THE INFLUENCES OF DIABETES SELF-MANAGEMENT EDUCATION(DSME) BASED ON HEALTH COACHING (HC) ON THE CHANGES IN KNOWLEDGE AND BEHAVIOR OF HEALTH CADRES IN PROVIDINGEDUCATION IN THE RUMPA VILLAGE

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Abstract

Backgrounds: Diabetes mellitus (DM) is a chronic condition and/or a group of metabolic diseases that occur when the body cannot produce enough insulin hormone or cannot effectively use the insulin it produces, resulting in hyperglycemia. The higher cases of DM are directly correlated with the risk of complications. Poorly controlled blood glucose levels can lead to damage to the heart vessels, eyes, kidneys and nerves, resulting in various diseases such as cardiovascular disease, stroke, nephropathy, blindness, kidney failure, impotence in men, amputation and infections. Diabetes mellitus is treated with pharmacological and non-pharmacological therapy. One non-pharmacological treatment for diabetes mellitus is by providing education such as Diabetes Self-Management Education (DSME)**; Objectives**: This research aims to determine the effect of DSME based on health coaching on cadres' knowledge and behavior in providing education. **Methods**: This research is Quasy Experimental Design with a pre and post without control approach. The sampling method was conducted using a total sampling technique of 20 people. **Results:** The results of the normality test on Shapiro Wilk show pre knowledge p=0.203, post knowledge p=0.557 <0.05, pre DSME behavior p=0.187 <0.05 and post DSME behavior p=0.061 <0.05, meaning that the data is normally distributed. Furthermore, knowledge data is analyzed using a paired sample t test with a result of p=0.000, and behavioral data is analyzed using an independent t test with a result of p=0.000. **Conclusions**: There is an influence of DSME based on HC on cadres' knowledge and behavior in providing education in the Rumpa village.

Keywords*: Diabetes Mellitus; DSME; Health Cadres; Knowledge; Behavior*

BACKGROUND

Diabetes mellitus (DM) is a chronic condition in which the blood glucose levels rise due to thebody's incapability of producing enough insulin or using insulin effectively. According to the WHO, it was estimated in 2014 that globally 422 million adults aged 18 years or older had diabetes. The highest number of diabetes cases was reported in Southeast Asia and the Western Pacific, accounting for approximately half of the world's diabetes cases (Sari et al., 2022).

Based on data from International Diabetes Federation (IDF), the number of people with DM worldwide was 537 million in 2021, and it is projected to increase to 634 million by 2030 and 783 million by 2045. Indonesia, along with China, the United States, Brazil, Russia and Mexico, has one of the highest prevalences of DM, with an estimated number of 10 million people affected (Utomo et al., 2020). According to *Riset Kesehatan Dasar* (Basic Health Research) in 2019, the prevalence of DM in Indonesia was 8.5%, with an estimated number of 16 million people affected(Sari et al., 2022).

The higher cases of DM are directly correlated with the risk of complications. Poorly controlled blood glucose levels can bring about damage to the heart vessels, eyes, kidneys and nerves, resulting in various diseases such as cardiovascular disease, stroke, nephropathy, blindness, kidney failure, impotence in men, amputation and infections. Complications caused by DM can lead to increased medical costs and loss of profession for patients with DM, resulting in substantialeconomic losses for families and patients (Milita et al., 2018).

Interventions in individual healthcare, particularly self-care education, have shown positive and cost-effective effects. When individual interventions are combined with decision-making action plans, they can save millions of lives and reduce patient suffering. One such form of self- care education that has been well-documented for its positive impact on the patients with type 2 diabetes mellitus is Diabetes Self-Management Education (DSME), an intervention that aims to change the behavior of patients with type 2 diabetes mellitus, facilitate knowledge, skills and abilities necessary for diabetes self-care, and promote preventive lifestyles against complications by type 2 diabetes mellitus (Chrvala et al., 2016).

Diabetes Self-Management Education (DSME) is a health education process for individuals or families to manage diabetes. Developed since the 1930s by Joslin, it is a behavioral intervention to increase knowledge regarding diabetes and enhance the skills of individuals and families in managing DM (Mandasari et al., 2017).

