Original Article

INSULIN SELF-ADMINISTRATION PRACTICES AMONG DIABETICS ATTENDING DIABETES MANAGEMENT CENTRE OF A TERTIARY CARE HOSPITAL IN LAHORE

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ABSTRACT

Background: More than 30% of all diabetic patients administer insulin as a sole therapy or together with oral hypoglycemic medications. This study was conducted to assess insulin self-administration practices among diabetic patients visiting Diabetes Management Center of tertiary care hospital in Lahore.

Material and methods: A cross-sectional study was conducted, using a convenient sampling technique, on 210 patients. A questionnaire developed, by using WHO guidelines regarding Insulin Self Administration, was filled by interviewing 210 patients attending the Diabetes Management Center, Services Hospital, Lahore. SPSS version 23 was used for data analysis.

Results: Out of 210 patients, 99.5% of the patients took care of temperature regulation, 83.9% practiced hand hygiene, merely 16.2% of the patients changed needle every time before use and 52.9% of the patients disposed of the needle properly. About 91.4% of patients rotated the injection site with 31.9% developing an injection scar. There is a significant relationship between educational status and checking of expiry date on vial (p= .016) and between gender of the patients and their knowledge of the proper site of administration (p= .014).

Conclusion: Health educational videos emphasizing storage, preparation of the solution and application as well as handling of syringes along with pictorial pamphlets, guidance from hospital staff and monitoring patient compliance with these practices can further improve these competencies.

Key Words: Insulin, Syringes, Temperature, Educational status

INTRODUCTION

Diabetes mellitus is a metabolic derangement, characterized by hyperglycemia primarily occurring as a consequence of partial or total insulin insufficiency.[1] The "diabesity" is considered as the largest epidemic of mankind history. Diabetes mellitus has been utterly belittled as an inclusive public health problem and it can no longer be ignored by the world.[2] Afflicting greater than 171 million people throughout the world and the calculation is anticipated to increase to 366 million by 2030.[3]

National Diabetes Statistics Report showed that approximately 9.3% of the United States residents have diabetes equivalent to 21.9 million people living in the United States.

A 2012 study calculating the number of patients who take diabetes medications speculated that 2.9 million diabetics (14%) use insulin solitarily, while 3.1 million (14.7%) take insulin and oral hypoglycemic drugs in combination.[4] About 7.5 million population of Pakistan is suffering from diabetes that is about 13.14% of the total population[5], of which type1 diabetes constitutes about 2% of the diabetic population of our country. The calculated incidence in Pakistan is about 1.02 per 100000 per year.[6]

Insulin is an essential component of the management of Diabetes Mellitus.[7] Figures from the developed world show that greater than 30% of all diabetic patients administer insulin either as the sole therapy or together with oral anti-diabetic medications.[8]

Despite consistent expert multidisciplinary care, concerns for glucose monitoring along with insulin injection administration is the

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responsibility of the diabetic patients or their attendant. Providing efficient self-management of diabetes is quite critical towards glycemic control, minimizing hypoglycemic attacks and improving health.[9] Insulin administration can be done subcutaneously through a variety of methods for example vial and syringe, devices like insulin pens, and continuous subcutaneous insulin infusion pumps.[10] These new devices, like insulin pens, are becoming more popular and provide easy and appropriate insulin administration. These devices are equipped to provide accurate dose adjustment, therefore minimizing the side effects like hypo- or hyperglycemia.[11]

According to research carried out in 5 tertiary care hospitals of Pakistan; of 375 patients, the majority of the patients used syringes (88.3%) for insulin administration, while fewer patients used pen devices (11.7%).[12]

Insulin self-administration demands for the best of expertise developed by learning of various practices, such as proper storage, carriage, formation of the solution and its administration, along with usage of syringes, needles, or injectable pens. Therefore, proper insulin administration at home necessitates training, an urge for learning along with devotion and attention to self-care.[13]

Proper management and education provide consequential perfections in knowledge, attitudes, and skills which results in better glycemic control and is vastly acknowledged to be a fundamental element of inclusive diabetes care. Patient education proved to be an effective way in controlling the main health problem.[14]

Studies conducted throughout various parts of the world showed inadequate knowledge and poor practices regarding self-administration of insulin among diabetics. It was evident that the education of patients is crucial to decrease the side effects of diabetes mellitus and its proper management.[15]

In a developing country like Pakistan which is ranked 7th by WHO in diabetic prevalence, it is mandatory to assess the knowledge gap and the practices regarding insulin self-administration among patients suffering from diabetes mellitus.

The objective of study was to assess insulin self-administration competencies among diabetic patients visiting Diabetic Management Center of Services Hospital Lahore.

