

## The Description of Knowledge of Type 2 Diabetes Mellitus Patient Measured by Simplified Diabetes Knowledge Scale Indonesia Version (SDKS-INA)

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Submitted: 25-09-2020

Revised: 28-09-2020

Accepted: 28-09-2020

### ABSTRACT

Knowledge of diabetes is the important determinant to practice the self-care thus, the therapy goals of diabetes achieved. The aim of the study is to assess the knowledge of type 2 DM patients using SDKS-INA. This research is an observational study, with data collected in the community of the Yogyakarta province from January - May 2020. The assessment of knowledge of type 2 DM patients was measured by Simplified Diabetes Knowledge Scale in Bahasa Indonesia 1 for the non-insulin user (SDKS-INA1) and SDKS-INA2 for insulin user. Ninety-six of the non-insulin user and 28 insulin user type 2 DM participated in this study. The percentage of non-insulin user type 2 DM patients with a high level of knowledge was 53.13%, while in those in insulin user was 60,70%. However, high knowledge level is not the intention to discontinue giving education. The knowledge level also should be assessed routinely as well as delivering sustainable diabetes education.

**Keywords:** diabetes mellitus; knowledge; SDKS-INA

### INTRODUCTION

Diabetes Mellitus (DM) is a chronic illness that requires continuous medical care (Association American Diabetes, 2020). Type 2 DM is the most common type of diabetes, which almost 90-95% of all cases of diabetes (Dirjen Binfar Alkes, 2005). International Diabetes Federation in 2017 estimated that 425 million or 8.8% of people in the world have diabetes. Indonesia ranks sixth in the top ten countries/territories with the highest diabetes cases in 2017, reaching up to 10 million people throughout Indonesia (International Diabetes Federation, 2017). The pharmacological and non-pharmacology therapy were required type 2 DM patient. One of non-pharmacology therapy is self-management behavior (Aghili *et al.*, 2016; Dirjen Binfar Alkes, 2005). Self-management behavior includes self-care activities that must be done to achieve therapy goals (Funnell *et al.*, 2010).

Knowledge of diabetes is an important determinant to practice the self-care (Kugbey *et al.*, 2017). A good perception of diabetes builds the patient to recognize the course of the disease, prevention, complication, and management. Thus, an accurate understanding

of diabetes can provide clinical results that benefit patients (Rudjianto *et al.*, 2015). A recommendation revealed that self-management skills and knowledge should be assessed routinely at least annually (Jeeva & Babu, 2017).

To provide the assessment of knowledge of type 2 DM in the low literacy level, especially in Indonesia, Simplified Diabetes Knowledge Scale in Bahasa Indonesia (SDKS-INA) was developed. SDKS-INA is a new instrument for diabetic knowledge. The SDKS-INA was originally from the previous SDKS that was modified for Indonesian patients. The knowledge that must be owned between insulin user and non-insulin user type 2 DM patients is different. In the insulin user, they are obligated to have information about insulin. SDKS-INA is distinguished into SDKS-INA1 for non-insulin user diabetic patients, and SDKS-INA2 for insulin user diabetic patients (Jasper *et al.*, 2014; Nababan, 2020).

The aim of the study is to assess the knowledge of type 2 DM patients measured by SDKS-INA. By knowing the knowing, the health professional can arrange the new strategy for further diabetes

therapy management, especially education for patients.

## METHODOGY

This research employed a cross-sectional study. The data were collected in the community of the Yogyakarta province from January - May 2020. The data collection was conducted through face to face or phone interview for 20-30 minutes. The subject was taken by consecutive sampling, where patients were selected through inclusion and exclusion criteria up to a specific time and number of samples. The inclusion criteria were patients with a diagnosis of type 2 DM, aged between 35 - 70 years old, agreed to participate in the study by signing an informed consent form, and able to do exercise. The exclusion criteria were: patients who had a mental illness or language barriers that can interfere with the research had severe complications such as end-phase diabetic nephropathy or proliferative diabetic retinopathy. In this study, a total of 96 non-insulin users and 28 insulin user type 2 DM patients participated. The characteristic patient was collected, such as age, gender, work status, level of education, number of comorbidities, number of medicines and duration of diabetes used case report form.

The assessment of knowledge of type 2 DM patients was conducted using Simplified Diabetes Knowledge scale in Bahasa Indonesia. The SDKS-INA was developed in Bahasa Indonesia by some expert panel. SDKS-INA consists of 2 types, SDKS-INA1 for non-insulin user diabetic patients and SDKS-INA2 for insulin user diabetic patients. The questionnaire consists of 17 true-false-do not know statements. The correct answer is scored 1 (one), and do not know, and false is scored 0 (zero). The maximum score is 17. The composition of statements between SDKS-INA1 and SDKS-INA2 is different. The SDKS-INA1 has three subdomains, and SDKS-INA2 consists of 4 subdomains. The level content validity index of SDKS-INA was 0.8 to 1. The reliability was showed the Cronbach's alpha 0.658 and 0.680, respectively, for SDKS-INA1 and SDKS-INA2(Nababan, 2020). Descriptive analysis was used to analyze the frequency and percentage of characteristic and knowledge of type 2 DM patients.

