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THE EFFECT OF HEALTH EDUCATION IN DIABETIC MELLITUS ON KNOWLEDGE LEVEL USING LEAFLET IN LAUT DENDANG VILLAGE

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Abstract

Blood glucose levels rise in diabetic mellitus (DM), a metabolic disorder that is not communicable. The cause is impaired insulin function and abnormal insulin secretion. Diabetes mellitus causes various complications. One way to prevent and overcome these complications is through health education. This study sought to determine whether health education about diabetes mellitus had an impact on Laut Dendang Village residents' level of knowledge. This kind of study is quantitative pre-experimental and uses a total sampling technique with a pre-experimental pre-posttest design with one group without control and the number of respondents were 30 people. Evaluation of knowledge scores was measured using the Diabetic Knowledge Questionnaire (DKQ-24) with 24 question items. Data analysis used the Wilcoxon test. The results of the study used wilcoxon test that there was effect of health education in diabetic mellitus management on knowledge level in Laut Dendang Village with p-value = 0.001 (α < 0.05). It is suggested for future research to add variables of Medication Compliance, Medication Supervisor, Family Support, Quality of life and Health Locus of Control.

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Introduction

The metabolic disorder known as diabetes mellitus (DM) is typified by excessive hyperglycemia caused by decreased insulin synthesis, insulin action, and carbohydrate, lipid, and protein metabolism, which increases the risk of heart disease, vascular disease, obesity, cataracts, and erectile dysfunction, also heart disease (World Health Organization (WHO), 2019). According to the International Diabetes Federation (IDF), diabetes mellitus (DM) is a serious or chronic long-term disorder in which blood glucose levels increase as a result of the body's inability to produce or use the hormone insulin. According to a report from the International Diabetes Federation (IDF), in 2021, Indonesia had around 19.5 million people with diabetes mellitus, placing it in fifth place in the world in terms of the number of people with diabetes (Dwi, 2023; International Diabetes Federation (IDF), 2024). And it is predicted a significant increase to 23.3 million people in 2030 and 28.6 million in 2045 (International Diabetes Federation (IDF), 2024). Indonesia also recorded the highest number of type 1 diabetes sufferers in ASEAN, with 41.8 thousand people in 2022, this figure makes Indonesia the country with the most type 1 diabetes sufferers in ASEAN, and is ranked 34th out of 204 countries on a global scale, and type 1 diabetes sufferers in Indonesia are generally between 20 until 59 years old (Ahdiat, 2023).

The percentage of Diabetes Mellitus sufferers in 2019 in North Sumatra was 249,519 sufferers and those who received health services were 144,521 sufferers or 57.92%. The remaining 104,998 did not check themselves to health services (Dinas Kesehatan (Dinkes) Provinsi Sumatera Utara, 2019). In Indonesia there are 1785 DM sufferers who have experienced complications such as, 60% of diabetic foot cases are neuropathy, 20% are coronary heart disease, 10% are retinopathy, and 7.1% are nephropathy. In Eastern Indonesia, the prevalence of diabetic foot ulcers is around 12% and the prevalence of the risk of diabetic foot ulcers is around 55.4% (Purwanti & Maghfirah, 2016).

It is well known that managing individuals with diabetes mellitus involves four key pillars that help limit the disease's progression and consequences. Education, nutritional therapy, exercise, and pharmacology are the four pillars (Gaol, 2019). The level of patient knowledge about their disease greatly influences the process of preventing complications. Patients who possess adequate knowledge will be able to prevent issues; education, experience, and information sources are other variables that promote developing knowledge (Marbun & Tambunan, 2023; Sidauruk & Tambunan, 2023; Tambunan & Marbun, 2023).

Information is a source of knowledge or as a transfer of knowledge. A person can receive more information, then the knowledge they have will increase. It is very important for someone to get information from various mass media (leaflet, visualized power point, booklet, etc) and from health workers, because with the information obtained, diabetes sufferers will understand how to overcome health problems for themselves (Mulyani & Kurniawati, 2022).

The results of a study using Wilcoxon on knowledge about DM diet and blood sugar levels with a p value of 0.000 ($p < 0.05$). There is an effect of health education through leaflet media about DM diet on knowledge and blood sugar levels in the Pabuaran Mekar Village area, West Java Province (Rahmawati, 2023). In line with research (Pertiwi & Mujahid, 2022) that health education has an impact on knowledge levels and compliance with drug consumption in type II DM patients with a *p-value*= 0.001 ($\alpha < 0.05$).

