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Barriers to Insulin Therapy among Family Medicine Doctors in Family Health Care Centers, Sudan

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Abstract

Background: Type 2 Diabetes (T2DM) is mainly characterized by insulin resistance and insulin is the ultimate treatment to lower the level of glucose in the blood. Over the years, insulin has been proven to effectively improve HbA1c. However, there are many barriers to initiation of insulin therapy; here we will discuss physicians' barriers.

Objective: To study barriers to insulin therapy among family medicine doctors in family health care centers in East Nile and Bahri localities, Sudan.

Materials and Methods: An observational cross-sectional primary health-care based study carried out between February 2019 and February 2020.

Results: The study included 63 participants, the majority was females. 28 (44.4%) strongly agreed that patients benefit from receiving insulin therapy prior to developing complications. 24 (38.1%) stated that insulin therapy should be delayed until necessary, 51 (81.0%) strongly agreed that proper education and training are important for successful initiation of insulin therapy in T2DM. Specialist and participants who attended a workshop or a conference referred patients less to endocrinologist to initiate insulin therapy (p=0.001), (p=0.008) respectively. They believe that patient would not comply with therapy was most frequent barrier for doctors to initiate insulin therapy regardless of job title or workshop/conference attendance (p=0.343), (p=760) respectively. From doctor perspective; patient's barriers to insulin therapy was fear of needles and injections, hypoglycemia, and that initiation of insulin indicates the progression of the disease (p=0.012).

Conclusion: The doctors genuinely had a mixed attitude regarding initiating insulin therapy. Common barriers included the belief that patients would not agree to take insulin because they fear injections, hypoglycemia, and the fact that it will be a long-life treatment.

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Introduction

Diabetes is a worldwide health problem. A recent report from the International Diabetes Federation states that incidence of diabetes is increasing and 415 million people have diabetes worldwide (8.8% of the adult population). Out of these, 193 million people have diabetes that is undiagnosed, which allows disease progression without treatment and formation of complications. In 2015, diabetes caused a morbidity of 11.6% of total global adult health and a mortality of 5 million. The number of people with diabetes is expected to increase to 642 million by 2040 [1]. In 2014, The Middle East and North Africa had the highest age-adjusted global prevalence of diabetes (about 11%) and the prevalence in Sudan was about 18% [1].

Type 2 diabetes is characterized by problems in both insulin secretion (due to a progressive reduction in beta cell functioning), and insulin resistance. This is made worse by obesity and sedentary lifestyle. Uncontrolled diabetes increases the risk of mortality and morbidity, through the risk of macro-vascular and micro-vascular complications [2,3,4]. In Sudan, several factors, such as modern dietary habits and changes in socio-economic status, have added to the increased prevalence of diabetes [5].

Although studies have shown that improving glycemic control, by enforcing lifestyle modifications and aggressive use of medications, will ultimately decrease micro-vascular and macrovascular complications and eventually mortality related to diabetes [6,7]. But, beta cells of the pancreas will no longer respond to oral hypoglycemic agents to control hyperglycaemia and achieve HbA1c targets [8]. This gradual loss in beta cell function indicates that exogenous insulin therapy is

ultimately required to treat diabetic patients [9].

A consensus statement of the American Diabetes Association (ADA) and the European Association in for the Study of DM stated that insulin is the most effective glucose-lowering agent and insulin replacement therapy as a key component of effective diabetes management over the course of the disease [10]. Effective insulin therapy includes four critical accomplishments: Initiation, adherence, persistence and intensification [11]. Unfortunately, there are failures at initiation of insulin therapy; some are related to patients and some to providers. Some of provider barriers may be related to beliefs about the medication itself; some physicians believe that insulin therapy may not be effective, may result in weight gain, increase the risk of hypoglycemia and have other side effects [12]. Physicians also may believe that insulin therapy is cover some and painful for patients and will result in patient dissatisfaction [13-15]. Some barriers may be a function of the provider's level of specialization and treatment experience [12,16].