MATERIAL AND METHODS

It was a cross-sectional study conducted in Professor Faisal Masud's Diabetes Management Center of Services Hospital Lahore. The study duration was 6 months (April-September 2019). The sample size was estimated by WHO statistical software S-size by using the formula of estimating a proportion with specific relative precision. At a confidence level of 95%, anticipated population 0.9[12] and relative precision of 0.05, the estimated sample size of 210 patients was taken. The non-probability convenience sampling method was used for this study. Diabetic patients, visiting the Diabetes Management Center of Services Hospital Lahore, using insulin for the last 6 months falling between the ages of 18-70 years, were included in this study. Patients who were diabetics but using oral hypoglycemic drugs were excluded from this study design. A detailed structured questionnaire was prepared to collect the data. Face-to-face interviews were conducted, by using the checklist for standard operational procedures, for insulin self-administration.[16] SPSS version 23.0 was used for entry, compilation, and analysis of data. For quantitative variables, mean and standard deviation were calculated. For qualitative variables, frequency and percentage distribution tables were generated and Chi-square test was applied to see the significant difference between variables.

RESULTS

The data was collected from the Diabetes Management Centre of Services Hospital Lahore. A total of 210 patients fulfilling the inclusion and exclusion criteria were interviewed. Most of the respondents were

between 40-70 years with mean age of 51.3 years and SD±12.8.

According to sociodemographic data collected 119(56.7%) were female and 91(43.3%) were male of which 15(7.1%) were unmarried and the remaining 195(92.9) were married. Among them 74(35.2%) were illiterate, 40(19%) had primary education, 69(32.9%) had secondary education and 27(12.9%) had higher education.

Table-1: Sociodemographic characteristics of respondents

Demographic Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	91	43.3
Female	118	56.2
Marital status		
Married	195	92.9
Unmarried	15	7.1
Educational status		
Illiterate	74	35.2
Primary	40	19
Secondary	69	32.9
Higher education	27	12.9

201(95.7%) had proper knowledge about insulin self-administration and 173(82.4%) had knowledge of proper sites. When inquired about the practices regarding insulin self-administration results showed that 208(99.5%) patients took care of temperature regulation, 160(76.2%) checked expiry date before use, 174(82.9%) of patients maintained a proper blood sugar monitoring chart,176(83.9%) practiced hand hygiene, whereas 34(16.2%) patients changed the needle every time before use. Only 78(37.1%) of the respondents used to clean injection site with spirit swab before use, 192(91.4%) patients rotated the injection site, which is why only 67(31.9%) patients felt a scar mark. About 171(80%) of the respondents used to inject at 90-degree angle. Only 111(52.9%) of the patients disposed of the needle properly. Only a few respondents 42(20%) immediately consulted a doctor in case of hypoglycemic attack.
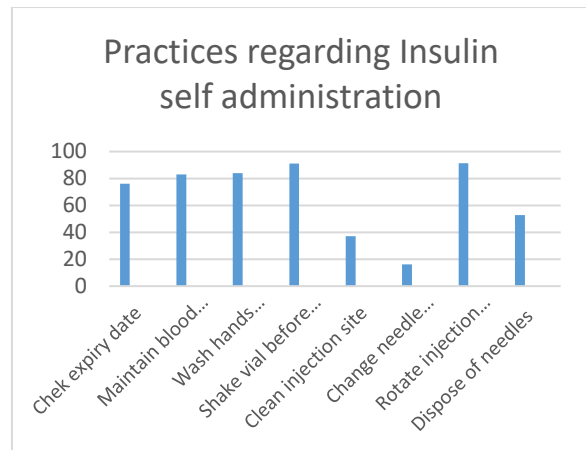

Figure-1: Practices related to insulin self-administration

This shows that there are significant practice gaps in the areas of disposal of needles and cleaning injection sites.

Table-2: Relationship of gender with knowledge about suitable site of insulin self-administration.

Gender	Do you know what the suitable sites for self-administration are?		
	No	Yes	Total
Female	13 (6.2%)	105 (50%)	118 (56.2 %)
Male	24 (11.4%)	68 (32.4%)	92 (43.8%)
Total	37 (17.6 %)	173 (82.4%)	210 (100%)

(p=0.014)

There is a significant relationship between gender and patient knowledge about proper sites of self-administration.

Table-3: Relationship between checking of the expiry date and educational status of respondents

Educational Status	Do you check the expiry date on the vial before use?		
	No	Yes	Total
Illiterate	25 (11.9%)	49 (23.3%)	74 (35.2%)
Primary	9 (4.3)	31 (14.8%)	40 (19.1%)
Secondary	15 (7.1%)	54 (25.7%)	69 (32.8%)
Higher education	1 (0.5%)	26 (12.4%)	27 (12.9%)
Total	50 (23.8%)	160 (76.2%)	210 (100%)

(p=0.014)

The above results show that there is a significant relationship between educational status and checking the expiry date on the vial before use.

