



## RESEARCH ARTICLE

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**Anti-hyperglycemic Medication Compliance, A Quality Assurance Project**Rayan Mamoon<sup>1</sup>, Yusufal Mamoon<sup>2\*</sup>, Debbie Hermanstyn<sup>3</sup> and Issac Sachmechi<sup>4</sup><sup>1</sup>Coordinated BA/MD Program Brooklyn College/SUNY Downstate Medical Center, Macaulay Honors College, Research volunteer, Queens Hospital Center, Jamaica, NY<sup>2</sup>Assistant Professor, Department of Internal Medicine, Icahn School of Medicine at Mount Sinai, Queens Hospital Center, Jamaica, NY<sup>3</sup>Diabetes Educator, Queens Hospital Center Diabetes Clinic, Jamaica, NY<sup>4</sup>Professor, Department of Endocrinology, Icahn School of Medicine at Mount Sinai, Queens Hospital Center, Jamaica, NY**ABSTRACT**

Consistent with other studies, 30% of the interviewed patients with type 1 or type 2 diabetes reported that they missed a dose of their diabetes medication on at least one day in the past month [1]. Forgetting and lifestyle inconvenience were the two most frequently reported reasons for non-compliance. Adherence can potentially be increased through combining new forms of treatment and increasing educational reinforcement.

**ARTICLE HISTORY**

Received November 17, 2021  
Accepted November 24, 2021  
Published November 30, 2021

**Introduction**

Compliance to medications is arguably the most crucial part in the treatment for diabetes [2]. Diabetes medications are prescribed to perform a variety of essential metabolic functions such as controlling blood glucose levels, stimulating production of insulin, and regulating the digestion of carbohydrates [3]. Skipping even a few doses each week can increase a patient's A1c levels and significantly elevate their chances of developing further complications [4,5]. Despite these warnings and constant reminders from their healthcare providers, diabetics often have trouble consistently adhering to their treatment regimen.

**Objective**

To interview patients in order to assess whether they are routinely complying with their diabetes medications and how we can improve compliance with medications.

**Methods**

50 patients, between the ages of 21 to 81(mean age=56), that met with the diabetes educator at Queens Hospital Center's Diabetics Clinic between July 2020 and July 2021 were asked the following 10 questions regarding their compliance to their medication regimen.

1. Do you take your diabetic's medications regularly?
2. Do you skip your diabetic's medications at any time and if yes why so?
3. Can you easily pick up your refills from your pharmacy?
4. Do you understand how and when to administer your diabetic's medications?
5. Are you currently taking insulin?

6. If you are taking insulin, do you adjust your insulin dosages depending on your daily diet or activity level?
7. Do you monitor your blood sugar levels?
8. Do you read the directions on your medications?
9. Do you experience any side effects from your diabetic's medications?
10. Do you have any suggestions for the diabetes' clinic?

**Results****Table 1: Percent distribution of responses to question 2.**

Does not skip medications	70%
Reported skipping medications on multiple occasions	30%

**Table 2: Frequencies of occurrence for each of the four reasons why patients skipped their diabetes medications**

Reason for skipping	Frequency of occurrence
Side effects	20.00%
Problems with the pharmacy/ insurance coverage	13.33%
Lifestyle inconvenience	40.00%
Forgetting	53.33%

**Discussion**

92% of the interviewed patients reported that they understand how to properly administer their diabetes medications. 70% of patients reported that they did not skip their medications at any time, indicating that the clinic is doing a thorough job at educating their patients and motivating them to comply with their medications. The other 30% of patients reported skipping

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their medication anywhere from once a month to multiple times a day. There were four reasons why patients claimed to skip their medications and nearly a third of the patients had multiple reasons for skipping.

The most frequent reason for why patients skipped their medication was because they would forget to take their medication at the correct time. Two individuals over the age of 60 who forget to take their medications asked for pill boxes so that they would have an easier time organizing their medications. Another patient who forgot to take her Novolog dose before a meal took it after her meal, but experienced hypoglycemia. Forgetting is the simplest explanation for why people skip their medications, but it is also arguably the hardest issue to overcome.

Inconvenience to lifestyle was the second most frequent reason for why patients skipped their medications. Taking insulin before lunch specifically seems inconvenient for patients. One patient admitted that he skips his lunchtime insulin when he goes out and compensates by taking insulin at two times that he was not instructed to do so. Social pressures seem to take a role in forcing patients to defy the instructions given to them by their clinician. Fear of needles is another inconvenience for patients taking insulin.

The third reason, avoidance due to persistent side effects was also a significant reason that caused some patients to skip their medication. Some of the patients that do not currently skip their medications previously discussed side effects with their clinicians and had their regimens quickly adjusted so that they no longer experienced those effects. The fourth reason for non-compliance with medication is issues with the pharmacy and insurance coverage.

### Suggestions

It seems inevitable for some patients, specifically those above the age of 60, to forget to take their diabetes medications. Reinforcing how patients should adjust their dosages when they forget to take their medications can be crucial, in preventing patients from experiencing hypoglycemia or hyperglycemia [6]. Providing some patients who are on multiple medications with pill boxes may help them stay organized and adherent to their treatment plan. Patients may also be advised to put alarms in their cell phones to remind them when it's time to take their diabetes medications. New insulin pens such as Inpen could be beneficial for reminding patients to administer their medications consistently [7]. Those patients who forget their daily basal insulin may benefit from once-weekly basal insulin injections like Icodec [8]. To increase accountability, patients should also be encouraged to involve a family member, friends or home health aids in their treatment plan. For example, none of the five patients who had family members present with them during their interview skipped their medications. Patients experiencing adverse effects from their medications should counsel their medical provider in order to be switched to another medical regimen.

For problems regarding inconveniences to lifestyle, the provider should look for alternative treatment plans that fit the lifestyle of the patient. If that is not possible, then the provider should educate the patient on possible lifestyle modifications that would

allow the patient to be more compliant with their medications. To reduce fear of needles, patients should be referred to the diabetes educator who will show them the new nano needles that are thinner than hair and are not painful. For problems related to the pharmacy and insurance coverage, the provider should find out the specific problem the patient faces and take the appropriate actions.

### Conclusion

Patients who were interviewed in this study mostly demonstrated a high degree of compliance with their medication regimen. Forgetting and inconvenience to lifestyle are the two most common reasons why patients reportedly skipped their medications. The other two reasons, side effects and problems with the pharmacy/insurance, were much less common.

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