

Assessment of patients' knowledge and attitudes towards self-insulin administration and skin manifestations in the regions of Aseer

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Abstract

Background: Diabetes Mellitus (DM) is one of the most widely prevalent diseases in Saudi Arabia. Health education is considered essential to improve knowledge and change behavior. People affected by diabetes often have inadequate knowledge about the nature of diabetes, its risk factors, and associated complications.

Methods: The study employed a cross sectional design and was conducted in Aseer, Saudi Arabia. We used a validated scale to measure the participants' knowledge. A sample of 182 patients was conveniently selected from primary health care centres.

Findings: Regarding the study participants' knowledge of diabetes mellitus, the results showed that 53.8% of patients are diagnosed with type I diabetes compared to 46.2% diagnosed with type II. Also, the study results revealed that 81.3% of patients have a positive family history of diabetes. Furthermore, 51.8% of patients have a controlled blood glucose level as evident by HbA1c being less than 7.

Conclusions: The injected insulin in the lipoatrophy area may lead to inappropriate absorption of the insulin and poor blood glucose level control with unpredictable hypoglycemia.

Keywords: Knowledge, attitude, insulin injection users, the skin manifestations, Saudi Arabia

Introduction

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia due to defects in insulin secretion, insulin action, or both. DM is classified into four classes; T1DM represents 10% of all cases and results from a cellular-mediated autoimmune destruction of the beta cells of the pancreas. They are insulin-dependent in this type of patient. T2DM represents >90% of all cases of diabetes and it is characterized by insulin resistance followed by reduced insulin secretion from beta cells. Patients of this type use oral hypoglycemic agents, and they mostly end up using insulin. Gestational diabetes is glucose intolerance with onset or diagnosis during pregnancy, and around 60% of women with GDM will develop T2DM in the ensuing 5–10 years. Other specific types of diabetes include those that result from genetic defects in insulin secretion or action (monogenic diabetes), endocrinopathies (e.g., Cushing syndrome, acromegaly), or drugs (corticosteroids, antiretrovirals, atypical antipsychotics) (1). Diabetes Mellitus (DM) is one of the most widely prevalent diseases in Saudi Arabia. Health education is considered essential to improve knowledge and change behavior. People affected by diabetes often have inadequate knowledge about the nature of diabetes, its risk factors, and associated complications (2). Skin lipodystrophy, its most prevalent (95%) form, is a frequent localized diabetes treatment complication, known since the beginning of insulin therapy. LHs are areas of thickened subcutaneous fat tissue confined to insulin injection sites in the form of painless induration, swelling, and nodules lacking an external capsule and steadily growing over time with repeated injections. They tend to shrink after patients stop using the area for injections after being taught correct administration techniques (3). To minimize DM morbidity and mortality by preventing or delaying complications, optimal glycemic management is essential (4). Only patients who adhere to self-management practices such as a nutritious diet, regular exercise, blood glucose monitoring, taking medicines as prescribed, the capacity to manage their diabetes, and good coping mechanisms may achieve optimal glycemic control. This study was to measure the knowledge level among diabetic patients about skin manifestations.

Materials and Methods

Research design

The study used cross section descriptive research design

Sample

The study employed a convenience sample of patients diagnosed with diabetes mellitus in Aseer region. A total of 182 patients diagnosed with diabetes were recruited in the period between April 2022 and June 2022. The sample size was calculated to detect correlation between variables with a medium effect size at 0.80 power, level of significance of 0.05 and p-value of 0.05 (Cohen, 1992). Inclusion criteria were, first, patients diagnosed with type I diabetes mellitus. Secondly, all participants should be able to read and write English or Arabic and be willing and able to consent. Patients were excluded if they had a learning disability, known organic mental disorder, or the presence of visual, language or communication difficulties.

Setting

The study was conducted at three outpatients' clinics operated by the MOH. These clinics were chosen because they serve the majority of patients diagnosed with diabetes and were easily accessed by the researcher.

Recruitment

Patients diagnosed with diabetes mellitus in Saudi Arabia typically visit outpatient clinics monthly. A poster was displayed in these clinics advertising the study and requesting volunteers. Interested participants received further information directly from a researcher. The study recruited acute or chronic patients being treated in these clinics when they attended for appointments. A study information package was given to each participant alongside a verbal explanation about the project. Sufficient time was afforded to each participant to read the study information. Participants were asked to return a signed consent form to the nursing department in the clinic. The researcher administered a study inclusion checklist to assess participants' eligibility. Ethical approval was obtained from the Scientific Research Committee of the MOH (Ref 157892).

