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Knowledge of Self-Monitoring of Blood Glucose and the Degree of Self Titration of Anti-Diabetic Drugs in Rawalakot Azad Jammu and Kashmir

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ABSTRACT

Objectives: In the context of managing diabetes mellitus, self-blood glucose monitoring is crucial. While self-blood glucose monitoring, all instructions must be followed, and keeping record is crucial to help the doctor titrate the medications and dosages of anti-diabetes medicines. Furthermore, it is important to prevent patients from self-titrating after self-monitoring of blood glucose.

The aim of the study is to evaluate the knowledge and practice of self-blood glucose monitoring among diabetes patients as well as the level of self-titration of anti-diabetic medications among diabetes patients.

Study design and setting: This cross-sectional community based research was conducted in Rawalakot (Azad Jammu & Kashmir) from December 2021 to June 2022.

Methodology: A validated questionnaire was filled by 171 adult male and female diabetes patients who self-monitored their blood sugar levels at home. Patients with diabetic complications and those with juvenile diabetes were excluded from the study.

Results: Only 46 (26.9%) of the 171 patients reported knowing about and correctly implementing self-blood glucose monitoring. 125 patients (73.1%) lacked the necessary information and did not accurately monitor self-blood glucose. On the basis of self-monitoring, 111 people (64.9 percent) acknowledged that they self-titrate their anti-diabetic medications.

Conclusion: Blood glucose self-monitoring should be promoted, and patients should be instructed by a doctor or diabetes educator on the significance of following the correct procedures of doing the self-monitoring of glucose.

Keywords: Blood Glucose Self-Monitoring, Diabetes Complications, Diabetes Mellitus, Hypoglycemia

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INTRODUCTION:

The rise in the prevalence of metabolic syndrome, which includes diabetes, dyslipidemia, and hypertension, is the result of the epidemiologic shift, urbanization, and changes in lifestyle and dietary habits.[1] In another ten years, Pakistan is expected to have the highest diabetes prevalence in the world. By 2025, it is predicted that Pakistan would have over 70 million diabetics. The South East Asian continent has a higher rate of diabetes morbidity and death than the rest of the globe.[2] According to current World Health Organization (WHO) research, this kind of diabetes, which was previously exclusively seen in adults, is now increasingly showing up in children. The incidence of diabetes has been steadily increasing over the last 30 years, with the fastest increase occurring in low- and middle-income nations. T2DM is said to manifest early in children, perhaps as a result of contemporary lifestyle changes.[3] According to estimates from the International Diabetes Federation (IDF), there will be 425 million adults worldwide who have diabetes in 2017. (IDF). With a 9.2 percent prevalence, diabetes is the second most common disease in the MENA region of the IDF. Between 2017 and 2045, the number of persons with diabetes is predicted to increase by 110 percent in the MENA region, reaching 629 million worldwide.[4] In 2017, 10.7% of adult patients died from diabetes-related causes (20-79 years). Managing diabetes in our community is

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difficult due to a number of problems, including insufficient self-care in diabetes, periodic follow-up, adherence to medication, foot care, and frequent monitoring of patient glycemic level.[5] An essential component of diabetic self-care is glucose self-monitoring. Self-monitoring for diabetes and hypertension is increasing in Pakistan as a result of broad media advisories. Self-blood glucose monitoring must be carried out with great care. Patients must carefully execute it under the direction of doctors.[5] Every time self-monitoring is done, all the suggested stages for blood glucose monitoring must be followed. Self-blood glucose monitoring errors occur when it is not done carefully.[6] Since the only information on the understanding and use of self-blood glucose monitoring by diabetic patients comes from the west, it is necessary to evaluate SBGM usage among our community. Additionally, it is very unusual for patients to alter their medication dosage by missing or taking extra tablets in accordance with SBGM, which may cause disrupted glycemic control and potentially have life-threatening consequences like hypoglycemia.[7]

One of the key factors cited for the aforementioned statement is that our population is less aware of and less likely to practice self-care for diabetes than the west. This is significant for diabetes management because self-care is a personal tool for managing diabetes and achieving a high quality of life.[8]

METHODOLOGY:

The aim of the study was to evaluate the level of self-titration of anti-diabetic medications among diabetes patients based on self-blood glucose monitoring as well as the knowledge and practice of self-blood glucose monitoring among diabetes patients. This cross-sectional community-based research randomly sampled 171 adult male and female diabetes patients in Rawalakot, Azad Jammu & Kashmir, from December 2021 to June 2022.

Data was collected by using a well-designed questionnaire that was approved by experts in pharmacology, general medicine, and biostatistics. To validate the questionnaire, Cronbach's alpha was determined, which was 0.81. Diabetes patients who choose to take part in the study completed an informed consent form upon reading the information page and obtaining additional explanation after gaining IRB permission. Their demographic information and diabetes history were documented. The procedure included the patient responding to a series of questions about independently monitoring their blood glucose that was posed by the investigator, with their responses being logged. Consequently, our patients received accurate information on self-blood glucose monitoring as well as the side effects of insulin and self-adjusting anti-diabetic medications.