Patients may be concerned about efficacy, safety and weight gain, in addition to, convenience, interference with daily life and the social stigma related to the disease [15,17-19]. Patients also have inaccurate beliefs about insulin treatment, one, the idea that insulin can result in diabetes complications and is an indication of end-stage of the disease and even death. Some patients feel guilty that they have failed to take good care of themselves and insulin is a punishment for them [12]. Other barriers include un-affordability and un-affordability of insulin [20].

The quality of diabetes care in the primary care clinics is doctor-dependent as they are the only care providers [21,22]. However, the quality of care in the public sector is different, better service is found in the urban health clinics and university-based primary care clinics due to the presence of family medicine specialists and multidisciplinary diabetes teams [21].

Literature Review

Type 2 diabetes is characterized by progressive deficiency in insulin secretion and insulin resistance. Ultimately insulin is the only drug of choice at the end of the road [8].

The postprandial hyperglycemia seen in patients with T2DM is a decrease in the peripheral re-uptake of glucose. In response to food intake, insulin levels increase in normal individuals as well as those with T2DM, peripheral uptake of glucose occurs; however, in patients with T2DM this is markedly reduced. As well as less shunting of glucose into the tricarboxylic acid cycle, and less storage of glycogen [23,24].

The UK Prospective Diabetes Study (UKPDS) is a landmark randomized, multicentre trial that followed up 5,102 patients with newly diagnosed type 2 diabetes, for over 20 years, and studied their medication and incidence of complications. It included 23 UK clinical posts and showed that the complications of type 2 diabetes could be reduced by improving blood glucose and/or blood pressure control. Reducing HbA1c by approximately 1% over median 10 years, with sulphonylurea or insulin, reduced the risk of "any diabetes-related endpoint" by 12% and microvascular disease by 25%, with a 16% reduced risk of myocardial infarction (P=0.052). Post-UGDP (University Group Diabetes Program) noted that sulphonylurea or insulin therapies might be harmful, but no increase was observed with these agents in the incidence of cardiovascular deaths, myocardial infarction or sudden death. Quality of life was not impaired but there was increased risk of hypoglycemia and weight gain [25].

Studies Done

A review by Peyrot et al. [12], from 13 countries in Asia, Australia, Europe, and North America examined the correlates of patient and physician attitudes toward insulin treatment. Data are from surveys of patients with type 2 diabetes not taking insulin (n=2,061) and diabetes care providers (nurses = 1,109; physicians = 2,681) stated that patient and doctor attitudes were different among countries, controlling for individual factors. Patients consider the efficacy of insulin as low and blame themselves if they had to start insulin therapy. However, those who adhere to diet and exercise have less self blame. Patients who are not managing their diabetes well are significantly more likely to see insulin therapy as potentially beneficial. Most nurses and general practitioners (50% to 55%) tend to delay insulin therapy and are reluctant to start insulin until very late stages, but specialists and expert opinion leaders tend to start insulin earlier. Delay of insulin therapy is not likely when physicians and nurses see their patients as accepting the concept of insulin. Those are patients who are adherent to medication and clinic visits [26].

A study from Cape Town carried out in 2005 by Haque et al. [27], included 46 medical officers from primary care centers. Ten individual interviews were conducted with the physicians as well as focused group discussions. It was found that doctors' barriers were lack of knowledge about insulin initiation, less experience with and use of guidelines related to insulin therapy, language and time barriers between doctor and patients, and fear of hypoglycemia. On the other hand, patient barriers were mistaken ideas about insulin, non- compliance, ignorance about diabetes, use of traditional herbs, fear of injections, and poor socioeconomic conditions. System barriers were inadequate patient-doctor time, lack of regular care and follow up in addition to un-affordability of insulin [27].

A literature search by Caballero AE in 2006 was conducted for publications related to Hispanic Americans, Latino individuals, Type 2 diabetes and insulin therapy by using PubMed/National Center for Biotechnology Information. It was found that physician challenges associated with addressing the negative perceptions about insulin therapy are further compounded by cultural and language barriers often encountered when treating Latino patients. Increased cultural awareness and competence among healthcare providers and increased use of Spanish-speaking diabetes educators seem to improve diabetes outcomes among Latino patients making use of this information can be very helpful because Sudan is a big country with people from different backgrounds, cultures and races [28].

