

ORIGINAL ARTICLE

Antihyperglycemic Therapy Compliance with HbA1c Levels in Type 2 Diabetes Mellitus Patients among Pekanbaru Prolanis Participants

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Abstract: One of the pillars in the management of Type 2 Diabetes Mellitus (DM) is pharmacotherapy, i.e. the use of antihyperglycemic drugs. Success in DM management is influenced by patient compliance to the pharmacotherapy given. One indicator of controlling Type 2 DM is HbA1c levels. This study aimed to analyze the relationship between antihyperglycemic therapy compliance and the HbA1c levels in Type 2 DM patients in the Chronic Disease Management Program in Pekanbaru. **Method.** This was a cross-sectional study. Samples were taken by consecutive sampling method. Laboratory examination was carried out to obtain HbA1c levels, the value of which was categorized controlled if $<7\%$. The compliance with the use of antihyperglycemic drugs was assessed using Medication Possession Ratio (MPR). Patients were considered compliant if they had an MPR of $\geq 80\%$. Data were analyzed using the Fisher Exact test. **Results.** Most of the 48 patients had uncontrolled HbA1c levels (87,5%). The level of non-compliant patients was also very high (91,7%). This study showed a significant relationship between pharmacotherapy compliance and HbA1c levels ($p < 0.05$). **Discussion.** There was a relationship between pharmacotherapy compliance and the level of HbA1c in Type 2 DM patients. Physicians should pay more attention to patients with low compliance as it may increase the risk to a high HbA1c level.

Keywords: compliance, diabetes mellitus, HbA1c

INTRODUCTION

Based on the 2018 Basic Health Research, the prevalence of people with diabetes mellitus (DM) in Indonesia reaches more than 1 million people. Type 2 diabetes reaches 90% of the population with diabetes. This number may be greater considering

there are still many DM patients who have not been diagnosed.¹

Diabetes mellitus is a chronic disease that will be carried for life, but with control through good management can prevent damage and organ failure or complications. One of the pillars in the management of

Type 2 DM is pharmacotherapy, namely the use of antihyperglycemic drugs.²

Success in managing DM is influenced by patient compliance with the pharmacotherapy given. One indicator of DM Type 2 control is HbA1c levels. HbA1c examination is a standard examination to assess the effect of DM therapy 2-3 months before. Adherence to the use of antihyperglycemic drugs is an important component of DM therapy. Compliance is associated with improved glycemic control and reduced mortality. This study aims to analyze the relationship of adherence to the use of antihyperglycemic drugs with controlling DM Type 2, especially HbA1c levels in participants in the Chronic Disease Management Program (Prolanis) in Pekanbaru.^{3,4,5}

METHODS

This research is a cross-sectional study conducted at the first-level health facility Prolanis Primary Health Care Pekanbaru. Data collection was conducted at three primary health care. This study was conducted on outpatient Type 2 DM patients who performed control at the primary health care with inclusion criteria including patients with a diagnosis of Type 2 DM and enrolled in the Prolanis program, had undergone therapy using oral antihyperglycemic drugs for at least 6 months, and were aged > 18 years. Exclusion criteria included pregnant and nursing patients, patients with chronic kidney or liver disease and those undergoing hemodialysis. The sample in this study was

taken by consecutive sampling method. The determination of the sample size of this study uses a paired categorical analytic formula.⁶

HbA1c levels are obtained through laboratory examinations, HbA1c is said to be controlled if the value is <7%. Adherence to the use of antihyperglycemic drugs was assessed with a medication possession ratio. Medication possession ratio is a comparison of the number of days of refill prescriptions with the number of days needed for treatment. In this study, medication possession was seen for 6 months through medical records. Patients are said to be compliant with treatment if they have an MPR of $\geq 80\%$. Frequency data were analyzed using univariate analysis and the relationship of adherence to the use of antihyperglycemic with HbA1c levels was analyzed by the Fisher Exact test.^{2,6,7}

RESULTS

Demographic data shows that of the 48 respondents most were female (79.2%). The number of patients aged ≥ 60 years (56.3%) was more than the age of <60 years (43.7%) (Table 1).

Table 1. Characteristics of Respondents

Characteristics	Frequency (n)	Percentage (%)
Gender:		
- Female	38	79,2
- Male	10	20,8
Age:		
≥ 60 -year old	27	56,3
<60-year old	21	43,7

Notes:

n = 48 respondents

The proportion of respondents who used antihyperglycemic monotherapy (70.8%) was greater than those who used combination therapy (29.2%).

Table 2. Types of Antihyperglycemic Therapy

Types of therapy	Frequency (n)	Percentage (%)
Monotherapy	34	70,8
Combination	14	29,2
Total	48	100

The most widely used oral antihyperglycemic drugs by respondents were the biguanide group, namely metformin at 72.58%, followed by the sulfonylurea glibenclamide group 20.96% and glimepiride 6.46%. The most antihyperglycemic combination is the combination of metformin with glibenclamide (71.43%) compared to the combination of metformin with glimepiride (28.57%).