The intervention model of DSME has various methods, durations, intensities of distributions, forms of education, demographic factors and different clinical characteristics of patients, actually leading to inconsistency in clinical outcomes and other reported outcomes from several studies, with no standardized description of the intervention (Chrvala et al., 2016).

In addition to DSME being a supporting healthcare intervention for self-care education, there is another healthcare education practice according to Palmer et al. (2014), a health education and health promotion practice in the context of coaching related to patient-centered education methods to improve individual well-being, facilitate the achievement of health goals and promote self- management, known as health coaching (Syikir, 2021).

Health coaching, in line with the Diabetes Self-Management Education (DSME) program, is an intervention that focuses on behavior change for patients with type 2 diabetes mellitus,

facilitating knowledge, skills and abilities required for diabetes self-care. DSME focuses more on counseling between the patients and educators, directing information to the patients and instructingthem to follow the educators' directions, while health coaching in a coaching context is a sort of partnership that seeks to explore the patients' potentials in order to find solutions to their health and enhance self-awareness that leads to the patients' improving ability in dealing with their disease to help prevent it from worsening and that encourages effective and structured communication techniques with the addition of motivational interviews in the self-care education process (Bennett et al., 2010; Chrvala et al., 2016; Conn & Curtain, 2019; Funnell et al., 2011; Haas et al., 2014; Rahmawati et al., 2016; Wong-Rieger, 2011).

The addition of the health coaching program in the practice of DSME is very helpful in achieving glycemic control goals, that is by means of a counseling education concept in DSME with a structured partnership and effective communication concept in health coaching. Therefore, it is expected to increase the self-awareness of patients with type 2 diabetes mellitus on the importance of improving self-care diabetes management in order that their blood glucose can be controlled and diabetes complications do not occur which can result in increased health status for patients with type 2 diabetes mellitus (Syikir, 2021).

The involvement of members as a team including doctors, nurses, other health workers, patients and their families is the key to success and plays important roles in a comprehensive DM management. One of the volunteers from other health workers often encountered in the communityis health cadres (Sjattar et al., 2019). Health cadres in Ministerial Regulation No. 25 of 2014 are the people chosen by the community who are trained and equipped with materials in handling health problems to an individual or community and who can work in places related to health services. Health cadres become the driving team, liaison and disseminator of health issue information at community health centers (Sjattar et al., 2019).

The importance of DM management education involving cadres poses equal importance for other community members, considering that DM is a hereditary disease that poses a risk to other community members. In addition, DM is a chronic disease that undermines patients' abilities, so, if cadres are involved in this education program, the community can help manage DM and improve self-care behaviors in patients as their condition worsens (Windani et al., 2018).

Education is a continuous process that has to be continuously observed for progress. The primary goal of health education is to increase knowledge about DM. This knowledge will be the starting point for changing attitudes and lifestyles and ultimately for changing the behavior of communities and patients with DM, increasing compliance that will subsequently improve the quality of life of patients with DM. Education conducted in this activity involves communities thatexists in the neighborhood (Windani et al., 2018).

Health cadres must have a great level of knowledge and skills regarding health problems in the community because people find themselves close to health cadres, as health cadres come fromwhere the community lives, and therefore communication between them should be better established (Amanda et al., 2020). Gradually and continuously providing health information through cadres can encourage community's knowledge so that health information will be more easily accepted by the community itself. Health cadres will also be more familiar with the habits and characteristics of the community (Amanda et al., 2020).

Data of patients with DM from Dinas Kesehatan (Health Office) in Polewali Mandar Regency (2022) shows there were 6,662 patients with DM, including that from Puskesmas

Binuang which indicated 153 patients out of 361 (42%). Also, based on data from 20 health centers, Puskesmas Mapilli was reported to be one of the health centers with the highest case rates of DM, with approximately 58% patients affected out of 467. Cadres' lack of knowledge and behavior in providing DSME might be the cause of high cases of DM in a community. It is in line with preliminary studies conducted by researchers on 10 cadres at Puskesmas Mapilli; five of whom had low knowledge of self-care management for patients with DM, and only one or two possessed good knowledge, such as motivating patients to exercise and perform physical activities and encouraging blood-glucose checking. Cadres also said they had never received some specific DSME educations from health workers. Moreover, health workers at Puskesmas Mapilli said that among health cadres in the working area Puskesmas Mapilli are the ones from Rumpa, a village with more active cadres than others, but cadres of Rumpa have not been given education or training related to self-care diabetes management.