A British study by Phillips in 2006 looked into the experience of diabetes nurse specialists when they converted patients with type 2 diabetes to insulin therapy as observed from the interviews conducted. The process of converting patients to insulin therapy was not different between nurses. There was little variation between practitioners in the procedure of converting patients to insulin therapy. This procedure forms an important part of a diabetes nurse's workload. The nurses adapted their approach to individual patients depending on their needs although some common themes emerged during the interviews [29].

In 2007, Nakar et al. from Israel analyzed 157 family physicians and 101 patients who completed a questionnaire regarding barriers to insulin treatment and answered an open-ended question about

the criteria for starting insulin. They observed that in comparison between barriers of study group patients and perspectives of the control group patients, the study group patients considered their illness as not very serious (46.7% *vs.* 7%, P<0.0001), feared addiction to insulin (39% *vs.* 20.8%, P<0.01) and feared hypoglycemia (12% *vs.* 4%, P=0.05), and perceived the quality of their treatment worse (P<0.001). Pain associated with injection and blood tests were not an issue to them. Of the physicians only 44.3% specified two criteria or more for initiating treatment with insulin. Physicians' main barriers for starting insulin were patients' compliance (92.3%), fear of hypoglycemia (79.9%), coping with pain associated with blood tests (53.9%), and pain associated with injections (47.4%) [30].

A study from United States of America (USA) by Hayes RP et al. [31], included primary care physicians (n=505, mean age = 46 years, 81% male, 62% with >10 years practice; 52% internal medicine) and showed increased consensus on attitudes regarding risk/benefits of insulin therapy, positive experiences of patients on insulin and patient fears or concerns about initiating insulin. Remarkable disagreement was seen in thoughts about the metabolic effects of insulin, need for insulin, and efficiency of self-monitoring blood glucose, training and occurrence of hypoglycemia in elderly patients [31].

In 2009 Kunt T and Snoek FJ carried out a review that stated that many patients with diabetes failed to achieve adequate glycemic control because of inappropriate use of insulin. Patients and health care professionals face many potential barriers to insulin initiation and intensification in primary care. These can be categorized as due to lack of motivation and familiarity or experience as well as time and affordability constraints [32].

In a study carried out in Hyderabad, India by Hayat AS and NailaSwith [33], six focus-group discussions and twelve individual interviews were conducted with 541 medical officers serving at 67 primary health care centers. It was observed that patient's barriers included mistaken beliefs about insulin, fear of injections, belief in traditional healers and using herbs, non-compliance to medications, lack of knowledge of the disease and its progression, poor socio-economic conditions and age of the patients. Doctor's barriers include lack of knowledge about insulin, unawareness of practical guidelines for insulin therapy, language barriers between doctors and patients and fear of hypoglycemia and obesity. System's barriers were excessive workload, short consultation time, lack of continuity of care and financial constraints [33].

From studies that also explored the perception of patients, a study from USA by Karter et al. [34], conducted among type 2 diabetes patients with poor diabetes control where participants failed to start prescribed insulin because of misconceptions regarding insulin risk. Thirty-five percent (35%) believed that insulin causes complications and problems such as blindness, renal failure, amputations, heart attacks, strokes, or even early death, plans to work hard on behavioral attitude, improve sense of personal failure, low self-efficacy, injection phobia, concerns of hypoglycemia and the negative impact on social life and job, literacy, health care provider inadequately explaining risks/benefits, and limited insulin self-management training [34].

Again, a systematic review by Lee et al. [35] identified the barriers and facilitators to start insulin in patients with type 2 diabetes where 9,740 references were included; they categorized three main factors: Patient-related factors, healthcare professional and system factors. The main patient related barriers were fear of pain and injection (n=18), concerns about side effects of insulin (n=12), perception that insulin indicated end stage of diabetes (n=11), inconvenience (n=10), difficulty in insulin administration (n=7), punishment and self-blame (n=7) and stigma and discrimination (n=7). Healthcare professionals' barriers were as follows: poor knowledge and skills (n=9), physician inertia (n=5) and language barriers (n=4). System barriers included lack of time (n=5). The most common facilitators were understanding the benefits of insulin (n=7), not being afraid of injections (n=5), and patient education and information (n=5) [26].