Methods

This study uses a single group pre-posttest design without control and is quantitative pre-experimental (Simanullang & Tambunan, 2023; Basiroen et al., 2025; Judijanto et al., 2024). The study was conducted in Hamlet 9, Laut Dendang Village, Deli Serdang Regency. This study was conducted in

June - July 2024. The education was delivered through leaflet and displayed also through visualized power point. The population of DM sufferers in hamlet 9, Laut Dendang Village is 30 people. The respondents in this study were 30 people with a total sampling technique.

The instrument in this study was a Diabetic Knowledge Questionnaire (DKQ-24) which was adopted from previous research (Lim et al., 2023). Each research variable's frequency distribution was described using univariate analysis. The Wilcoxon-test was employed in the bivariate analysis (Puspitasari et al., 2024). Methods are described in detail, and references should be included for non-regular methods. It should include the design or research framework, research objectives, techniques, and data collection instruments that describe the data analysis approach.

Results

Table 1. Characteristic Respondents

Characteristic Respondents	Frequency (f)	Percentage (%)
Gender:		
Male	17	56.7%
Female	13	43.3%
Age (Years Old):		
30-40	6	20%
41-50	15	50%
51-60	9	30%
Education:		
Junior High School	9	30%
Senior High School	17	56.7%
Diploma 3	3	10%
Bachelor Degree	1	3.3%
Occupation:		
Housewife	8	26.7%
Self Employed	6	20%
Laborer	5	16.7%
Civil Servant	7	23.3%
Unemployed	4	13.3%
Length of DM:		
1-5 years	8	26.7%
5-10 years	16	53.3%
>10 years	6	20%
Follow Up Status:		
Routine	20	67.7%
Not Routine	10	33.3%
Medication's Compliance:		
Compliance	20	67.7%
NonCompliance	10	33.3%
TOTAL	**30**	**100%**

According to Table 1, the data indicates that the predominant demographic among respondents was male, comprising 17 individuals (56.7%). The age group most represented was 41-50 years, with 15 individuals (50%). In terms of educational background, the majority of respondents had completed senior high school, totaling 17 individuals (56.7%). Regarding occupation, housewives represented the largest group, with 8 individuals (26.7%). Furthermore, the majority of respondents had been diagnosed with diabetes mellitus for a duration of 5-10 years, amounting to 16 individuals (53.3%). Additionally, 20 respondents (67.7%) reported having routine check-ups, and an equal number, 20 respondents (67.7%), indicated adherence to their medication regimen.

Table 2. Distribution of Knowledge Level Before and After Health Education

Knowledge Level	Health Education			
	Pre-test		Post-test	
	(f)	(%)	(f)	(%)
Low	28	93.3%	0	0%
Enough	2	6.7%	7	23.3%
Good	0	0%	23	76.7%
TOTAL	**30**	**100%**	**30**	**100%**

According to Table 2, the pre-test results of the health education assessment indicate that a significant majority of respondents, totaling 28 individuals (93.3%), exhibited a low level of knowledge. In contrast, only 2 individuals (6.7%) demonstrated an adequate level of knowledge, while none achieved a good level of knowledge. Conversely, the post-test results reveal that the majority of respondents, amounting to 23 individuals (76.7%), attained a good level of knowledge. Additionally, 7 individuals (23.3%) displayed an

adequate level of knowledge, with no respondents falling into the low knowledge category.

Tabel 3. Analysis of The Effect Health Education in Diabetic Mellitus on Knowledge Level in Laut Dendang Village (Wilcoxon Test)

	Health Education			
Knowledge Level	**Pre-test (Mean)**	**Post-test (Mean)**	***Z-Score***	***P-Value***
	1.07	2.77	4.002	0.001

Based on Tabel 3 describes that mean pre-test = 1.07 and mean post-test = 2.77, it shows that there was an increase in respondents' mean knowledge level before and after health education with mean 1.70. Z-score showed 4.002 and the p-value was 0.001 ($\alpha < 0.05$), indicating that the knowledge level in Laut Dendang village was impacted by health education regarding diabetes mellitus.

Discussion

1. Characteristic of Respondents

In the study conducted in Hamlet 6, Laut Dendang Village, the findings indicate that the majority of respondents were male, comprising 17 individuals (56.7%), while female respondents accounted for 13 individuals (43.3%). The predominant age group among respondents was 41-50 years, with 15 individuals (50%), followed by those aged 30-40 years, totaling 6 individuals (20%), and respondents aged 51-60 years, numbering 9 individuals (30%). Regarding educational attainment, the majority of respondents had completed senior high school, represented by 17 individuals (56.7%). The most common occupation among respondents was that of housewife, with 8 individuals (26.7%).

