelman SV. Psychological Insulin Resistance in Patients With Type 2 Diabetes: The scope of the problem. *Diabetes Care*. 2005; 28:2543-2545
- Kloos H, Hailemariam D, Kaba M, & Tadele G. Traditional medicine and HIV/AIDS in Ethiopia: Herbal medicine and faith healing: A review. *Ethiopian Journal of Health Development*. 2013; 27:141–55

21. Lee KY, Lee YP, & Jenn C. A Qualitative Study On Healthcare Professionals' Perceived Barriers To Insulin Initiation In A Multi-Ethnic Population. *BMC Family Practice*. 2012; 13:1471-2296
22. Polinski JM, Smith BF, Curtis BH, Seeger JD, Chowdhury NK, Connolly GJ, & Shrank WH. Barriers to Insulin Progression Among Patients With Type 2 Diabetes: A Systematic Review. *The Diabetes Educator*. 2013; 39:53-65
23. Haque M, MFamMed, Navsa M, Emerson SH, Cheryl RD, & Levitt NS. Barriers to initiating insulin therapy in patients with type 2 diabetes mellitus in public-sector primary health care centers' in Cape Town, *Journal of Endocrinology, Metabolism and Diabetes of South Africa*. 2005; 10(3): 94-99, DOI: 10.1080/22201009.2005.10872127