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## Research Article

# The Effect of Health Education on Diet Compliance Among Patients with Diabetes Mellitus in the Sukaraja Public Health Center's Work Area in Sukabumi Regency

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### Abstract

**Aims:** There is a significant public health problem in which the number of people diagnosed with diabetes is increasing year after year. One possible explanation for this is a lack of adherence to the DM diet. As a result, it is critical to conduct health education regarding DM diet compliance. The purpose of this study was to assess the effect of health education on dietary compliance in patients with diabetes mellitus in the Sukaraja Public Health Center's work area in Sukabumi Regency.

**Methods:** This study employs a quasi-experimental design with a non-equivalent control group. Purposive sampling was used to collect the sample. 38 respondents were divided into two groups, each with 18 respondents: the intervention group and the control group. Analysis of data using the Paired Sample T-Test and the Independent Sample T-Test.

**Results:** After health education in the intervention group, there was an increase in dietary compliance in patients with diabetes mellitus ( $p = 0.004$ ), and in the control group there was an increase in dietary compliance ( $p = 0.021$ ) and there was a difference between dietary adherence in the intervention group and the control group ( $p = 0.024$ ).

**Conclusion and Suggestion:** There is an influence of health education on the dietary compliance of diabetes mellitus patients, so it is hoped that this health education can be provided continuously to improve the dietary compliance of diabetes mellitus patients and serve as an evidence-based practice for the Sukaraja Health Center.

### Keywords

**Diabetes Mellitus, Diet Compliance, Health Education**

## INTRODUCTION

Modern society faces one of the world's most serious health problems. According to Teli, diabetes mellitus is a chronic disease that can have a variety of adverse effects or serious complications on a person's health (1). According to Waspadji, lifestyle changes, particularly in urban areas, have increased the prevalence of degenerative diseases such as diabetes mellitus (DM) and others (2).

According to Riskesdas data from 2018, diabetes mellitus is one of the top ten most prevalent diseases in West Java. In West Java, the prevalence of diabetes mellitus as diagnosed by doctors or through symptoms is 2.0 percent (3). According to the International Diabetes Federation (IDF), DM patients in Indonesia will total 178 million people over the age of 20 in 2020, and assuming a 4.6 percent prevalence rate, an estimated 8.2 million DM patients will be obtained (4).

Diabetes Mellitus (DM) is a metabolic disorder characterized by a constellation of symptoms caused by elevated blood sugar levels (hyperglycemia) as a result of abnormal insulin secretion, insulin action, or both. The increase in blood sugar levels prevents blood sugar that has accumulated in the blood from entering the cells. Insulin resistance occurs as a result of low insulin levels or impaired insulin function (5).

Diabetes mellitus can have a direct or indirect effect on a patient's physical health. According to Philips, when a diabetic patient is hyperglycemic, he or she will experience extreme thirst, frequent urination, headaches, fatigue easily, and irritability. Meanwhile, if the patient is hypoglycemic, he or she will easily sweat, feel hungry, have visual disturbances, feel weak, have impaired motor coordination, mental confusion, and anxiety (1).

If left unchecked, the various effects of DM can certainly deteriorate the sufferer's health. As a result, DM management efforts are critical for

mitigating the various consequences or risks of complications. Among the numerous DM management strategies, the DM diet is one of the most critical. Diet is the primary therapy that can aid and facilitate the action of diabetes medications such as hypoglycemic tablets, anti-aggression, and antibiotics. The right diet can help maintain stable blood sugar levels (6). A high level of compliance is required when implementing the diet in order to control blood sugar levels in diabetic patients. According to Niven, dietary compliance is frequently neglected in diabetic patients due to a lack of attention to balanced food intake, which results in an increase in blood sugar levels and eventually an imbalance in the amount of insulin produced (7).

Adherence is defined as a patient's level of compliance with the method of treatment and behavior recommended by doctors or medical professionals. Despite this, many diabetes mellitus patients experience treatment failure, which can be caused by a variety of factors, including a poor diet (8). Diabetes Mellitus complications can occur as a result of non-adherence to the therapy program, which includes diet, exercise, and medication use (9).

Numerous factors can influence adherence to the DM diet, including motivation, family support, and awareness of the DM diet's benefits. From these various factors, it is critical for DM patients to have a working knowledge of the DM diet in order to improve adherence to the DM diet. Therefore, in order to increase DM patients' compliance with the DM diet, it is critical to provide health education to people with Diabetes Mellitus and their families (10).

Health education is a dynamic process of behavior change that occurs not as a result of the transfer of information or theory from one person to another or as a result of a set of procedures, but as a result of awareness generated within the

individual, group, or society. Health education is a critical component of diabetes management. Individuals with Diabetes Mellitus must be informed correctly about the diet that must be followed (4).