Considering the background explained above, the researchers are interested in conducting research on "*The influences of Diabetes Self-Management Education (DSME) Based on Health Coaching (HC) on the changes in knowledge and behavior of health cadres in providing educationin the Rumpa village*".

METHODS

The type of research used was quasi-experiment with a *pre and post without control* study design. The study took place in a village named Rumpa, within the working area of Puskemas Mapilli in Polewali Mandar Regency. The sample size for this study included all of 20 health cadresin Rumpa, selected using a total sampling technique. Data collecting was conducted using a questionnaire and observation sheet. The Diabetes Self-Care Knowledge Questionnaire (DSCKQ-30) used in the study consisted of 30 items of questions describing three domains of self-care diabetes. Assessment was done using a Goutman scale ranging from 0-1, which includes 30 statements: 18 about modifiable lifestyle, 8 about compliance to self-care practices, and 4 about consequences of poorly controlled blood sugar levels. Additionally, an observation sheet was used to assess the ability of health cadres in providing DSME based on health coaching from the University of California San Francisco Center for Excellent in Primary Care Health Coaching. It comprised 35 items of observation covering preparation (3 items), greeting (2 items), agenda setting (6 items), ask-tell-ask technique (6 items), teaching new treatments (3 items), action plan (6 items), closing the loop (3 items) and patient-coach interaction (6 items). Data analysis methods in this research included univariate analysis and bivariate analysis. Univariate analysis was used to explain or describe each research variable's characteristics, while bivariate analysis, for knowledgedata, used a paired t-test (for normally distributed data) or Wilcoxon test (for non-normally distributed data) with a significance level of <0.05, and, for behavior data, it used an independent t-test (for normally distributed data) or Wilcoxon test (for non-normally distributed data) with a significance level of <0.05. The researchers intended to compare data before and after the intervention.

RESULTS AND DISCUSSION

Table 1. Description of Respondent Distribution Based on Age

No	Age	F	%
1	Young Adult (20-40 years old)	12	66.7
2	Old Adults (40-60 years old)	6	33.3
	Total	**18**	**100**

Source: Data Primer 2023

From Table 1 above it can be learned that there are 12 respondents (66.7%) as young adults aged 20-40 years old, and there are 6 respondents (33.3%) as old adults aged 40-60 years old.

Table 2. Description of Respondent Distribution Based on Education Level

No	Education Level	F	%
1	SD (Elementary School) SMP	10	55.6
2	(Junior High School)	5	27.8
3	SMA (Senior High School)	3	16.7
	Total	**18**	**100**

Source: Data Primer 2023

From Table 2 above it can be learned that there are 10 respondents (55.6%) of SD graduates, 5 respondents (27.8%) of SMP graduates and 3 respondents (16.8%) of SMA graduates.

Table 3. Description of Respondent Distribution Based on the Length of Being a Cadre

No	Length of Being a Cadre	F	%
1	>10 Years	4	22.2
2	5-10 Years	7	38.9
3	1-5 Years	4	22.2
4	<1 Year	3	16.7
	Total	**18**	**100**

Source: Data Primer 2023

From Table 3 above it can be learned that there are 4 respondents (22.2%) in the category of >10 years, 7 respondents (38.9%) in the category of 5-10 years, 4 respondents (22.2%) in the category of 1-5 years and 3 respondents (16.7%) in the category of <1 year.