Most respondents have uncontrolled HbA1c levels (87.5%), the percentage of HbA1c that is controlled is only 12.5%. The average HbA1c level was 9.4% (Table 3).

Table 3. Distribution of Respondents Based on HbA1c Levels in Primary Health Care

HbA1c level	Frequency (n)	Percentage (%)
Not controlled	42	87,5
Controlled	6	12,5

Notes:

n = 48; mean = 9,4; median = 9,1; lowest level = 6,1; highest level = 15,3

In this study, the majority of respondents did not comply with the use of oral antihyperglycemic (91.7%) (Table 4).

After analyzing the Fisher Exact test it was found that the statistically significant relationship between adherence to the use of antihyperglycemic with HbA1c levels ($p < 0.05$) (Table 5).

Table 4. Compliance with use of Oral Antihyperglycemic

Compliance	Frequency (n)	Percentage (%)
No compliance (MPR < 80%)	44	91,7
Compliance (MPR ≥ 80%)	4	8,3
Total	48	100

Table 5. Correlation of Compliance with the Use of Antihyperglycemic and HbA1c Levels

Compliance	Not controlled HbA1c n (%)	Controlled HbA1c n (%)	p
No compliance (MPR < 80%)	41 (93,2)	3 (6,8)	0,004
Compliance (MPR ≥ 80%)	1 (25)	3 (75)	

DISCUSSION

Characteristics of Respondents

The proportion of respondents by sex in this study was greater in the female group than in the male group. The magnitude of this proportion does vary in various places, research in Egypt shows the proportion of men more than women.⁸

In this study the proportion of respondents aged ≥ 60 years was bigger than respondents aged < 60 years, this is by the theory that the prevalence of Type 2 diabetes increases in the population with older age. Although Type 2 DM is more common in older age, it is currently increasing in the adolescent and young adult population due to lack of physical activity, unhealthy eating patterns, and increasing obesity.^{8,9}

Use of Antihyperglycemia

The most commonly used type of therapy is monotherapy (70.8%), and the oral antihyperglycemic drug most widely used by respondents is the biguanide group, metformin (72.58%). This result is not surprising because the trend of the use of

antihyperglycemic in the United Kingdom during the period 2000-2017 showed that 73% of patients with Type 2 DM were initiated with metformin monotherapy. Likewise, if compared to one of the countries in Asia, Taiwan, the most common tendency to use antihyperglycemic is a biguanide. Biguanide is indeed recommended as first-line therapy in Type 2 DM. In many countries including the United, States metformin is preferred as pharmacological initial therapy for Type 2 DM.^{9,10}

Relationship of Compliance Use of Anti-Hyperglycemia Drugs with HbA1c Levels

The majority of uncontrolled HbA1c levels in this study (87.5%) showed that the management of Type 2 DM was not going well. This is reinforced by research data that the level of patient compliance with the use of antihyperglycemic is also bad. The results of this study showed a large number of non-compliance (91.7%). Even though good compliance will increase glycemic control. The greater the non-compliance, the more likely the HbA1c level to be uncontrolled.^{11,12}

Poor adherence to the use of antihyperglycemic can result in an increased risk of treatment costs, increased disease complications and the risk of hospitalization. Identifying patients who are not compliant in outpatient treatment is important to carry out therapy effectively.¹²

The problem of adherence to therapy is so complex because of many factors that influence it. These factors include health service system factors (weak access, long waiting times, difficulty in obtaining repeat prescriptions, unpleasant clinic visits, policies, availability of drugs). Factors related to therapy are the administration

route, the complexity of the therapy, the duration of the therapy period, the side effects of the drug, the level of behavior change needed, the taste of the drug, and the need for storage of the drug. Patient factors namely sex, age, marital status, education, ethnicity, psychosocial factors: trust, motivation, attitude, the relationship between patients and prescribers and so on. Disease factors namely disease symptoms and disease severity. Socio-economic factors namely there is no ability to take a break from work, medical expenses and income, and social and family support.^{13,14}

Various methods are used to improve the comfort and compliance of Type 2 DM patients with the therapy given. These include reducing the complexity of therapy by using fixed dosed combination pills, reducing the frequency of drug administration, using drugs that are associated with some side effects (such as hypoglycemic effects and increasing body weight), providing education to improve patient-doctor / service communication health, create a system of "reminders" and social support to reduce the burden of costs.¹⁵

CONCLUSION

The greater the level of non-compliance with the use of antihyperglycemic, the uncontrolled HbA1c level also tends to be greater. Non-compliance with patients undergoing medical therapy, especially the use of antihyperglycemic, is one of the drug therapy problems (DTP) that needs special attention.

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