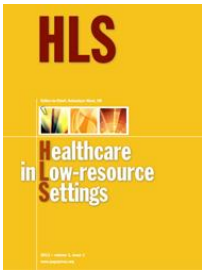
Healthcare in Low-resource Settings



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Original Research/Review

The effect of psychoeducation with health coaching method on HbA1c levels Among Type 2 Diabetes Mellitus

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Significance for public health: Unregulated diabetes mellitus (DM) can result in a range of severe complications, such as hypoglycemia, hyperglycemia, and metabolic ketoacidosis. The intervention study yielded positive outcomes by fostering patient empowerment in managing their treatment, enhancing their ability to address diabetes independently, and boosting their confidence in self-care decisions.

Abstract

Different dangerous and life-threatening complications, such as hypoglycemia, hyperglycemia, and metabolic ketoacidosis are caused by uncontrolled Diabetes Mellitus (DM). Therefore, this study aimed to analyze the effect of psychoeducation with health coaching methods in type 2 DM patients on HbA1c levels.

In this context, a quasi-experimental design was adopted with pre-and post-test control group methods. The sample size for the intervention and control groups was 30 type 2 DM patients who were routinely controlled at the Kalijudan Surabaya Community Health Center between March to April 2023 using a simple random sampling method. The intervention group received psychoeducational intervention using the health coaching method with six sessions through 3 meetings and module media, while the control only received module education media. Furthermore, the HbA1c level was taken before and after intervention, and the effect was measured using the t-test.

The results showed that pre-test and post-test HbA1c levels were decreased (mean 9.06; 5.98) and increased (mean 9.13; 10.59) in the intervention and control groups, respectively. Psychoeducation with the health coaching method and provision of modules to patients was more effective compared to groups only given modules (0.000).

In conclusion, this intervention motivated patients subjected to treatment, facilitated increased personal control, and built confidence in managing diabetes independently. The implication obtained was an increase in the ability of patients to make self-care decisions.

Introduction

Recent developments are triggering changes, such as increased consumption of unhealthy foods, which can lead to high blood sugar levels. In this context, diabetes mellitus (DM) causes various complications, increasing the rate of disability and death. Hypoglycemia, hyperglycemia, and metabolic ketoacidosis are dangerous and life-threatening complications and emergency conditions of type 2 DM. Uncontrolled blood sugar levels are an indication of people with diabetes who are unable to apply self-care behavior according to the correct rules.[1]

DM is the world's sixth leading cause of morbidity and healthcare problems and the high prevalence impacts the need for financing. In East Java, there was a trend towards an increase in the incidence of DM from 2019 to 2021. The prevalence of cases in 2019, 2020, and 2021 was 94,076, 94,264, and 96,280 people, respectively.[2–4]

Health coaching for DM patients can have a good effect because the disease will be controlled after conducting laboratory tests. In this context, HbA1c levels are used to assess the quality of long-term glycemic control and the effectiveness of therapy. The test represents the average daily blood glucose and carbohydrate balance over two months. HbA1c is also used to monitor disease progression and determine the development of DM complications. In addition, the test is better than fasting blood glucose examination and the checks should be carried out at least twice a year.[5] HbA1c value is directly proportional to the possibility of experiencing complications, which reduces the quality of life.[6] Therefore, the application and discipline of appropriate self-care are practical in DM management to significantly reduce the risk of complications.[7]

Psychoeducation with health coaching method assists patients in raising awareness and behavior to maximize the potential of managing illness. Health coaching includes workers engaging with patients, focusing on issues, and collaboratively finding solutions. This collaborative process is often used in managing chronic diseases such as cardiovascular, diabetes, cancer, and chronic respiratory disease (International Coach Federation). The intervention consists of 6 sessions in 3

meetings between the therapist and the patient. Therefore, this study aimed to analyze the effects of psychoeducation using health coaching method on HbA1c levels in type 2 DM patients.

Materials and Methods

The study design was quasi-experimental with a Pre-test and Post-test Control Group method. This study's population was 83 type 2 DM patients routinely controlled at the Kalijudan Community Health Center from March to April 2023. The sample size of 30 people for intervention and control groups was taken using simple random sampling.