According to data from the Sukabumi District Health Office in 2020, there were 20,047 non-communicable disease patients in the top 15 Sukabumi District Health Centers, with the Sukaraja Health Center in Sukabumi Regency ranking third with 1,662 cases, and DM cases ranking fourth with 68 cases. According to the description above, the researcher is interested in conducting research on the effect of health education on diabetes mellitus patients' diet compliance in the Sukaraja Health Center Work Area.

## METHODS

**Study design:** This study employs a quasi-experimental design with a non-equivalent control group approach.

**Sample:** The intervention group consisted of 18 participants, while the control group had the same number, 36 respondents constituted the total sample size. Inclusion criteria (education at least completed elementary school, patients suffering from diabetes mellitus (DM), ages 45–74 years, patients who are conscious and cooperative and willing to participate in the study) and exclusion criteria (DM patients with complications, patients with leg gangrene (diabetic foot ulcers).

**Instrument:** This study's instrument consisted of a 32-question compliance questionnaire based on the Guttman scale.

**Data collection:** The data collection method was questionnaires.

**Data analysis:** The data analysis method was univariate and bivariate analysis using Paired Sample t-Test and Independent Sample t-Test.

## RESULTS

### 1. Description of respondent characteristics

**Table 1.**  
Description of respondent characteristics

| Characteristics of respondents | Group        |      |         |      |
|--------------------------------|--------------|------|---------|------|
|                                | Intervention |      | Control |      |
|                                | F            | %    | F       | %    |
| <b>Gender</b>                  |              |      |         |      |
| Woman                          | 14           | 77.8 | 13      | 72.2 |
| Man                            | 4            | 22.2 | 5       | 27.8 |
| <b>Age</b>                     |              |      |         |      |
| 45-54 Year                     | 7            | 38.9 | 6       | 33.3 |
| 55-64 Year                     | 10           | 55.6 | 8       | 44.5 |
| 65-74 Year                     | 1            | 5.5  | 4       | 22.2 |
| <b>Last education</b>          |              |      |         |      |
| Primary school                 | 7            | 38.9 | 5       | 27.8 |
| Junior High School             | 5            | 27.8 | 4       | 22.2 |
| Senior High School             | 4            | 22.2 | 9       | 50.0 |
| College                        | 2            | 11.1 | 0       | 0    |

| <b>Job-status</b>     |    |      |    |      |
|-----------------------|----|------|----|------|
| Work                  | 11 | 61.1 | 10 | 55.6 |
| Does not work         | 7  | 38.9 | 8  | 44.4 |
| <b>Long Suffering</b> |    |      |    |      |
| <5 Year               | 3  | 16.7 | 3  | 16.7 |
| 5-10 Year             | 10 | 55.5 | 7  | 38.9 |
| >10 Year              | 5  | 27.8 | 8  | 44.4 |

According to Table 1, the intervention group had the highest proportion of women at 77.8 percent, or as many as 14 individuals. The majority of respondents were aged 55–64 years, which accounted for 38.9 percent or as many as seven people. The majority of respondents have completed elementary school, which is 38.9 percent or as many as seven people. The majority of respondents (61.1 percent or as many as 11 people) are employed. The majority of respondents, 55.5 percent, or as many as ten people, have had DM for 5–10 years. While the majority of those in the control group were female, 72.2 percent or as many as 13 individuals. The majority of respondents, 44.5 percent or as many as eight people, were in the age range of 55–64 years. The majority of respondents (50.0 percent or as many as nine people) had a high school education. The majority of respondents worked, which equals 55.6 percent or up to ten people. Some respondents, 44.4 percent or as many as eight people, had been diagnosed with DM for more than ten years.

## 2. Univariate Analysis

### Overview of Dietary Compliance Before and After Health Education in the Intervention Group and Control Group

**Table 2.**  
Overview of Dietary Compliance Before and After Health Education  
in the Intervention Group and Control Group

| Dietary Compliance        | N  | Mean  | Selisih Mean | SD    | Nilai Min | Nilai Maks |
|---------------------------|----|-------|--------------|-------|-----------|------------|
| <b>Intervention Group</b> |    |       |              |       |           |            |
| Pre                       | 18 | 14.67 | -4.22        | 2.401 | 12        | 19         |
| Post                      | 18 | 18.89 |              | 3.644 | 14        | 24         |
| <b>Control Group</b>      |    |       |              |       |           |            |
| Pre                       | 18 | 14.11 | -1.67        | 2.374 | 11        | 18         |
| Post                      | 18 | 15.78 |              | 2.713 | 12        | 19         |

According to table 2, the average value of dietary compliance obtained from 18 respondents prior to the measurement (pre-test) in the intervention group was 14.67, with a standard deviation of 2.401, a minimum value of 12 and a maximum value of 19. After the post-test, the average value for dietary compliance was 18.89, with a standard deviation of 3.644, a minimum value of 14 and a maximum value of 24. In the control group, the average value of dietary compliance obtained from 18 respondents was 14.11 with a standard deviation of 2.374, ranging from 11 to 18. After the post-test, the average of diet adherence is 15.78, with a standard deviation of 2.713. The minimum and maximum values are 12 and 19, respectively.