Outcome Measures

Socio-demographic data

All participants completed a demographic information sheet, which included data on gender, age, education level, marital status, employment status, income, and BMI.

Participants knowledge about Diabetes Mellitus

The third part asked questions on the type of DM, BMI, and history of high cholesterol levels and their method of using insulin. The survey instrument was a self-administered anonymous questionnaire in Arabic. It contained questions regarding knowledge regarding insulin use and its side effects. This instrument has been employed previously among southern border people in Saudi Arabia. Data collection was done in the form of the participants' responses to the questions.

Results

A total of 182 patients completed the survey questionnaire. The results showed that half of the study participants were aged 34 or less. Moreover, more than half of the study participants were males. The results showed that 56.6% of patients are married, whilst 44.5% of them are single. In terms of economic status, the majority of the participants had medium or low economic status. The results also indicated that half of the study participants attained a secondary education level or less. Moreover, 65% of patients have a government job. Interestingly, more than half of patients had an average monthly income of less than 10,000 SAR. Almost all of the study participants (80%) reported being overweight, obese, or morbidly obese. However, 82.9% of study participants had dyslipidaemia. Table 1 presents the sociodemographic characteristics of the study participants.

Regarding the study participants' knowledge of diabetes mellitus, the results showed that 53.8% of patients are diagnosed with type I diabetes compared to 46.2% diagnosed with type II. The findings of the study indicated that 81.3% of patients have a positive family history of diabetes. Furthermore, 51.8% of patients have a controlled blood glucose level as evident by HbA1c being less than 7. The results of the study demonstrate that 55.4% of patients had a random blood glucose of less than 200 mg/dl, whilst 44.3% of patients had a blood glucose of 200 mg/dl or more. This is also reflected in the results of random blood sugar as 41.1% of patients had a random blood glucose level less than 125 mg/dl. 49.1% of patients believed that diabetes is treated by insulin injection, whilst 51.9% presented a contrasted view. 36.8% of patients had been using insulin for less than five years, while 63.2% had been using it for a long time. The most preferred site of insulin injection is the arm, as it is evident from their response of 47.8%, followed by the thigh at 31.8%, and the abdomen is the least preferred site. Likewise, the majority of patients use insulin more than once daily. 57.4% of patients mentioned that they used a mixed treatment approach to treat diabetic retinopathy. The results showed 71.4% of patients change needles frequently. 51.6% of patients keep a distance of two fingers between each injection. However, 70.9% of patients were not informed about the main complication of insulin injection, lipodystrophy.

Figure 1: Insulin injection-induced bruising in two subjects: in the abdominal wall on the left and on the arm in the right panel



Figure 2: Bruising at the injection site (a, b). Lateral view of an LH nodule coming together with bruising (c), best seen after magnification