The intervention group received psychoeducation using health coaching method, six sessions through three meetings, and media modules, while the control only received module education media. HbA1c data was taken before and after the intervention and the examinations were carried out for 2.5 months. The examination was conducted by laboratory personnel trained to take the patient's venous blood and perform analysis to determine level. The collected data was analyzed using the T-test and the analysis was executed by using SPSS Statistics Version 25.0.

An ethical clearance letter was gained from Health Research Ethics Commission of Health Polytechnic, Ministry of Health, Surabaya, number: EA/1081/KEPK-Poltekkes_Sby/V/2022.

Results and Discussion

Demographic data

Table 1 shows the characteristics of DM patients, including gender, education, occupation, age, and duration of suffering from DM. Table 2 shows the homogeneity test results showed no significant differences in the characteristics of gender, occupation, age, and duration of suffering from DM in the two groups (p-value 0.083; 0.065; 0.459; 0.947). In contrast, the educational characteristics of the two groups showed differences (p-value 0.037). HbA1c before intervention (Mean ± SD 9.06 ± 1.79; 9.13

± 2.34) in the two groups did not show a significant difference (p-value 0.897). Meanwhile, the value (Mean ± SD 5 .98 ± 0.95; 10.59 ± 2.64) after the intervention reported a significant difference (p-value 0.000).

Psychoeducation with health coaching method and HbA1c levels

Table 3 shows the results of health coaching psychoeducation and HbA1c levels on intervention and control group. The results of the pre-test and post-test comparison of HbA1c levels in DM patients who received psychoeducational interventions with health coaching method and educational media modules showed a significant difference (p-value 0.000). The patients who received psychoeducational interventions using health coaching method reported decreased HbA1c levels towards average values (Mean ± SD 9.06 ± 1.79 to 5.98 ± 0.95). Meanwhile, individuals who only received educational media modules showed a significant difference (p-value 0.000), with an increased mean pre-test and post-test HbA1c values (Mean ± SD 9.13 ± 2.34 to 10.59 ± 2 .64).

There was no significant difference in HbA1c levels between DM patients who received psychoeducational interventions using health coaching method with educational media modules and those who only received educational media modules (p-value 0.897). The mean ± SD HbA1c values between intervention and control groups were 9.06 ± 1.79 and 9.13 ± 2.34, respectively. After health coaching intervention, the groups significantly differed in HbA1c values (p-value 0.000). Considering the mean ± SD HbA1c trend, there were differences, namely 5.98 ± 0.95 and 10.59 ± 2.64, where HbA1c levels of the intervention group were lower than treatment.

This study found that psychoeducational interventions using health coaching method and providing modules to DM patients reduced HbA1c levels. This treatment was carried out through education, discussion, and action plans related to the problems experienced by patients. The control group was only given the same module as the treatment group but not psychoeducational interventions using health coaching method. Previous studies stated that the stages were conducted sequentially

according to the needs of the DM patient [8]. The series of activities and observations in each intervention session are as follows:

First Meeting

The first meeting was to create a relationship of mutual trust, provide information and motivation through education about DM self-care, and carry out an HbA1c examination. The creation of a mutual trust relationship is the first step in communication between nurses and patients. Trust is the desire of a party to surrender or take the actions of another individual based on the hope of performing a specific action.[9] A good relationship between patients and nurses can be created out of credibility, empathy, concern, and sincerity.

Diabetes Self-Management Education (DSME) given to patients is essential in managing type 2 DM. Furthermore, the provision of education can change the self-care behavior of the patient through continuous motivation. Direct education is often provided, but patients with disabilities may struggle to retain the information. In this context, there is a need for educational materials delivered through modules, which can serve as a medium for more effective and lasting learning. The results are consistent with previous study, where the effect of teaching sessions in supportive educative programs increases the knowledge and understanding of type 2 DM patients.[10]

Second Meeting

The second meeting is to identify problems and explore self-potential in diabetic patients, discuss directions and goals and implement activity plans. This stage is the most critical in health coaching because of the changes in the behavior of patients. At this stage, a coach offers training in problem-solving to address any obstacles preventing patients from completing treatment programs or acquiring specific skills essential for managing health conditions. Additionally, support is provided to enhance the ability to cope with the challenges associated with illness and assist in maintaining

psychological well-being to preserve self-confidence. The patient remains optimistic in dealing with the disease through the information obtained from health coaching activities.[11]