In terms of health status, the majority of respondents had been diagnosed with diabetes mellitus (DM) for a duration of 5-10 years, totaling 16 individuals (53.3%). Additionally, 8 individuals (26.7%) had been living with DM for 1-5 years, while 6 individuals (20%) had been affected for more than 10 years. Routine health check-ups were reported by 20 respondents (67.7%), whereas 10 individuals (33.3%) did not engage in regular check-ups. Furthermore, 20 respondents (67.7%) adhered to a routine medication regimen, while 10 individuals (33.3%) exhibited noncompliance in their medication intake.

Previous research results (Gaol, 2019) which was conducted at the Lingkar Timur Health Center, Bengkulu City in 2019 with 30 respondents describes that the majority of female respondents (80%). The highest respondent education (60%) is at the elementary and junior high school level. The highest occupation in this study is unemployed as much as (53.3%). The another study (Pertiwi & Mujahid, 2022) in the area of Sokaraja I public health centre with 30 respondents showed that the majority of respondents were 36-45 years old (56.43%). Females made up the bulk of responders (66.7%). Based on the history of DM, the results of the study showed that the majority of respondents suffered from DM for 1-5 years (60%). Additionally, 40% of respondents had completed junior high school.

2. Respondents Knowledge Level Before and After Health Education

In the study conducted in Hamlet 6, Laut Dendang Village, the findings indicate that a significant majority of respondents, totaling 28 individuals (93.3%), possessed insufficient knowledge. Conversely, only 2 individuals (6.7%) demonstrated an adequate level of knowledge, while none exhibited a high (Good) level of knowledge. This can be influenced by the low level of information and lack of health education regarding diabetic management in people with diabetes mellitus, the limited education specifically for treating diabetic wounds and the high costs of managing diabetic wounds influence the low level of public knowledge, especially regarding diabetes management. In line with previous research (Taranda & Yohanes, 2022) at Tikala Community Health Center, North Toraja Regency with 52 respondents describe that the majority respondents had low knowledge level is 45

people (86.5%). The lower a person's education level, the lower knowledge level they have, including knowledge about health.

This research shows that the majority of respondents have good knowledge level is 23 people (76.7%), respondents had enough knowledge level is 7 people (23.3%), and no one respondents had low knowledge level. The results of the study showed that after health education was carried out, respondents showed an increasing of knowledge level about diabetes mellitus management and respondents increasingly understood the importance of carrying out foot care and being able to control their blood sugar levels to minimize ongoing complications. Similar o previous research (Taranda & Amurdi, 2022) describe that the majority respondents had good knowledge level was 33 people (63.5%), the level of knowledge level in enough category was 14 respondents (26.9%), and only 5 respondents (9.6%) were in the low category. Health education have effect on knowledge level from not knowing to knowing which occurs after feeling an object (Rachmawati, 2019). The importance of knowledge and skills that must be possessed by Diabetes Mellitus sufferers can help nurses in providing education and counselling.

3. The Effect Health Education in Diabetic Mellitus on Knowledge Level in Laut Dendang Village

It was found that there was a significant effect after health education about diabetes mellitus management on knowledge level with p-value = 0.001. In addition, the mean rank before health education was obtained = 1.07 and the mean rank after health education = 2.77, this indicates that there was an increasing on knowledge level after being educated from low to good knowledge level. Education can increase knowledge about DM, so that increasing client knowledge is one of the goals of health education, thereby increasing self-awareness in terms of health, changing lifestyles towards healthy ones, medication's adherence, and have high quality of life (Gaol, 2019).

Another similar research ((Fauziah, Pelawi, Ernauli, & Marni, 2020) at Padurenan Public Health Centre in 2019, it shows there is an effect of health education on knowledge level with *p-value* = 0.001. Previous research (Suciana, Daryani, Marwanti, & Arifianto, 2019), there are five pillars of diabetes mellitus management including health education, exercise, pharmacological management, independent blood sugar control, and food planning (Fadillah & Tambunan, 2025). Education is one of the important pillars in diabetes mellitus management to increase a person's knowledge regarding of the diabetes mellitus management. Health education has an important role in conveying information on the five pillars of DM management so that respondents can have a good quality of life (Taranda & Yohanes, 2022).

Conclusions and Recommendations

It is concluded that health education through leaflet and visualized power point brought a significant impact on knowledge levels before and after the health education among Diabetic Mellitus. It is confirmed that educational program was effective in enhancing the knowledge of Diabetes Mellitus management among the participants in Laut Dendang Village. It is recommended for future research to add variables of Medication Compliance, Medication Supervisor, Family Support, Quality of life and Health Locus of Control.

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