Lakkis et al. [36], carried out a cross sectional research in 2013, where 348 family physicians were invited *via* email to fill an anonymous online questionnaire about their attitudes, beliefs and perceived barriers regarding insulin initiation in patients with T2DM from various Middle Eastern Arab countries, 122 physicians completed the questionnaire. Of them, 73.6% preferred to hold insulin therapy till a later stage and 59.0% initiated it themselves. The majority agreed that T2DM patients benefit from insulin before complications arise (85.7%) and patient education is of upmost importance (99.1%) and uncomplicated (74.7%). Sixty three per cent expressed reluctance to start insulin mostly because of perceived patients' reluctance. Referral to endocrinologists to initiate insulin therapy was associated with inadequate experience and concern about risks, particularly in elderly patients (backward logistic regression, P<0.05). Physicians' reluctance to initiate insulin therapy was associated with patients' perception of insulin initiation as a personal failure and threat to the quality of life (backward logistic regression, P<0.05) [36].

In 2016 a two-phases observational descriptive study from Spain by Escalada et al. [37], comparing between GPs, internal medicine specialists, and endocrinologists observed that in poorly controlled patients, 46% of GPs *vs.* 43.2% of internists and 31.3% of endocrinologists waited 3 to 6 months before starting insulin, and 71.4% of GPs *vs.* 66.7% of internists *vs.* 58.8% of endocrinologists need to confirm twice the HbA1c levels. The upper level of basal glucose more frequently considered as good control is 130 mg/dL for GPs (35.7%) and 120 mg/dL for internists (35.8%) and endocrinologists (37.5%). In patients without comorbidities, 32.5% of endocrinologists *vs.* 27.2% of internists *vs.* 17.9% of GPs initiated insulin when HbA1c was >7% while 26.3% of endocrinologists *vs.* 28.4% of internists *vs.* 38.4% of GPs initiated insulin when HbA1c was >8%. The interference of the therapy with the patient' social life and the need for time management were the most accepted barriers to initiate insulin [37].

Another systematic review by Chenoweth I in 2017 in which a total of 19 studies were reviewed. They looked into the perceptions of primary care physicians about the barriers to initiate insulin therapy for type 2 diabetes patients, how primary care physicians assess patients prior to initiating insulin, professional roles and possible solutions to overcome these barriers. The barriers described were many and covered doctor, patient, system and technological aspects [38].

In one study by Taylor Jr et al. [39], in 2017 in Barbados in which the patients' perspective was explored with a representative, population-based, sample of 175 eligible people with T2DM 25 years of age and over was surveyed by telephone. 117 people participated (67% response rate, 32% male, mean age 66 years, 90% Black, 22% on insulin). Of non-responders, 52 were not contactable and 6 were difficult to communicate with negative perceptions about insulin use included meant a worsening of diabetes (68%), would worry

family (63%), feared self-injection (58%), meant a failure in self-management (57%), injections were painful (54%), would be seen as being sicker (46%), increased hypoglycemia risk (38%), required effort (34%), causes weight gain (27%), causes a deterioration in health (14%), and would have to give up enjoyable activities (10%). Positive perceptions were helps good glycemic control (78%), would prevent complications (61%) and improves health (58%) [39].

In 2017 Alkhaifi et al. [40], carried out a qualitative study to explore the barriers of initiating insulin for patients with type II diabetes among general practitioners and family physicians in primary care settings in Oman. They observed that initiating insulin therapy was shown to be affected by the above mentioned factors. Physician factors which included physician knowledge, beliefs, fears and concerns. Patient factor included patient education, compliance and socio-economic status. System factors included short patient-doctor exposure time and lack of assisting resources [40].

Objectives

To study barriers to insulin therapy among family medicine doctors in family health centers in East Nile and Bahri localities, Sudan 2019.

Many patients with DM come to the health care center with uncontrolled HbA1C, and complications of diabetes. This could be due to under treatment on non- compliance with medication or delayed initiation of insulin therapy. There are number of physician barriers to early initiation of insulin therapy, we would like to identify them and address them appropriately to help the DM population to better control their blood glucose.