Based on the results of interviews and problem analysis in the intervention group, there were many obstacles in carrying out the diet, specifically avoiding sweet drinks and an irregular diabetes diet, lack of exercise, not understanding effective stress management, and rarely paying attention to foot care. At this stage, reflective dialogue is conducted with the patient, reviewing past actions and plans to address identified obstacles. Additionally, alternative methods are carried out to achieve optimal outcomes and enhance the patient's motivation by showing the potential for excellence. Diabetic patients are allowed to decide level of objectives and plans to be achieved in managing self-care.

Third Meeting

The third meeting is to carry out assessments and provide feedback. At this meeting, study explores matters related to the targets and objectives, exploring achievements, obstacles, and advantages to obtain ways for further improvement. This is the final stage of health coaching activities, where the coach evaluates and monitors the implementation of behavior changes while motivating patients.

An obstacle that often occurs is in regular exercise since DM patients do not carry out sports activities according to the correct rules. The reality was that patients did not comply with recommendations for good physical activity. Engaging in daily tasks constitutes exercise, thereby aiding in the regulation of blood glucose levels. Poorly controlled glucose levels can lead to complications, emphasizing the importance of regular physical activity in managing the condition. Exercise can be performed regularly, three to four times per week, with a total time commitment of around 30 minutes. Physical activities such as walking and jogging can improve insulin sensitivity, resulting in better blood glucose control.[12]

HbA1c levels in the intervention and control groups before treatment

The results of the pre-examination of HbA1c levels in the intervention and control group showed that the mean score for HbA1c levels was 9.06 and 9.13, respectively. Based on the statistical tests, a p-value of 0.897 was obtained, where the value was >0.05. Therefore, there was no difference between the intervention and the control groups, which were stated to be equivalent.

Examination of HbA1c levels described the daily average blood glucose and carbohydrate levels over two months. This examination monitors the disease's progress and determines the development of the complications. In these two groups, patients were unable to exercise control over DM management. Furthermore, blood glucose levels must be kept under control to prevent the manifestation of various complications. Measuring glycated hemoglobin (HbA1c) is a reasonable glycemic control to determine blood glucose levels over the last two to three months. A person is said to have DM when HbA1c level is ≥6.5%. Patients with HbA1c levels >7% are at a two times higher risk of experiencing complications. According to the United Kingdom Prospective Diabetes Study (UKPDS), a 1% reduction in HbA1c will reduce the risk of peripheral vascular disease, complications, death, and myocardial infarction by 43%, 35%, 21%, and 14%, respectively.[13]

HbA1c is used as an excellent determinant indicator for diagnosing diabetes and prediabetes. Analysis of HbA1c glycated hemoglobin in blood showed evidence of an average glucose level for about two to three months. HbA1c test is recommended as a standard of care for testing and monitoring type 2 DM.[14] Previous study explained that HbA1c levels could be a specific sign of the appearance of DM complications such as cardiovascular disease, nephropathy, or retinopathy [15]. Level is different for each patient and this depends on the history of DM as well as the long-term or short-term use of insulin doses and tablets. Another study showed that there was a significant relationship between carbohydrate, fat, and fiber intake with HbA1c levels ($p < 0.05$), median carbohydrate, fat, and fiber intake of 254.25 grams, 96.09 grams, and 19.1 grams, respectively.[16] Health coaching and behavioral counselling related

to DM were often aimed at patients with HbA1c above 7.0%[17] since poor control during the pre-test had a more significant intervention effect. In addition, education about DM given to change self-management behavior was only effective for patients with HbA1c above 8%.[18]

HbA1c levels in the intervention and control groups after treatment

HbA1c levels in the intervention and control groups (p-value 0.000) were 5.98 and 10.59, respectively. This condition shows that HbA1c for the intervention group is lower or better than the control. In the treatment group, the intervention was given in the form of psychoeducation with health coaching method, and media modules, while in the control, only modules were provided.