## RESULT AND DISCUSSION

A total of 96 non-insulin users and 28 insulin user type 2 DM patients participated. All the patients were assessed the characteristic and the knowledge level. Table I showed the characteristic of non-insulin user, while in Table III showed the characteristic of insulin user. The knowledge level was presented in Table II for non-insulin user and in Table IV for insulin user type 2 DM.

### Knowledge in Non-Insulin User Type 2 DM

A total of 96 non-insulin user patients were collected, with the woman was more dominant (59.37%). Most of the patient was adult, and 52.08% of the subjects were employed. In Indonesia, the prevalence of women with diabetes in 2018 was higher than men. In this study, the total proportion of women was also more elevated than men (Balitbangkes, 2018). Education level in this study was divided into three, which were primary, secondary, and high level. The primary level was for elementary school, the secondary level was for junior and senior high school, and the high level was for associate, bachelor, master, and doctoral degree. The patient in the secondary education level was 48.96%, and 41.67% had a high education level. The patients in this study mostly had no comorbidity (45.83%). Fifty-six of patients had 1-2 medicines. One to 5 years of diabetes duration was had 44.79% of non-insulin user patients.

SDKS-INA1 have three subdomains, consist of general knowledge (8 statements), lifestyle and medication adherence (5 statements), and disruptor in glycemic management (4 statements). The maximum score of SDKS-INA1 was 17. In this study, the mean score showed 10.26, which was also be the cutting point score of this study. The patient who had a score below 10.26, was included in low-level knowledge, and vice versa. The percentage of patients with a high level of knowledge was 53.13%. The other study showed a similar result that revealed, 52.5% of patients had scored more than the mean score while 47.5% of patients had less than the mean score(Kassahun & Mekonen, 2017). However, this result of the study was different with the other study that revealed the knowledge level in developing country still low (Al-Qazaz *et al.*,

**Table I. Characteristic of Non-Insulin User Type 2 DM Patients**

<b>Variable</b>	<b>Total (n=96)</b>	<b>Percentage (%)</b>
<b>Age</b>		
Adult	89	92.7
Elderly	7	7.29
<b>Gender</b>		
Man	39	40.63
Woman	57	59.37
<b>Education Level</b>		
Primary	9	9.37
Secondary	47	48.96
High	40	41.67
<b>Work status</b>		
Unemployed	46	47.92
Employed	50	52.08
<b>Number of Comorbidities</b>		
No comorbidity	44	45.83
1 comorbidity	36	37.5
2 comorbidities	13	13.54
3 comorbidities	3	3.13
<b>Number of Medication</b>		
1-2 medicines	56	58.33
3-4 medicines	36	37.5
≥ 5 medicines	4	4.17
<b>Duration of Diabetes</b>		
< 1 year	8	8.33
1-5 years	43	44.79
6-10 years	21	21.88
> 10 years	24	25

**Table II. Description of Knowledge in Non-Insulin User Type 2 DM Patients**

<b>Level of knowledge</b>	<b>General Knowledge Subdomain</b>	<b>Lifestyle and Medication Adherence Subdomain</b>	<b>Disruptor in Glycemic Management Subdomain</b>	<b>Knowledge measured by SDKS-INA1 (n=96)</b>
<b>Low</b>	47,92%	39,58%	69,79%	46,88%
<b>High</b>	52,08	60,42%	30,21%	53,13%

2012; Al-Rasheedi, 2014; Kaur & Kaur, 2017; Larasati *et al.*, 2019). The difference of result due to the different of the knowledge measurement tool. SDKS in a new measurement that modified accordingly and considered more suitable to Indonesia culture, straightforward way and short time duration.

In the disruptor in glycemic management subdomain, 69.69% patient had low knowledge. The statements of this subdomain consist of the impact of infection on blood glucose, the frequency of glucose test when suffering

common-cold, how to take diabetes medicine, and the impact of smoking cessation in controlling blood sugar. The answer to the statement of the frequency of blood glucose test should be more often when patient suffering common-cold is true. Type 2 DM patients must have an awareness to have a blood glucose test more often, especially when suffering common-cold. Due to the low knowledge level in this subdomain, indicated the education of the frequency of blood glucose test possible to be low. This data was provided with another study that showed 65% type 2 DM patients did once

