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KNOWLEDGE OF DIABETIC PATIENTS ABOUT INSULIN INJECTION TECHNIQUE.

Muhammad Sajid Mehmood[1], Muhammad Wajad Munir[2], Wajahat Sultan Baig[3], Abida Mateen Ansari[4], Shazia Siddiq[5], Muhammad Farooq[6]

1. MBBS, M.Phil (Physiology)
Assistant Professor
Department of Physiology
Frontier Medical College,
Abbottabad, AJK, Pakistan
2. MBBS, FCPS (Medicine)
Assistant Professor
Department of Medicine
Alnafees Medical College and
Hospital, Islamabad, Pakistan.
3. MBBS, FCPS (Medicine)
Senior Registrar
Department of Medicine
Shifa College of Medicine,
Islamabad.
4. FCPS
Assistant Professor
Department of Medicine
Alnafees Medical College and
Hospital, Islamabad, Pakistan.
5. FCPS (Medicine)
Associate Professor
Department of Medicine
CMH Rawalakot, Poonch Medical
College, Rawalakot, AJK.
6. MBBS, FCPS (Medicine)
Assistant Professor
Department of Medicine
Wateen Medical College, Islamabad.

Correspondence Address:
Dr. Sajid Mehmood
Hose No. 8; Street No ¼, Bahar Colony,
Chakri Road Lakhan,
Dhamial Camp, Rawalpindi.
drsaji111@gmail.com

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ABSTRACT: Diabetes mellitus is leading cause of morbidity and mortality worldwide. Most of them are due to its macro and microvascular complication. **Objectives:** To determine the accuracy of insulin injection technique in adult diabetic patients between age of 20 to 50 years on insulin therapy for ≥02 years. **Study Design:** Cross sectional study. **Settings:** Pakistan Institute of Medical Sciences, Islamabad. **Period:** From March to August, 2016. **Subjects:** All diabetic patients between age 20 to 50 years and on insulin therapy for >02 years were enrolled in the current study. **Material & Methods:** A total of 260 diabetic patients fulfilling the inclusion criteria, visiting the emergency or medical OPD, who gave informed consent were enrolled. The patient's knowledge was categorized as "Adequate" or "Inadequate" on the basis of his/her score. Data was entered and analyzed by using SPSS version 22 software. **Results:** The mean (±SD) age of all patients was 36.8 (± 8.5) years. Out of 260 patients, 150 (57.3%) patients were female and 138 (53.1%) lived in urban areas. Majority of patients, 141 (54.2%) received knowledge regarding insulin injection technique from doctors and 98(37.7%) received knowledge from family member or friend. Out of 260, 64 (24.6%) patients had adequate knowledge, while 196 (75.4%) patients had inadequate knowledge score. **Conclusions:** One quarter of the patients has adequate knowledge about insulin injection techniques. Based on our findings there is a need to conduct awareness campaigns at the community level to impart useful knowledge about diabetes and its various aspects like insulin injections techniques.

Key words: Diabetes, Insulin Syringe, Knowledge of Injecting Insulin.

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INTRODUCTION

Diabetes mellitus (DM) is known as one of the key reason of death and debility worldwide. Most of morbidity and mortality is due to its macro and microvascular complication. According to American Diabetic Association, DM is a set of metabolic disorders characterized by means of hyperglycemia due to deficiencies of insulin secretion, its action or both. The long term hyperglycemia is linked with dysfunction, and failure of various organs, affecting the nerves, blood vessels, eyes, heart, and kidneys.[1]

DM is widely prevalent disease with an increasing incidence worldwide. Pakistan is among top 10 countries globally where diabetes mellitus is prevalent.[2] The occurrence of newly established cases of DM is 15.1% in males and 6.8% in female gender in urban areas, while 5.0% of male and 4.8% of female population is effected in rural areas in Pakistan.[3]

Hyperglycaemia is a collective effect of uncontrolled DM and over the period of time leads to serious damage to the several body's systems, specifically the nerves and vessels.[4] Untreated DM can result in many complications. The important short term complications include diabetic ketoacidosis and hyperosmolar hyperglycemic state.[5] The long-term hyperglycemia of DM is associated with dysfunction, damage and failure of various organs, specifically the eye, kidneys, heart, nerves, and blood vessels.[6]