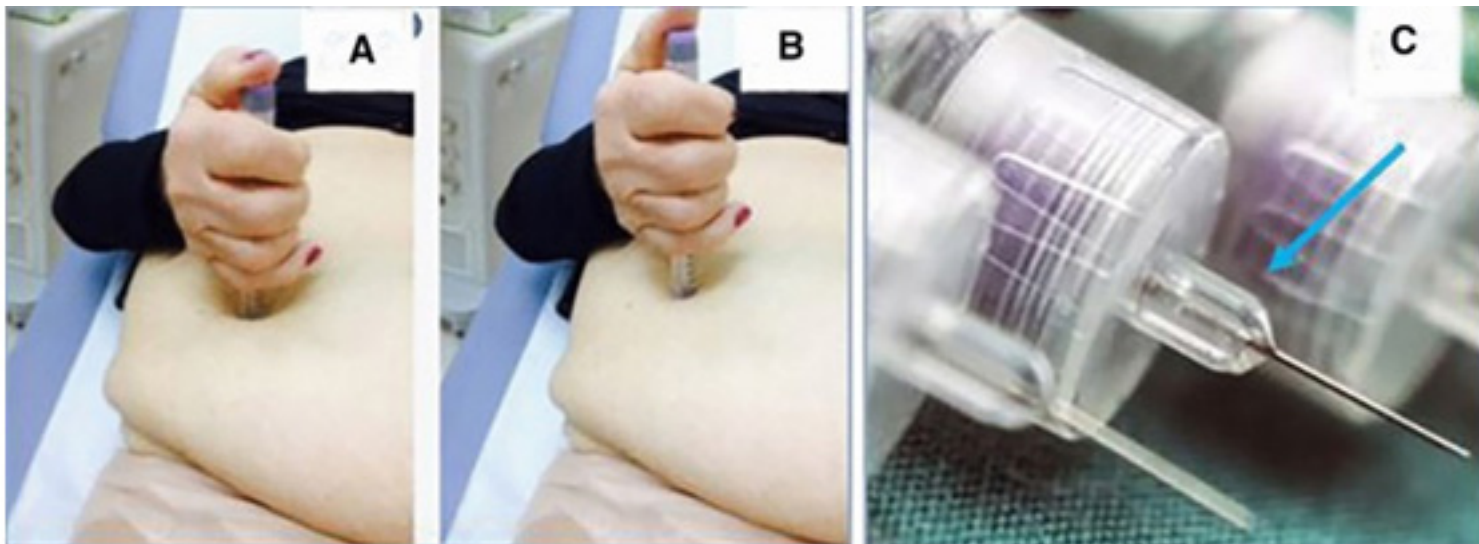


Table 1: Sociodemographic Characteristics of Participants (n = 182)

Characteristics	Frequency	Percentage
Age		
12-24	28	15.3%
25-34	70	38.4%
35-44	10	5.40%
45-54	27	14.8 %
>55	47	25.8%
Gender		
Male	108	59.3%
Female	74	40.7%
Marital Status		43.4%
Single	79	56.6%
Married	103	
Education level		
Primary	29	15.9%
Intermediate	19	10.4%
Secondary	45	24.7%
University	44	24.1%
Graduate	45	24.7%
Employment		
Governmental	120	65.9%
Private	28	15.3%
Military	21	11.5%
Students	6	3.2%
Others	7	3.8%
Income		
Less than 5000 SAR	52	28.5%
5000 -10,000 SAR	69	37.9%
10,000-20,000 SAR	49	26.9%
20,000 – 30,000 SAR	7	3.8%
>30,000 SAR	5	2.7%
Body Mass Index		
Less than Normal	28	15.3%
Ideal body weight	8	4.3%
Overweight	73	40.1%
Obesity	63	34.6%
Morbid obesity	10	5.4%
Do you have high lipid and cholesterol profile?	151	82.9%
Yes	31	17.1%
No		

Table 2: Study Participants Knowledge towards Diabetes

Subscale	Yes	No
Knowledge about diabetes		
What type of DM do you have?		
Type one	98	53.8%
Type two	84	46.2%
Is anyone in your family diagnosed with DM?		
Yes	148	81.3%
No	34	18.7%
HBA1c Level:		
4 – 5.6	7	3.8%
5.7 – 6.4	23	12.6%
6.5 – 7	65	35.7%
7 – 8	32	17.5%
8 – 9	27	14.8%
9 – 10	20	10.9%
+ 10	8	4.30%
Random blood sugar test		
Less than 140	26	14.2%
140 – 199	75	41.2%
200 – 300	57	31.3%
300 – 400	18	9.8%
More than 400	6	3.2%
Random blood sugar test		
Less than 140	9	4.9%
140 – 199	66	36.2%
200 – 300	37	20.3%
300 – 400	35	19.2%
More than 400	35	19.2%
Is the treatment for your DM Insulin?		
Yes	144	79.1%
No	38	20.9%
How many years have you used Insulin?		
Less than 5 years	67	36.8%
5 – 10 years	64	35.1%
more than 10 years	51	28.0%
Where is the Site of Insulin Injection?		
Arm	87	47.8%
Thigh	58	31.8%
Abdomen	37	20.3%
How many times do you need Insulin injection per day?		
1	18	9.8%
2	78	42.8%
3	64	35.1%
4	22	12.1%
Did you change the needle after injection?		
Yes	130	71.4%
No	52	28.6%
Do you inject in the same place frequently?		
Yes	100	71.4%
No	82	28.6%
Do you keep distance by two fingers between each injection?		
Yes	94	51.6%
No	88	48.4%
Have you heard about the Lipodystrophy and skin manifestations due to Insulin Injection?		
Yes	53	29.1%
No	129	70.9%

Discussion

First, insulin-delivery syringes were given to diabetic Mellitus (DM) patients in 1924. Since that time, disposable plastic syringes have replaced glass syringes as the primary delivery method for subcutaneous insulin, and insulin pumps have replaced insulin pens and needles. Drug delivery through pens for diverse insulin formulations is now possible due to their simplicity, convenience, and precision (1). Technology advancements made pens more precise and user-friendly about ten years ago, and shorter, sharper needles made injections simpler and more well-liked by patients (2).