Univariate Analysis

Table 4. Health Cadres' Knowledge pre and post Training of DSME Based on Health Coaching

Knowledge	Mean	SD	Median	Min-Max
Pre Post	15.56 26	1.79 1.41	16 26	12-18 23-29

Source: Data Primer 2023

Table 4 indicates the mean score of knowledge for pre-test is 15.56 categorized as low level of knowledge. The score of deviation standard is 1.79 with the median score of 16, the minimum score of 12 and the maximum score of 18. Meanwhile, the mean score of knowledge for post-test is 26 categorized as high level of knowledge. The score of deviation standard is 1.41 with the median score of 26, the minimumscore of 12 and the maximum score of 18.

Table 5. Health Cadres' Behavior pre and post Training of DSME Based on Health Coaching

Behavior	Mean	SD	Median	Min-Max
Pre Post	15.22 32.11	1.99 2.47	15 32.5	12-19 28-35

Table 5 indicates the mean score of health cadres' behavior in administering DSME based on health coaching for pre-test is 15.22 categorized as low level. The score of deviation standard is 1.99 with the median score of 15, the minimum score of 12 and the maximum score of 19. Meanwhile, the mean score ofhealth cadres' behavior in administering DSME based on health coaching for post-test is 32.11 categorized as high level. The score of deviation standard is 2.47 with the median score of 32.5, the minimum score of 28 and the maximum score of 35.

Bivariate Analysis

Bivariate analysis is conducted to learn the influence of DSME based on HC on knowledge and behavior of cadres in providing education in Rumpa. The statistic test used is paired t test and independentt test as data were distributed normally.

Table 6. The Difference of Cadres' Knowledge before and after Provision of DSME Based on HC

Knowledge	Average (s.d)	Deviation (s.b)	CI 95 %	*P-value*
Before	15.56(1.79)	10.44(2.064)	11.47- 9.42	0.000
After	26(1.41)			

Source: Data Primer 2023

Table 6 indicates that the difference of cadres' knowledge before intervention averages on 15.56 with a standard deviation of 1.79, and after intervention there is an improvement to 26 with a standard deviation of 1.141. This research is considered reliable due to the fact that the mean score of 10.44 falls within the 95% confidence interval of 11.47 to 9.42.

The paired t-test analysis results on the effect of DSME based on health coaching on the health cadres' knowledge in Rumpa indicate p-value = 0.000 < 0.05. It suggests that Ho is rejected, thus concluding that there is a difference in the respondents' knowledge before and after administration of DSME based on health coaching in Rumpa.

Table 7. The Difference of Cadres' Behavior before and after Administration of DSME Based on HC

Behavior	Average (s.d)	Deviation (s.b)	CI 95 %	*P-value*
Before	15.22(1.99)			
		16.89(2.59)	18.18- 15.60	0.000
After	32.11(2.47)			

Source: Data Primer 2023

Tabel 7 indicates that the difference of cadres' behavior before intervention averages on 15.22 with a standard deviation of 1.99, and after intervention there is an improvement to 32.11 with a standard deviation of 2.47. This research is considered reliable due to the fact that the mean score of 16.489 falls within the 95% confidence interval of 18.18– 15.60.

The paired t-test analysis results on the effect of DSME based on health coaching on the health cadres' behavior in Rumpa indicate p-value = 0.000 < 0.05. It suggests that Ho is rejected, thus concluding that there is a difference in cadres' behavior before and after administration of DSME based on health coaching in Rumpa.

Diabetes mellitus is a genetic disease that occurs when blood sugar levels increase or are at abnormal levels due to insulin secretion, insulin action or a combination of both (Amanda et al., 2020). DM can have significant impacts on reducing human resources and increasing healthcare costs. People with DM require complex and continuous care, including education, meal planning, medication and physical exercise. Effective self-management of DM can be achieved if individuals have the skills and knowledge to manage it independently. Self-management requires active participation from patients, families and community. To achieve success in managing DM, Diabetes Self-Management Education (DSME) is needed as it covers the disease, control and monitoring, complications, specific issues, pharmacological and non-pharmacological treatments, hypoglycemia, and guides to the use of available healthcare facilities (Rahmawati et al., 2016).

Diabetes Self-Management Education (DSME) is a process that provides knowledge to patients with diabetes on self-care strategies whose purpose is to optimize metabolic control, prevent complications and improve the quality of life for patients with DM (Nurul & Arofiati, 2019).