Inclusion Criteria are Type II diabetes mellitus patients in their adult years, both male and female, who self-monitor their blood sugar levels at home and are ready and willing to provide us with information. Exclusion Criteria are Diabetics with type I diabetes and acute complications in diabetic individuals.

The research approval was taken from The Faculty of Medical and Health Sciences, Department of D-Pharmacy's Review Board (No. UPR/o3/421/2021) On 7 Nov 2021.

Statistical Analysis: MS Excel was used to tabulate the data, and Statistical analysis was done using SPSS 17. Percentage and frequency were calculated for all variables. Cronbach's alpha test was run for statistical analysis.

RESULTS:

Our study included 171 patients with diabetes, of which only 46 (25.7%) demonstrated a sufficient understanding of self-monitoring of blood sugar and were practicing it correctly. The remaining 125 (73.1%) were not properly self-monitoring their blood sugar levels. Out of the 80 patients who received instruction on self-monitoring from their healthcare provider, 111 (64.9%) admitted to skipping doses or adjusting their insulin dosage without medical supervision. Despite this, a total of 145 patients (84.8%) reported being able to recognize the symptoms of hypoglycemia. However, only 46 patients (26.9%) consistently tracked their blood sugar readings through self-monitoring. The percentages of other responses from the participants are listed in Table/Figure 1.

DISCUSSION:

The purpose of this study was to assess the extent to which individuals with diabetes are knowledgeable about self-monitoring of blood glucose (SMBG) and are implementing proper precautions related to SMBG. In addition, we sought to determine the extent to which patients with diabetes self-adjust their anti-diabetic medications based on their own SMBG results. By evaluating these factors, we aimed to improve the self-management skills of diabetic patients and ultimately improve their glycemic control.

In order to effectively self-monitor blood glucose (SBGM), it is important that patients are properly trained and equipped with a validated instrument. However, our research found that approximately half of the patients in our study received education on SBGM from sources other than healthcare providers, such as paramedics, acquaintances, and family members. It is crucial that patients receive proper instruction from doctors or other qualified healthcare professionals to ensure accurate and safe SBGM practices. In addition, it is important to store SBGM equipment away from direct sunlight and to thoroughly clean and dry hands before performing the procedure. Our research also revealed that a significant proportion of the study population did not follow these guidelines, similar to the findings of a previous study conducted in the eastern region of India by Choudhury et al.[12] To ensure accuracy, it is recommended to use a different finger or location for each SBGM measurement and to avoid using the index and thumb. While the outer

Table 1: Responses were provided by a total of 171 participants about blood glucose self-monitoring.

Questions Asked	YES	NO
Do you regularly monitor yourself for diabetes?	99 57.9%	64 42.1%
Did you follow your doctor's advise and purchase a monitoring instrument?	103 60.3%	68 39.7%
Have you ever had a doctor explain how to self-monitor at least once?	80 46.8%	91 53.2%
Do you wash and dry your hands before taking measurements?	63 36.8%	108 63.2%
Do you blow air on your hand to dry it before taking a measurement?	104 60.8%	67 39.2%
Do you consistently prick the same finger?	75 43.9%	96 56.1%
Do you gauge the level using the first fingertip blood drop?	111 64.9 %	60 35.1%
After one use, do you discard the lancet away?	108 63.2%	63 36.8%
Do you routinely keep track of your blood sugar readings till you see a doctor?	46 26.9%	125 73.1%
After checking your blood sugar on your own, do you skip or take additional medication before seeing a doctor?	104 60.4%	67 39.2%
Do you modify the dosage of your insulin or medications after conducting your own blood sugar checks before consulting a doctor?	111 64.9%	60 35.1%
Are you familiar with the name and dosage of your diabetic medication?	116 74.3%	44 25.7%
Do you know the common side effects of your diabetes medications?	120 70.2%	51 29.8%
Can you identify hypoglycemic symptoms?	145 84.8%	26 15.2%
Have You ever had symptoms of hypoglycemia?	98 57.3%	73 42.7%

palm can also be a suitable site for measurement, locations such as the thighs should be avoided. It is important to use a new lancet for each prick and to retain the second drop of blood in the canister, applying gentle pressure to the sides. Lancets should be properly disposed of using a hard plastic cover.[13]

One of the main findings of our study was that, while many diabetic patients self-adjust their regular insulin or oral anti-diabetic medications, a significant proportion are able to recognize the symptoms of hypoglycemia and are familiar with the brand names and common side effects of their medications. However, patients often cited difficulty in reaching a healthcare provider and busy schedules as reasons for self-titration. It is important to note that self-monitoring of blood glucose (SBGM) using venous blood may not always be accurate and can result in significant variations in results. While a 20% difference may be acceptable for monitoring purposes, it is never appropriate to adjust medication without first consulting a healthcare provider. Patients with diabetes should be made aware of the potential risks of hypoglycemia associated with self-titration. It is essential that patients receive proper education and support to ensure safe and effective management of their diabetes.[14,15,16]