Materials and Methods

Study design: A cross-sectional health center based study.

Study area: This study was conducted in family health care centers, this study included family medicine doctors from East Nile and Bahri localities family health care centers.

Study period: This study was conducted between February 2019 and February 2020.

Study population: Family medicine doctors working in East Nile and Bahri localities family health care centers.

Inclusion criteria: Family medicine doctor (Registrar, specialist or consultant)

Sampling and sampling technique: According to the ministry of health there are approximately (75) family medicine doctors working at the study area at the time of data collection. Using the modified Cochran Formula for small populations sample calculation:

n= n0/1+ ((n0-1)/N) Where n0 = Recommended Sample size (384) and N = Population. n0=384/(1+ (384-1/75) = 62.9=63.

Using random sampling, where the first doctors encountered were asked to participate. This method was chosen because of the approximate number between the sample size and population.

Data collection methods and tools: The data was collected during the study period from the study centers, the data collection started immediately after the approval was obtained. Data was collected through a semi-structured, self-administrated, pre-tested structure questionnaire that was based on previous studies, then was modified to meet the objectives of this research [14,26,28].

The researcher visited the health centers and asked the doctors to participate by filling the questionnaire during their rest time, the researcher was present while the participants filled the questionnaire and explained and answered all inquiries and questions.

Study variables:

Dependent variable:

- Insulin therapy in type 2 diabetes mellitus patients

Independent variables

- Gender (recorded as male or female).
- Job (recorded as registrar, specialist, consultant)
- Attitude
- Practice
- Perceived barriers of doctor regarding initiating of insulin therapy
- Perceived barriers of patient from doctor view regarding initiating of insulin therapy

Data analysis: The data entry and statistical analysis was carried out by a statistician using the Statistical Package for Social Sciences (SPSS) version 26.0, SPSS Inc. Chicago, IL.

Statistical significance test: The frequency distributions for independent variable and dependent variable were generated. The chi-square test was used for comparisons of proportions in two groups. A P-value <0.05 was considered as indication of statistical significance, were the level confidence was 95%.

Ethical consideration: All participants were informed about their right to refuse to participate. The confidentiality of the participants was established by coding of the questionnaire and the data list. Ethical clearance was obtained from the SMSB/EDC ethical review board and approval from the centers where the study was conducted.

Informed consent: The protocol, aims and benefits of the study were explained for all the participants in the study, and a written voluntary informed consent was obtained from each.

Results

Table 1 shows the demographic data, the study included 63 participants; the females (were more than males (23.8%). Their ages ranged from 26 to 44 years old, the mean ± Standard deviation was 35.56 ± 3.33 years old, the registrars were (87.3%) and specialists (12.7%), most participants had between 2 to 5 years of experience (80.9%). Figure 1 shows that 54 (85.7%) of the participants had attended a workshop or a conference for diabetes management that included insulin treatment in type 2 diabetic patients and 9 (14.3%) had not attend.

Figure 2 shows that 8 (12.7%) thought that insulin therapy should be delayed until actually needed in type 2 diabetes patients (after using combination of several classes of oral hypoglycemic agents at maximum doses), 24 (38.1%) agreed/stated, 3 (4.8%) had a neutral belief, 17 (27.0%) disagreed, and 11 (17.5%) strongly disagreed.

Figure 3 shows that of the participants 28 (44.4%) strongly agreed that type 2 diabetes patients benefit from insulin therapy even before developing complications, 26 (41.3%) agreed and 3 (4.8%) were neutral.

Table 1: Distribution of demographic data.