A new technique in self-care management is health coaching (HC), as considered an effort to treat and manage chronic diseases worldwide. Health coaching is one approach to changing the behavior of patients with type 2 diabetes mellitus. Behavioral changes can improve HbA1C and have positive impacts on managing type 2 diabetes mellitus. The focus of health coaching is on patients, especially those with diabetes mellitus (Aliun & Arofiati, 2022).

Health coaching is line with Diabetes Self-Management Education (DSME), which is an

intervention that aims to change the behavior of patients with type 2 diabetes mellitus by facilitating knowledge, skills, and abilities needed for diabetes self-care. Incorporating health coaching into DSME practices greatly aids in achieving glycemic control goals through the education counseling concept within DSME, emphasizing structured partnership and effective communication in healthcoaching. This is expected to increase self-awareness among patients with type 2 diabetes mellitus regarding the importance of enhancing diabetes self-care management, thus controlling blood glucose and preventing diabetes complications, ultimately improving their health status (Syikir, 2021).

Research results indicate a significant difference in self-care management knowledge betweenthe control and intervention groups among patients with type 2 diabetes mellitus. The average scoredifference in the intervention group is significantly better compared to the control group.

During the intervention, health coaches prove effective in increasing patients' knowledge about lifestyle changes, compliance to self-care practices and the consequences of poorly controlled blood sugar. According to health cadres acting as coaches during the Diabetes Self-CareManagement intervention, patients are able to improve their self-management knowledge and gainmotivation, enhancing their curiosity and confidence to control their disease.

The improved knowledge in the intervention group compared to the control group can be attributed to the health cadres who received prior DSME training. The intervention group undergoes a five-day education with the addition of a logbook containing educational formats and self-care management practice sheets. Patients filled out these sheets upon completing the activities, which were observed weekly by health cadres. The logbook also included a booklet on DM and self-care management, serving as a reference for patients on DM-related materials.

For 5 days of education administration of DSME based on health coaching, health cadres havedelivered 2 sub-themes related to DM and self-care management using health coaching concepts daily. Subsequently, health cadres and patients together selected themes related to self-care, with patients choosing their priorities for daily self-care management practices such as blood glucose monitoring, diet, exercise, medication adherence, and foot care.

The research results before and after the intervention show an average mean difference of -

37.00 in the intervention group compared to a mean difference of -700 in the control group. Theintervention group has a p-value of 0.000 (<0.05), while the control group has a p-value of 0.678 (>0.05). Thus, it is concluded that the intervention group with DSME based on health coaching shows greater improvement in knowledge of self-care management to patients with type 2 diabetes mellitus compared to DSME implemented by the health center, acting as the control group.

These findings are line with previous research by Syikir (2021), indicating that post-intervention, the intervention group of patients with type 2 diabetes mellitus shows significantly higher improvements than the control group, including self-care management knowledge. Rahmawati et al. (2016) also demonstrates that DSME influences an improvement in knowledge, dietary patterns, physical exercises, pharmacological therapy and blood glucose monitoring improvements among patients with type 2 diabetes mellitus.

CONCLUSION

Based on the research findings to assess the influence of DSME based on health coaching on self-care management of patients with type 2 diabetes mellitus in the working area of Puskesmas Mapilli, it can be concluded that:

1. The research results using paired sample T-Test shows that the intervention group obtains a p-value of 0.000 (<0.05), while the control group obtains a p-value of 0.678 (>0.05). The difference in pre-post scores within the intervention group is also significant with a p-value of 0.000 (<0.05). This indicates that DSME based on health coaching has an effect on self-care management of patients with type 2 diabetes mellitus.
2. There is a difference in knowledge about self-care management in patients with type 2 diabetes mellitus between the intervention group receiving DSME based on health coaching and the control group not receiving DSME, where knowledge about self-care management in the intervention group is better than in the control group.
3. There is a difference in self-care management among patients with type 2 diabetes mellitus between the intervention group receiving DSME based on health coaching and the control group not receiving DSME, where self-care management in the intervention group is better than in the control group.

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