Education about DM has been well-acknowledged as an indispensible tool for the management and prevention of diabetes Mellitus.[7] Insulin plays a vital role in the treatment of DM. There is no fixed

dose of insulin that is effective for each patient, the dose of insulin fluctuates, depending on patient's glycemic index and the type of insulin used. The adjustments are tailored throughout the life of individual as required.[8]

The precise technique of insulin injection is as important to ideal glycemic control as the dose and type of insulin delivered. The improper techniques and choice of sites could alter insulin absorption, subsequently leading to variation in peak insulin effect. This may result in unexpected hyperglycemia. Moreover, it may also result in escalated risk of nocturnal hypoglycemia.[9]

In 2011 A. Surendranath-et al revealed that approximately 70% of the patients had inadequate awareness about insulin injection techniques; and remaining 30% of them had moderately adequate knowledge.[10] The current study has been carried out to assess the level of knowledge about insulin injection techniques in diabetic patients and to scrutinize the common error in injecting techniques. If our study demonstrates inadequate knowledge, interventions will be needed to improve this aspect of diabetes management. DM patients require medical care from physician lead coordinated team. This team usually include physicians, physician's assistants, nurse practitioners, dietitians, nurses, diabetic educator, mental health professionals and pharmacists with expertise and a special interest in diabetes.

Refined animal-sourced insulin was the only solitary type of insulin existing; until genetic advances occurred later with medical research. The firstly genetic-engineered, synthetic "human" insulin was made using bacteria E. coli by Arthur Riggs and Keiichi Itakura in 1978. This landmark was achieved in history of management of DM at the Beckman Research Institute located at the City of Hope in collaboration with Herbert Boyer at Genentech. The massive majority of insulin available worldwide is this biosynthetic recombinant "human" insulin or its analogues.[11]

Rissanen and Partanen have proposed that the technique of the administration of injection is just as important to ideal glycemic control as dose and type of insulin.[12]

Blood glucose control fluctuates with the technique used for insulin injection. There has been great focus on ideal insulin regimens for enhanced blood sugar control, however, little attention has been paid regarding, how to inject insulin correctly for improved blood sugar control and prevention of complications.

SUBJECTS AND METHODS

All diabetic patients between age 20 to 50 years and on insulin therapy for >02 years visiting Emergency or medical OPD, of PIMS were enrolled in the current study. The study was started after approval from ethical review board of Shaheed Zulfiqar Ali Bhutto Medical University/ Pakistan Institute of Medical Sciences, Islamabad (PIMS).

OPERATIONAL DEFINITIONS

Diabetes Mellitus

Patient is said to be diabetic if his/her fasting blood sugar level is ≥126mg/dl and 02 hour plasma glucose level ≥200mg/dl after 75 g oral glucose tolerance test or random plasma glucose level ≥200mg/dl and symptoms of hyperglycemia or HbA1c ≥6.5%.

Adequate knowledge about insulin injecting techniques: Total score is 12 on the questionnaire. Diabetic patients who score ≥9 will have adequate knowledge and who will score ≤8 will have inadequate knowledge.

Methods

Enrolment was done between March and August, 2016. A total of 260 diabetic patients fulfilling the inclusion criteria, visiting the emergency or medical OPD Pakistan Institute of Medical Sciences, Islamabad, who gave informed consent were enlisted. The data was composed on a structured questionnaire, especially, designed for this study. The score was awarded for each question and the knowledge of patient was considered as "Adequate" or "Inadequate" on the basis of this score. Data was entered and

analyzed by using SPSS version 20 software.