Variable	n (%)
Gender	
Male	15 (23.8)
Female	48 (76.2)
Age	
20-30 years old	3 (4.8)
31-40 years old	57 (90.5)
Older than 40 years old	3 (4.8)
Job Title	
Registrar	55 (87.3)
Specialist	8 (12.7)
Years of experience after start of family medicine training	
Less than 2 years	4 (6.4)
2-5 years	51 (80.9)
More than 5 years	8 (12.7)

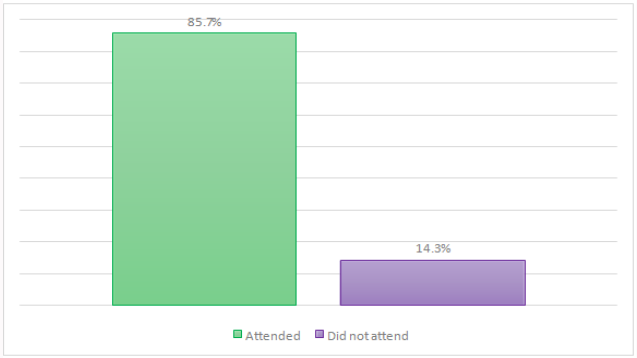

Figure 1: Distribution of attendance of a workshop or a conference for diabetes management.

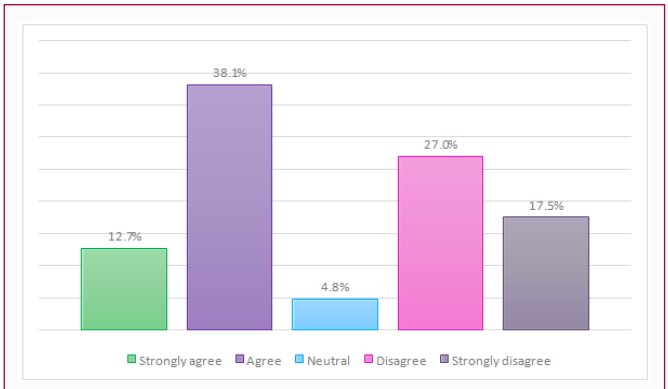

Figure 2: Delaying insulin therapy until absolutely necessary.

Figure 4 shows that proper education and training are important for successful insulin therapy in type 2 diabetes patients. Of the participants 51 (81.0%) strongly agreed with this statement, 9 (14.3%) agreed, while only 3 (4.8%) had a neutral response.

Figure 5 shows that 18 (28.6%) of the participants never referred patients of type 2 diabetes to endocrinologist to initiate insulin therapy, 9 (14.3%) seldom did, 24 (38.1%) sometimes did, and 12 (19.0%) often did.

The Cross-tabulation of referring patients to endocrinologist

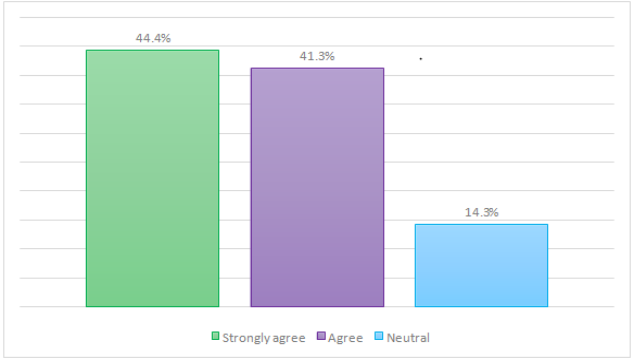

Figure 3: Patient benefit from receiving insulin therapy prior to developing complications.

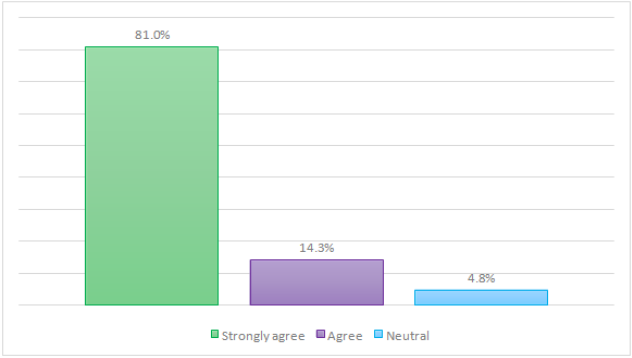

Figure 4: Proper education and training are the keys to successful initiation of insulin therapy.