**Table III. Characteristic in Insulin User Type 2 DM Patients**

Variable	Total (n=28)	Percentage (%)
<b>Age</b>		
Adult	27	96.43
Elderly	1	3.57
<b>Gender</b>		
Man	13	46.43
Woman	15	53.57
<b>Education Level</b>		
Primary	1	3.57
Secondary	13	46.43
High	14	50
<b>Work status</b>		
Unemployed	15	53.57
Employed	13	46.43
<b>Number of Comorbidity</b>		
No comorbidity	8	28.57
1 comorbidity	15	53.57
2 comorbidities	4	14.29
3 comorbidities	1	3.57
<b>Number of Medication</b>		
1-2 medicines	13	46.43
3-4 medicines	9	32.14
≥ 5 medicines	6	21.43
<b>Duration of Diabetes</b>		
< 1 year	2	7.14
1-5 years	11	39.29
6-10 years	7	25
> 10 years	8	28.57

**Table IV. Description of Knowledge in Insulin User Type 2 DM Patients**

Level of knowledge	Lifestyle and Medication Adherence Subdomain	General Knowledge Subdomain	Disruptor in Glycemic Management Subdomain	Medication Adverse Effect Subdomain	Knowledge measured by SDKS-INA2 (n=28)
<b>Low</b>	35,71%	35,71%	35,71%	35,71%	39,29%
<b>High</b>	64,29%	64,29%	64,29%	64,29%	60,70%

blood glucose test in 3 months. This number revealed that patients were still not perceived the importance of blood glucose test. Hence, even the patients suffering common cold, the frequency of blood glucose test difficult to improve(Dinesh *et al.*, 2016).

The statement of all diabetes medicines must be taken before meals are wrong. However, many subjects answered wrongly to this statement. It seems that the awareness of how to take diabetes medicine probably is still low. Several patients assumed that all diabetes medicines have a similar way to take. This

information must be emphasized to DM patients through counselling by a pharmacist to avoid the disruptor in glycemic management. The prevalence of smoking habit in the diabetic patient was similar to the general population. Insufficient knowledge of smoking cessation, and the prevalence indicated less of awareness of patient toward the benefit of smoking cessation, especially in controlling blood sugar(Campagna *et al.*, 2019). These result of knowledge level is a benefit to be considered as the education that must be delivered to non-insulin type 2 DM.

### **Knowledge in Insulin User Type 2 DM Patients**

A total of 28 of insulin user type 2 DM patients were collected. The characteristic subject presented in Table III. The subject dominantly is woman consist of 53.57% and the less was the man. In Indonesia, the prevalence of women with diabetes in 2018 was higher than in men. In this study, the total proportion of women was also more elevated than men (Balitbangkes, 2018). Mostly the patient was adult, 53.57% was unemployed. The patient who had a high education level was 50%, and 46.43% had secondary education level. The patients in this study mostly had one comorbidity (53.57%). Type 2 DM patients who used insulin, mostly had a longer duration of diabetes. In this study, 26 of 28 patients had more than 1-year diabetes. Another study in insulin user, 45% of the patient had more than three years of diabetes (Wilson & Symphoria, 2016). Subjects who had 1-2 medicines was 46.43%.

SDKS-INA2 consists of 4 subdomains, which are lifestyle and medication adherence (4 statements), general knowledge (7 statements), a disruptor in glycemic management (3 statements), and adverse medication effect (3 statements). The mean score was 9.75 of 17. This score also is the cutting point. The patient who had a score that less than 9.75 was included in low level, and vice versa. The level of knowledge type 2 DM patient in this study mostly had high level (60.70%).

In general knowledge subdomain, there are seven statements, but the mean of the score was 3.9 of 7. There were 3-4 statements that not correctly be answered by the patients. One of seven statements are "if you forget to take your once-daily morning pill and it only comes to your mind at bedtime in the night, you do not need to take it". The answer to those statements is correct. Since the insulin user type 2 DM patient has a high risk to have hypoglycemia due to the use of insulin. This statements could be more educated and warned by the pharmacist to improve the clinical benefit and to prevent the adverse drug event for insulin user. The other statement is "urine testing and blood testing are both equally as good for testing the level of blood glucose". The knowledge regarding this statement is possible to low. One of the studies showed that the majority of the patient had

insufficient knowledge and practice in urine testing (Desalu *et al.*, 2011).

Both knowledges of non-insulin user and insulin user type 2 DM patients in this study was high level. Diabetes Mellitus is a chronic disease that requires continuous therapy simultaneously repeated and sustainable education to keep and to remind the knowledge whom patients had. Hence, the self-care was provided to achieve aims of type 2 DM therapy. This result of the study can be a consideration for the health professional to selected the most important education that must be emphasis.

### **CONCLUSION**

The percentage of non-insulin user type 2 DM patients with a high level of knowledge was 53.13% while in insulin user was 60,70%. Regarding diabetes is a continuous disease, high knowledge level is not the intention to discontinue giving education. The knowledge level should be assess routinely as well as deliver diabetes education.

### **ACKNOWLEDGE**

Researchers would like to thanks the patients participating in the study.

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