### 3. The classic assumption test

#### a. Normality test

**Table 3.**  
**Normality test**

| Dietary Compliance        | Saphiro-Wilk | p-value | Keterangan |
|---------------------------|--------------|---------|------------|
| <b>Intervention Group</b> |              |         |            |
| <i>Pre-Test</i>           | 0.881        | 0.027   | Normal     |
| <i>Post-Test</i>          | 0.930        | 0.192   | Normal     |
| <b>Control Group</b>      |              |         |            |
| <i>Pre-Test</i>           | 0.909        | 0.081   | Normal     |
| <i>Post-Test</i>          | 0.917        | 0.116   | Normal     |

According to Table 3, the p-value for the normality test in the pre-test intervention group is 0.027, while the post-test group has a p-value of 0.192. The p-value for the normality test was 0.081 for the pre-test control group and 0.116 for the post-test control group. This demonstrates that the data from the pre- and post-tests are normally distributed in the control and intervention groups.

#### b. Homogeneity Test

**Table 4.**  
**Homogeneity Test**

| Characteristics of respondents | Levene Statistic | p-value | Information |
|--------------------------------|------------------|---------|-------------|
| Gender                         | 0.564            | 0.458   | Homogen     |
| Age                            | 4.456            | 0.042   | Homogen     |
| Last education                 | 0.207            | 0.652   | Homogen     |
| Work                           | 3.415            | 0.073   | Homogen     |
| Long Suffering                 | 1.697            | 0.201   | Homogen     |

According to Table 4, respondents in the control and intervention groups share or are homogeneous in terms of demographic characteristics.

### 4. Bivariate Analysis

#### a. Hypothesis Testing the Effect of Health Education on Diet Compliance in the Intervention Group and Control Group

**Table 5.**  
**Hypothesis Testing the Effect of Health Education on Diet Compliance in the Intervention Group and Control Group**

| Dietary Compliance        | N  | Mean  | Mean difference | SD    | t      | p-value |
|---------------------------|----|-------|-----------------|-------|--------|---------|
| <b>Intervention Group</b> |    |       |                 |       |        |         |
| <i>Pre-Test</i>           | 18 | 14.67 | -4              | 2.401 | -3.367 | 0.004   |
| <i>Post-Test</i>          | 18 | 18.67 |                 | 4.058 |        |         |
| <b>Control Group</b>      |    |       |                 |       |        |         |
| <i>Pre-Test</i>           | 18 | 14.11 | -1.48           | 2,374 | -2.547 | 0.021   |
| <i>Post-Test</i>          | 18 | 15.94 |                 | 2.999 |        |         |

According to Table 5, the intervention group's p-value for the paired sample t test is 0.004, and a p-value of 0.05 indicates that  $H_0$  is rejected, indicating that health education has an effect on dietary compliance in the intervention group. This is demonstrated by an increase in the mean pre- and post-test dietary compliance scores in the intervention group, from 14.67 to 18.67, with a mean difference of -4. In the control group, the p-value for the paired sample t-test was 0.021, indicating that  $H_0$  is rejected. Therefore, it can be concluded that health education has an effect on dietary compliance in the control group. This is demonstrated by the increase in the mean of dietary compliance between pre- and post-test in the control group, from 14.11 to 15.94, with a mean difference of 1.48.

### b. Hypothesis Testing Differences in Dietary Compliance in the Intervention Group and the Control Group

**Tabel 6.**  
**Hypothesis Testing Differences in Dietary Compliance in the Intervention Group and the Control Group**

| Dietary Compliance | N  | Mean  | Mean difference | t     | p-value |
|--------------------|----|-------|-----------------|-------|---------|
| Intervention Group | 18 | 16.67 | 1.73            | 2.206 | 0.024   |
| Control Group      | 18 | 14.94 |                 |       |         |

According to Table 6, the p-value for the independent test sample is 0.024, and the p-value for the control group is 0.005, indicating that there are differences in the health education of people with diabetes mellitus between the intervention and control groups. The increase in the mean value between the control and intervention groups demonstrates this. Between 14.94 and 16.67 in the control group and 14.94 to 16.67 in the intervention group.