It is well-known that a significant proportion of individuals with diabetes are asymptomatic and may go undiagnosed for a prolonged period of time before receiving treatment. Regular self-monitoring of blood glucose (SMBG) and proper management of diabetes can help prevent the development of microvascular and macrovascular complications.[9,10] Serial monitoring of blood glucose levels can also aid in the adjustment of anti-diabetic medications

and alert patients and healthcare providers to dangerous fluctuations in blood sugar levels.[8] However, our research found that only 24.1% of patients fully adhere to all key stages of SMBG, with the remaining individuals skipping one or more important steps. This rate of adherence is lower than that observed in Western populations, where over 60% of patients typically adhere to SMBG guidelines. These findings suggest that there is a need for increased education and understanding of the importance of SMBG in our study population.[11]

Another significant finding of our study was the low number of patients who regularly track their blood sugar levels and the lack of a consistent practice of doing so. Many patients do not start monitoring their blood sugar until they meet with a healthcare provider, and very few bring their self-monitoring of blood glucose (SMBG) instrument to their doctor or diabetes counselor for evaluation and calibration. [17] It is important for healthcare institutions to have dedicated diabetes counselors on staff who can provide education and support on SMBG to patients, as well as promote self-care for diabetes management. These counselors can play a crucial role in helping patients develop the skills and habits necessary for effective self-management of their diabetes. [18,19]

In Rawalakot, Azad Jammu and Kashmir, knowledge of SMBG and the degree of self-titration of anti-diabetic drugs may vary among individuals with diabetes. Some may have a good understanding of their condition and how to manage it, while others may be less knowledgeable. It is important for healthcare professionals in Rawalakot to provide education and support to individuals with diabetes to help them better understand their condition and how to effectively manage it through SMBG and self-titration of medications. This can help improve outcomes and quality of life for people with diabetes in Rawalakot and the surrounding area.

The American Diabetes Association and the Canadian Diabetes Society both have established guidelines for self-monitoring of blood glucose, which doctors should impart to their patients. It is essential that doctors educate their patients on these guidelines to ensure proper self-monitoring of blood sugar and effective diabetes management. These guidelines provide important recommendations for both healthcare providers and patients, which are mentioned below.[17,20]

Recommendations: As a physician, it's important to provide clear guidelines to your patients who are engaging in self-blood-glucose monitoring. First and foremost, encourage your patient to invest in a validated self-testing device. This will ensure that their results are accurate and reliable. Additionally, it's crucial to give your patient a hands-on demonstration of the self-monitoring procedures, so they understand how to properly use the device. It's important to specify the frequency and timing of self-monitoring as these may vary depending on the patient's diabetes profile. Encourage your patients to keep track of their glucose readings and bring these records to their next appointment. However, it's also important to caution them about the potential negative consequences of self-adjusting their diabetic medication without consulting a healthcare professional.

As a patient, it's important to follow certain recommendations when self-checking your blood glucose levels. Firstly, it's advisable to purchase a validated instrument only after consulting with your doctor, who will also provide instruction on how to perform self-blood-glucose monitoring (SBGM). Your doctor can also advise you on the frequency and timing of SBGM that is best suited to your needs. To ensure accurate results, it's important to wash your hands with plain water before self-monitoring and let them air dry. Each time you perform SBGM, use a sterile lancet and make sure to puncture your fingertip or outer palm. Use the second drop of blood for testing and avoid the first drop. After capping the lancet, dispose of it gently. It's also important to keep a journal to record your blood sugar levels after each puncture, and to bring this journal with you when you visit your doctor. However, it's important to note that instruments may sometimes produce inaccurate results. If you notice any aberrant numbers, speak with your doctor as soon as possible to determine if an instrumental mistake has occurred. Finally, it's crucial to never adjust your medication without consulting your doctor and to always bring your SBGM machine with you when travelling.

CONCLUSION:

Self-monitoring of blood glucose (SMBG) is a crucial aspect of diabetes management. It involves regularly measuring and recording the concentration of glucose in the blood using a portable device called a glucose meter. SMBG is important for individuals with diabetes because it allows them to make adjustments to their diet, physical activity, and medication regimen in order to maintain optimal blood glucose control and prevent short-term and long-term complications. Proper education and instruction on SMBG is essential for individuals with diabetes. Effective self-monitoring of blood glucose can help individuals with diabetes to better understand their condition and make informed decisions about their care. It is also an important component of self-titration, which refers to the process of adjusting the dosage of medication based on the results of SMBG. By adjusting their medication dosage as needed, individuals with diabetes can maintain optimal blood glucose control and improve their overall outcomes and quality of life.

List of abbreviations:

IDF: International Diabetes Federation
MENA: Middle East and North Africa
SBMG: Self-blood glucose monitoring
T2DM: Type 2 diabetes mellitus
WHO: World Health Organization

Authors Contribution:
Mehwish Fayaz: Conduct the whole research (including research design, data collection, data analysis and paper writing)
Abid Hussain: Data drafting
Izhar Ullah: Data Interpretation
Imran Ahmad: Data Collection
Imran Rabbani: Data Collection

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