DISCUSSION

Diabetes Mellitus is a chronic, non-communicable disease, associated with impaired blood glucose levels either due to defective insulin production or increased insulin resistance. Insulin administration is one of the mainstay therapies for Diabetes Mellitus. The treatment of Diabetes Mellitus requires the proper practice of self-administration of insulin in users.

Our study revealed that only 4.3% of subjects had insufficient knowledge regarding the self-administration of insulin, whereas 95.7% of participants were well aware of the proper method. However, in another study conducted in the diabetic clinic of Primary Health Centre, Alnamas only 60% had knowledge regarding the proper technique of insulin self-administration.[17] Another study conducted in the Out-Patient Department of a Multispecialty hospital in Kolkata, West Bengal, showed that 48% of patients possessed adequate knowledge about storing the insulin.[18] Hand washing is a very important measure to prevent the transmission of harmful microorganisms. About three fourth (83.9%) of participants had a satisfactory idea regarding washing hands properly before administration however, 37.1% of subjects in our study adopted the recommended practice of using spirit swab to disinfect the area before injecting. This was analogous to an earlier study carried out at Kolkata which had laid stress on the practice of washing hands before self-administration. It generated quite appreciative results revealing about 88% of patients following the practice.[19]

A similar study at Sri Devraraj Urs University, Tamaka, Kolar indicated 68% of the subjects had inadequate knowledge regarding insulin self-administration.[15] The reason for this high level of knowledge among patients is the provision of a proper classroom by the Diabetes Management Center for the patients where they are taught the proper method of insulin self-administration via videos.

A very small proportion of diabetic patients were admitted to changing the injection site. These findings correspond to similar research carried out in Finland, which revealed only a fraction of patients rotated the injection sites on the body. The most common site selected for injection was the abdomen.[10] However, in our study 91.4% of patients used to rotate the site on the abdomen itself. Injection administration at the same site repeatedly is related to the high incidence of lipohypertrophy and scar formation which in our study was positive for almost 31.9% of patients. Majority of patients 68.1% did not experience any scar formation since they avoided injecting the same area of the skin routinely. A study conducted in Spain showed that, of the patients who correctly rotated sites, only 5% had lipohypertrophy while, of the patients with lipohypertrophy, 98% either did not rotate sites or rotated incorrectly.[20]

Keeping insulin in a constantly cool environment at a stable temperature is imperative for its effectiveness. Around 99.5% of the patients admitted to keeping the insulin in a refrigerator to preserve the cold chain, as the diabetes center providing free insulin emphasized on bringing ice-filled thermos to take insulin from the Centre which inculcated the habit of storing insulin in refrigerators. This is in contrast to the findings from another study at Chitwan Medical College Teaching Hospital, Bharatpur, Nepal, which revealed that the majority of patients had denied maintaining the cold chain required for keeping the insulin injection.[15]

Used needles and syringes are dangerous for people if not disposed of properly. These can cause needle stick injuries and infections. Almost half (47.1%) of patients in our study disposed of the syringe by directly discarding it into the waste bin. However, 52.9% damaged the needle prior to discarding it. A study in Nepal conducted on the disposal of needles disclosed that the most common

method was disposal directly into the waste bin.[15] The United States Food and Drug Administration (USFDA) recommends syringes to be used for once only but due to financial constraints patients reuse needles and syringes often.[21]

The few shortcomings faced while conducting this study include the lack of diversity as only patients from a single hospital were involved in the study, which made it difficult to generalize the results. Another important factor was the lack of time for data collection which had a great impact on the findings of the study.

CONCLUSION

In our study almost all the patients had been provided with the information regarding self-administration of insulin while only a few changed the injection site leading to greater chances of lipohypertrophy. The majority of patients stored the insulin at an adequate temperature. On the other hand, a significant practice gap was observed in disposing of needles, washing hands, and cleaning the injection area before insulin administration.

Recommendations

Diabetes Mellitus can have long-term and fatal effects on the health of an individual. Proper health educational videos in the clinic emphasizing on different techniques including storage, transportation, preparation of the solution and application of insulin as well as handling of syringes or injection pens, and guidance from hospital staff as well as monitoring patient's compliance with these practices on each visit can further improve these competencies. Secondly, the provision of needles free of cost should be ensured as many of the patients belonging to low and middle-class backgrounds cannot afford to purchase syringes and needles frequently enough. Furthermore, the disposal of needles after use is an equally important issue and patients should be properly guided about the types of containers that could be used, proper labeling, and securing the lid of containers. Last, of all, the government must bring into existence legislation, national guidelines, or local municipality rules concerning the disposal of used needles and syringes.

AUTHOR'S CONTRIBUTION

MQ: Objectives, introduction, discussion & data collection

RM: Result analysis & interpretation

AS: Topic selection methodology & critical review

MC: Data collection, SPSS entry & abstract

MM: Data collection, SPSS entry & conclusion

MA: Data collection, SPSS entry & recommendations

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