## DISCUSSION

The results indicated that the average value of dietary adherence in the intervention group was 14.11, as determined by 18 respondents in the pre-test health education measurement. Juleka explained that efforts were made to increase patient adherence to treatment through health education. Because diabetes mellitus is a lifestyle disease, it is necessary to increase knowledge in order to alter one's lifestyle (9). Patient knowledge and compliance can be altered through health education. The knowledge he possesses is expected to serve as the foundation for modifying attitudes and lifestyles in order to alter behavior and thus increase adherence to the treatment program being pursued (4).

Additionally, the study's findings indicated that the average value of dietary compliance obtained from 18 respondents in the post-test measurement of health education was 17.01 in the intervention group. The findings of this study corroborate Norris et al. (2002), who found that patients who receive educational interventions have a better ability to manage their diabetes. Diabetes management entails adherence to dietary and behavioral guidelines. When a patient is educated, he or she gains the ability to manage disease on their own (11). Health education regarding dietary compliance is one of the treatments provided to patients with Diabetes Mellitus. According to numerous studies, health education can help patients with diabetes mellitus gain a better understanding of the disease,

improve diet adherence, and prevent further complications (11).

The results indicated that the average value for dietary compliance in the control group, as determined by 18 respondents in the pre-test, was 14.44. There are five major pillars in the management of people with diabetes mellitus: health education, diet planning, physical activity, pharmacology, and blood sugar monitoring. Diet planning is one of the five primary pillars of diabetes management that focuses on keeping blood sugar levels close to normal and under control. According to Soegondo, while implementing this diet is a necessary component of successfully managing diabetes mellitus, it frequently becomes an impediment in diabetes services due to the requirement for patient compliance and motivation (4).

Additionally, the results indicated that the average value for the control group's dietary compliance, as determined by 18 post-test respondents, was 14.61. According to Boeree, adhering to dietary rules is a formidable challenge for patients with diabetes mellitus because it requires a shift in their habits and behavior. Compliance refers to a person's obedience in performing a predetermined task, as well as internal encouragement to obey or obey what has been ordered (9).

According to the study's findings, patient compliance increased in the intervention group from an average of 14.67 to 18.67, a mean difference of -4. Statistical tests yielded a p value of 0.004 as a result of the results. It can be concluded that patients adhere to the Diabetes Mellitus diet more closely both before and after receiving health education on dietary compliance. The findings of this study corroborate Lukman's research, which indicates that health education about diabetes diet has an effect on people with diabetes mellitus's positive attitude toward managing diabetes independently. Ariyanti also bolstered the study's findings, stating that diet management health education at

the Kebonsari Health Center Surabaya, where the study's findings were implemented, can result in improved self-management skills and thus improve dietary adherence behavior in people with diabetes mellitus (12,13).

The results indicated an increase in dietary compliance in the control group, but the increase was not statistically significant based on the data, which indicated an average value of 14.11 to 15.94 with a mean difference of 1.48. The control group's increase in dietary compliance was influenced by information obtained during a health service examination. This is demonstrated by the results of the daily logbook kept during the research process, in which respondents visit the puskesmas once a week and health workers provide information about foods to avoid and foods to consume, thereby affecting the respondent's dietary compliance. By educating the community about health, they can increase their knowledge and then begin to change their behavior from unhealthy to health-promoting behaviors, such as adhering to the DM Diet (10).

According to the study's findings, there was a difference in the average value, with 14.94 for the control group and 16.67 for the intervention group. A p-value of 0.024 was obtained from statistical tests using an independent sample, indicating that there were differences in the health education of people with diabetes mellitus in the intervention and control groups. Regular health education using simple materials and appropriate methods, as well as providing adequate materials and timing in accordance with the respondent's rehabilitation schedule, can help increase respondent knowledge. It is also influenced by media factors from personal education, where researchers use leaflets about activities that respondents can do to add insight and information about the Diabetes Mellitus diet and to change behavior and lifestyle to prevent complications (11).





## CONCLUSION

The average result for patients with diabetes mellitus at the Sukaraja Public Health Center prior to health education was 14.67, while the average result for the control group was 14.11. In terms of dietary compliance in patients with diabetes mellitus at the Sukaraja Public Health Center, the average result after health education was 18.67, compared to 15.94 in the control group. Health education has an effect on the dietary compliance of diabetic patients in the intervention group. In the Sukaraja Health Center Work Area, there are differences in dietary adherence between patients with diabetes mellitus in the intervention group and the control group.

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