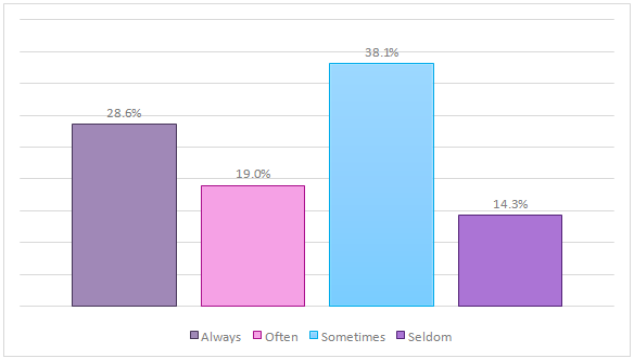

Figure 5: Referring patients to endocrinologist to initiate insulin therapy.

to initiate insulin therapy and job title did observed a statistical significance (p=0.001) as Table 2 shows that specialist referred less than registrars.

The Cross-tabulation of referring patients to endocrinologist to initiate insulin therapy and workshop or a conference attendance observed a statistical significance (p=0.008) as Table 3 shows that participants who attended a workshop or a conference were referred less.

Figure 6 shows that the participants who always follow the medical updates in insulin therapy were 27 (42.9%), 18 (28.6%) often did, 15 (23.8%) sometimes did, and 3 (4.8%) seldom did.

The Cross-tabulation of barriers for doctor to initiate insulin therapy and job title did not observe a statistical significance

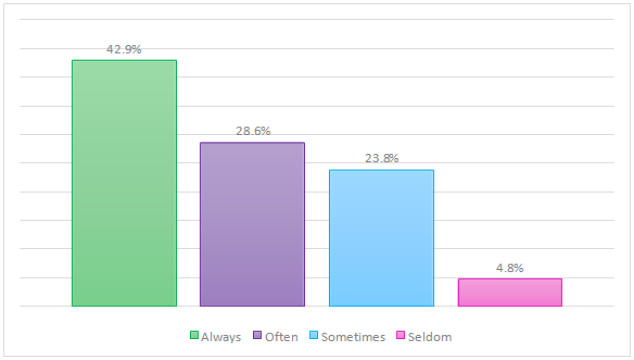

Figure 6: Following the medical updates in insulin therapy.

Table 2: Cross-tabulation of referring patients to endocrinologist to initiate insulin therapy and job title.

Doctor Barrier	Job Title	
	Registrar	Specialist
Never	15	3
Seldom	4	5
Sometimes	24	0
Often	12	0
Always	-	-

Table 3: Cross-tabulation of referring patients to endocrinologist to initiate insulin therapy and workshop/conference attendance.

Doctor Barrier	Workshop/Conference	
	Attended	Did not attend
Never	13	5
Seldom	9	0
Sometimes	24	0
Often	2	4
Always	-	-

Table 4: Cross-tabulation of barriers for doctor to initiate insulin therapy and job title.

Doctor Barrier	Job title	
	Registrar	Specialist
Knowledge to start therapy	6	0
Time for patient's education	5	0
Staff for patient's education and training	3	0
Risks associated with insulin therapy	6	0
Lack of equipped lab	4	1
Believe patients will not comply/ adhere	22	7
lack of experience with and use of guidelines related to insulin therapy	6	0
Other	3	0

(p=0.343) as Table 4 shows that most frequent barrier was and was the belief that patient would not comply with therapy.

Barriers for doctor to initiate insulin therapy and workshop or a conference attendance did not observe a statistical significance (p=0.760) as Table 5 shows that most frequent barrier was the belief that patients would not comply with therapy.

Barriers for patient to initiate insulin therapy and job title

Table 5: Cross-tabulation of barriers for doctor to initiate insulin therapy and workshop/conference attendance.

Doctor Barrier	Workshop/conference	
	Attended	Did not attend
Knowledge to start therapy	4	2
Time for patient's education	4	2
Staff for patient's education and training	3	0
Risks associated with insulin therapy	4	2
Lack of equipped lab	5	2
Believe patients will not comply/adhere	26	1
lack of experience with and use of guidelines related to insulin therapy	6	0
Other	2	0

Table 6: Cross-tabulation of barriers for patient to initiate insulin therapy and job title.