RESULTS

A total of 260 patients attended the medical OPD and accident and emergency department, Pakistan Institute of Medical Sciences [PIMS], Islamabad were enrolled. The mean (SD) age of all patients was 36.8 (± 8.5) years, and ranged was from 20 years to 40 years. Out of 260 patients, 69 (26.5%) patients were between the age of 20 to 30 years, 94 (36.2%) were aged between 31 and 40 years and 97 (37.3%) were aged between 41 to 50 years.150 (57.3%) patients were female and 138 (53.1%) lived in urban areas. Out of 260, 81 (31.2%) patients were illiterate and seventy(26.9%) patients had education up to matric level while, 129 (49.6%) patients were jobless/housewives and 88 (33.8%) were professionals. 134 (51.5%) patients were taking twice daily insulin regimen 161 (61.9%) patients were on insulin therapy for ≥ 05 years. 154 (59.2%) patients had family history of diabetes mellitus. Majority of patients, 141 (54.2%) received knowledge from doctors and 98(37.7%) received knowledge from family member or friend. The total maximum knowledge score was 12. The mean (± SD) score was 7.2 (1.5). The median knowledge score was 7. The minimum knowledge score was 3 while the maximum score achieved was 11. Out of 260, 64 (24.6%) patients had adequate knowledge score (9 and above) while 196 (75.4%) patients had inadequate knowledge score (8 and less).

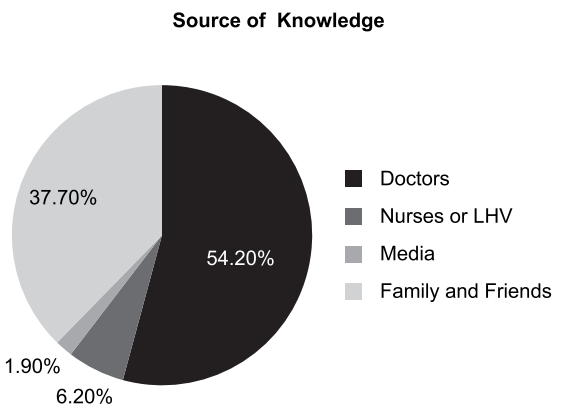

Figure-1. Source of knowledge about technique of Insulin injection.

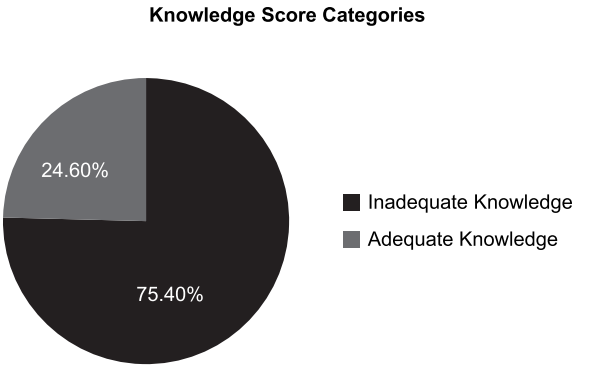

Figure-2. Knowledge score categorization

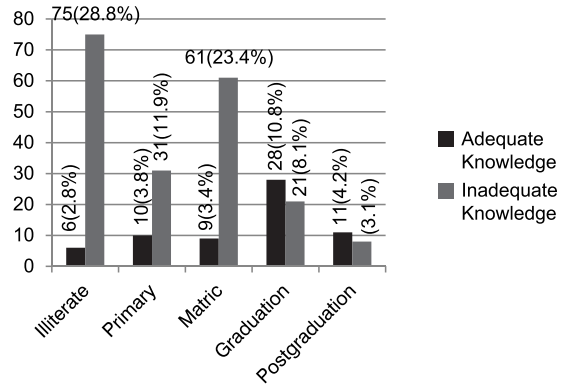

Figure-3. Patient educational status and insulin injection technique

DISCUSSION

Diabetes mellitus is the one of the most important cause of mortality and morbidity, affecting about 384 million individuals worldwide comprising 8.3% of the total adult population.[13] It is the eighth principal cause of death during 2012 and 2013. It has been estimated that 1.5 to 5.1 million deaths occur per year as a result of DM.[14] It can be computed in a way that 'a person dies with diabetes every 6 seconds'.[15]