182 patients from the Saudi Arabian province of Asser served as the subjects of our investigation. The majority of the study participants were Saudi Arabian, married, over 50, diabetic for longer than five years, and had been taking insulin injections for longer than five years. Most of them aren't properly informed about the risks associated with insulin injections. The majority of individuals experience discomfort and lipodystrophy (LD). Recommendation: By teaching optimal insulin injection techniques and disseminating written instructions, the Insulin Injection Techniques Education Program for Diabetics with Early Diabetes aims to raise patient understanding of insulin delivery and injection site care (press, leaflet).

Lipodystrophy (LD), a side effect of subcutaneous insulin that can manifest as PH, is a frequent complication. Even though the precise origin of PH is unknown, several local injection-related factors, including the extremely growth-promoting qualities of insulin, recurrent damage to the same place when patients do not alternate injections, and needle reuse, appear to be implicated (3). Instead, the immune response can be to blame for the lesions' scarring, which leads to atrophy of the subcutaneous adipose tissue (4). Standard methods call for ocular evaluation and palpation of the injection site to detect PH because some changes are easier to feel than to see. They are linked to all sizes of needles, probes, pens, syringes, and insulin pump cannulas, which are frequently positioned on the same area of skin (5). A large number of studies in the literature describes various rates of LD in various settings, including adult outpatients treated by general practitioners and other patients admitted to diabetes facilities, as well as children. The majority of them don't offer a lot of information on identification technology (6-8).

The Aseer area of Saudi Arabia was the subject of the first research of its sort on knowledge, attitudes, and skin complaints related to insulin injections. It was performed at a specialist medical facility, such as a diabetic department. The multivariate analysis supported our findings, which differed from other studies that discovered some variations between generalist and specialized observations. Another unique element of this study is the first clinical evaluation of skin bruises at the injection site [Figures 1 and 2].

Several studies report skin manifestations like bruises (4, 9, 10). Given the risks associated with insulin injections and the lack of a recognised treatment, this side effect is particularly concerning. Unfortunately, issues with injections have a detrimental influence on the overall amount of injections that diabetics are willing to get, which is unfortunate for both patients and medical personnel. In several trials, even though half of the patients said they had discussed these matters with their doctor, they still had pain and bruises as a result (11). Therefore, unpleasant injection site responses such as pain, redness, bleeding, and particularly bruising pose a significant obstacle to patient compliance with several daily injections. This is crucial in situations when doctors and/or healthcare workers lack the skills or expertise necessary to offer a specific service or where the doctor-patient relationship is poor (12).

An interesting interchange of patient experiences has started over the past few years through several networks, including the American Diabetes Association group. Patients can self-suggest appealing therapies on these noticeboards, including the careful rotation of injection sites, the use of thin, short needles, and the timing of injections. To further understand the reasons behind these injection challenges and discover evidence-based therapies to help patients adhere to their insulin medication, more thorough research is required. To uncover potential tactics to increase patients' knowledge, associated variables of their knowledge were found.

Patients who have never been married may be young people with comparatively higher educational status and likely high rates of type 1 DM who might benefit from further schooling. Employees of the government and non-governmental organizations are often educated individuals who may have greater access to information as well as superior comprehension. Similar to this, urban inhabitants and patients with at least a high school diploma or equivalent had more knowledge than their comparators by 2.25, 3.25, and 4.35 points, respectively. Research at the Hawasa Referral Hospital revealed a similar result. Patients who had at least finished their elementary school may have a larger likelihood of exposure to various communication aids including pamphlets, periodicals, and books, which might be the cause. Aside from their capacity to understand previously provided information, individuals may have minimal obstacles in interacting with the medical staff. It's interesting how many people abuse the insulin pen by not finishing the injection or by using their hands. Most frequently, they destroy the needle cone by pressing the pen too firmly on the skin. Our senior patients who have joint issues in their hands or who are anxious about injections experience this the most frequently. Case studies must be used to back up such anecdotal claims.

Limitations

While the observations noted are interesting, the study population is mainly from a single center and is not representative of the general population in Aseer region.

Conclusion

The injected insulin in the lipoatrophy area may lead to inappropriate absorption of the insulin, poor blood glucose level control with unpredictable hypoglycemia. Future studies should include large subjects, multiple centers, and regions to detect differences between groups.

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Ethical Approval

The study was approved by the Institutional Review Armed Forces Hospitals Southern Region (Research Project Code: AFHSRMREC/2022/MEDICINE/632).

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