Patient barrier	Job title	
	Registrar	Specialist
Fear of the injections/Pain	22	0
Fear of hypoglycaemia	13	2
Fear of addiction to insulin	4	1
Fear of weight gain	3	0
The perception of the initiation of insulin as worsening of the disease	8	4
Socioeconomic status is barrier in most cases	5	1
prefer use of traditional herbs	-	-
The cost of insulin	-	-
Other	-	-

Table 7: Cross-tabulation of barriers for patient to initiate insulin therapy and workshop/conference attendance.

Patient Barrier	Workshop/conference	
	Attended	Did not attend
Fear of the injections/Pain	22	2
Fear of hypoglycaemia	12	2
Fear of addiction to insulin	3	2
Fear of weight gain	3	0
prefer use of traditional herbs	-	-
The perception of the initiation of insulin as worsening of the disease	8	3
Socioeconomic status is barrier in most cases	6	0
Other	-	-

observed a statistical significance (p=0.012) as Table 6 shows that most frequent barrier was fear of injection and hypoglycemia among registrars and the perception of the initiation of insulin as worsening of the disease by half of the specialists. Barriers for patient to initiate insulin therapy and workshop or a conference attendance observed a statistical significance (p=0.498) as Table 7 shows that most frequent barrier was fear of injection among those who attended a workshop and perception that insulin is a sign for worsening of disease among those who did not attend.

Discussion

This study explored the main barriers that influence delayed insulin initiation by family doctors and how they perceived patients' barriers.

Most doctors attended a workshop or a conference for diabetes management that included insulin treatment in type 2 diabetic patients strongly agreed that proper education and training are the vital to successful initiation of insulin therapy in type 2 diabetes patients. Despite this the doctors genuinely had a mixed attitude regarding initiating insulin therapy. They delayed insulin therapy as much as possible even though they agreed it is best to start early to prevent complications. Where majority of participants strongly agreed that patients benefit from receiving insulin therapy before they even to start to develop complications; however, some thought that insulin therapy should be delayed until absolutely necessary. This was seen in a number of studies that physician inertia was a common barrier despite their understanding the role of insulin and its importance [28,37].

In several studies the extent of physician knowledge and experience had an effect on initiation of insulin [28,31,33,38]. Lack of sufficient knowledge, minimal practice and unaware of guidelines prevented physicians from not initiating insulin. This is improved by attending workshops and conferences.

In a study by Lakkis et al. [39] 59.0% of participants initiated therapy themselves, and referral to endocrinologists to initiate insulin therapy was associated with inadequate experience and concern about risks [39], while in our study specialist and participants who attended a workshop or a conference referred patients less to endocrinologist to initiate insulin therapy. The belief that patients would not comply with therapy was most frequent barrier for doctors to initiate insulin therapy regardless of job title or workshop/conference attendance [34].

From doctor perspective; patient's barriers to insulin therapy was fear of injection and hypoglycemia among registrars, and the perception of the initiation of insulin as worsening of the disease by half of the specialists. Most frequent barrier was fear of injection among those who attended a workshop and perception that insulin is a sign for worsening of disease among those who did not attend (p=0.498), these barriers were agreed upon many times previously indicating that regardless of background and cultural differences the barriers to insulin therapy initiation are within a narrow perspective [12,14,28,30,31,33,35,36,38].

Therefore, it seems reasonable to assume that patient education regarding insulin therapy and how to handle insulin may change their insight into this treatment option and accept it.

With regards to doctor barrier the attendance of a workshop, conference or an educational lecture appear lacking, and there need to be emphasis on the practice of insulin therapy more.

- Emphasis for doctors including family medicine doctors to initiate insulin therapy early in T2DM patients.
- Workshops and conferences to directly address the perceived barriers and suggest their solutions.
- Involve diabetic educators, dieticians and diabetic nurses to be part of the managing team.
- Patient education through group teaching and media to correct false beliefs.

Conclusion

The doctors genuinely had a mixed attitude regarding initiating insulin therapy. They delayed insulin therapy as much as possible even though they agreed it is best to start early to prevent complications.

The belief that patient would not comply with therapy was the most frequent barrier for doctors to initiate insulin therapy regardless of job title or workshop/conference attendance.

From doctor perspective; patient's barriers to insulin therapy was fear of injection, hypoglycemia, and perceiving that the initiation of insulin was worsening of the disease.

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