Most of the morbidity and mortality among diabetic patients is due to its acute and chronic complications. The risk of developing microvascular complications resulting from DM depends not only on the duration but also the severity of hyperglycemia. In the United States, diabetic nephropathy is the principal cause of renal failure. Cerebro Vascular Disease (CVD) is the major cause of mortality in people with either type 1 or type 2 diabetes. In fact, CVD accounts for

the highest health care expenditures beard by the diabetic individuals.[16,17] The individuals suffering from Type-2 DM are at a much higher risk (150-400%) of CVA. In recent times, the teaching of individuals to cope their DM has been considered as an integral part of their clinical management. Insulin has pivitol role in the management of diabetes. The insulin therapy demands a close coordination and understanding by both the DM patient and the diabetic care-giver. There has been no definite insulin dosage specific for a distinct patient, hence, insulin treatment must be individualized to fit the life style and metabolism of the individual and may need day to day adjustments.[18]

The target of the current study was to evaluate the knowledge of DM patients on insulin therapy regarding the insulin injection techniques. Total 260 diabetic patients were enrolled for the study by non-probability convenience sampling. The mean (SD) age of all patients was 36.8 (± 8.5) years, and ranged was from 20 years to 50 years of age. The highest number of subjects.[19] were aged between 41 to 50 years followed by 94 (36.2%) subjects between 31 and 40 years of age.[20]

This study also shows that the adequacy of knowledge about insulin injections techniques is correlated significantly to the education of the patients, more scores in educated patients. The result of our study are comparable to other studies carried worldwide.[21] Urban patients have better knowledge than rural patients. These results are consistent with other studies conducted in Pakistan.[22] Professional patients also have higher scores than the laborers and jobless patients. Most of Diabetic patients having adequate score took information from doctors. Our results are comparable to many studies from Pakistan and around the world.[23,24]

A study conducted in India by Surendernath et al. during 2011and another study among Nigerian community attending world diabetic day 2012, conducted by U.S Jasper et al yield quite similar result as that of our study.[10]

A study conducted in Lahore, Pakistan on knowledge and awareness of insulin injections techniques among trained qualified nurses, revealed that out of these 272 nurses only 40 have knowledge of all the steps regarding the insulin injection technique. The information that insulin might be injected 30 minutes prior to meal was known to 57.4% and 66.2% have the knowledge of injecting insulin in the subcutaneous tissue, 64% knew that insulin might be injected in upper arm. 75% have an idea that it may be injected in upper thigh. Almost 90% of the nurses have an idea that insulin may be inoculated in the abdomen. The technique of pinching skin was correct in 64% nurses. Moreover, 56.6% had knowledge that cleaning the skin with spirit is not required. Practically, the technique of injection was correct in 73% of the nurses and 90% gave it correctly at an angle of 90°.[25]

Therefore, this and the above quoted study recommends adequate, prompt and frequent educational seminars and workshops may be arranged for the diabetic patients as well as health care professionals in order to generate awareness and knowledge regarding all aspects of insulin therapy. There are many ways to improve knowledge regarding insulin therapy. A brochure or pamphlet with pictorial illustrations could be given to the patient visiting diabetic clinics and out-patient department to improve the techniques of insulin administration and to impart the knowledge regarding signs of hypoglycemia and hyperglycemia, complications of insulin and its management and the storage of insulin. This might help the patients to have better control of their glycemic index. Finally, there is also dire need to improve the knowledge of health care professional about insulin administration.

CONCLUSIONS

To conclude, our study shows that only one quarter of the patients have adequate knowledge about insulin injection techniques. The total knowledge score was 12. The mean (SD) knowledge score was 7.2 (± 1.5). Based on our findings, there is a need to conduct awareness campaigns at the community level to impart useful knowledge about diabetes and its various aspects like insulin

injections techniques. However, there is also need to conduct further studies to explore more about it.

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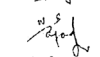
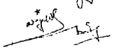
Men are not prisoners of **fate**,
but only prisoners of their own **minds**.

"Franklin D. Roosevelt"

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Muhammad Sajid Mehmood	Concept design, Data collection, Critical review.	
2	Muhammad Wajad Munir	Concept design, data analysis, write up.	
3	Wajahat Sultan Baig	Concept design, data collection, critical review.	
4	Abida Mateen Ansari	Concept design, critical review.	
5	Shazia Siddiq	Concept design, critical reivew, proof reading.	
6	Muhammad Farooq	Concept design, critical review.