A method of increasing knowledge is providing education about the management of DM, which is repeated even though the patient has received information. Material about DM is presented comprehensively to implement treatment and the explanations are carried out using simple language. The provision of structured education can change the functional dimension, namely, the patient's essential ability to read and understand health information. These skills enable individuals to obtain meaning from various forms of communication, such as interpersonal, modules, and the application of new information to everyday life. From the information received, DM patients can act independently and interact with information providers such as health workers.[19]

Patient education is closely related to disease prevention and knowledge of illness allows individuals to take action. This is aimed at optimizing behavior for overcoming health problems and improving health status. The variable informs patients about all health problems and the relationship with behavior.[20,21] Health coaching is carried out for the treatment group by identifying problems in individuals, as well as formulating, implementing and evaluating alternative solutions. This educational method is implemented to facilitate patients in articulating aspirations, identifying concerns, expressing desired changes, and specifying the support required.[22] Furthermore, health coaching is effective in terms of client self-efficacy as well as adherence to behavior change and medication.[23] In a randomized

controlled trial comparing health coaching to usual care, DM patients significantly improved HbA1c levels, medication adherence, exercise, stress, and health status.[24]

Differences in HbA1c levels before and after the intervention in the treatment group and the control group

HbA1c level values between pre and post in post-intervention subjects were declared significantly different and experienced a decrease. In control subjects, HbA1c levels based on the Mean ± SD value increased with a p-value of 0.001. The results related to health coaching significantly increased HbA1c in type 2 DM patients by 0.62% and also healthy diet behavior. Furthermore, previous study also found that intervention could improve HbA1c by 0.68%.[25] The study proves effectiveness of the intervention method among patients in Taiwan through a randomized controlled trial. This has reached the clinical effectiveness threshold of HbA1c (0.3-0.5%)[26] and is primarily implemented by providing motivation.[27,28] This study shows that coaching is effective in promoting healthy eating. The process can significantly reduce daily calories and food while increasing vegetable intake in line with the modules distributed. The effect of health coaching intervention on blood sugar control may show a causal relationship.

Dietary control is the most important therapy for type 2 DM and is also the safest control mechanism. Nutritional interventions effective in the maintenance management of type 2 DM and result in improved self-monitoring of blood glucose, blood lipids, HbA1c, blood pressure, and weight management can lead to reductions in medications, hypoglycemia frequency, hospitalizations, and treatment health costs.[29]

In the control group, HbA1c levels increased significantly despite being given a module related to care containing the DSME program. This shows that providing information through modules cannot improve behavior or habits. The situation is consistent with study where health education is insufficient to change patient behavior and habits.[27,30] Therefore, education through modules is less critical in

helping patients achieve correct and adequate health knowledge without showing effectiveness. This is supported because health coaching is more effective than education for behavior changes and habit formation.[31] Adult learning patterns are based on experience and tend to build behavior through adjustments.[32]

A previous study found that health coaching significantly improved diabetes control, decreasing HbA1C after intervention in a group of low-income patients.[11] In addition, health coaching improved patient glycemic control, with HbA1c levels 0.8% lower in the intervention group than control.[33] The results concluded that health coaching is an effective intervention to improve glycemic control, and this leads to a significant decrease in HbA1C levels.[34] Changes in behavior in the treatment group can build self-management abilities to provide insight into actions of making the best decisions.[35]

Conclusions

In conclusion, this study was an application of psychoeducation with health coaching method carried out for DM patients who require long-term management. Interventions provided to the treatment group, comprising education, health coaching, and the distribution of modules effectively lowered HbA1c levels compared to the control group, which was only given modules. A decrease in levels showed the behavior of DM patients for 2-3 months. Therefore, health workers, specifically nurses must reduce psychological burden by providing time to conduct health coaching for DM patients.

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Table 1. Characteristics of DM patients in the intervention and control group (n=30)

Characteristics	Intervention group		Control group		Equivalence p-value
	n	%	n	%	
Gender					0.083
Man	2	6.7	8	26.7	
Woman	28	93.3	22	73.3	
Education					0.037
elementary school	8	26.7	18	60.0	
junior high school	5	16.7	1	3.3	
high school	8	26.7	7	23.3	
PT	9	30.0	4	13.3	
Work					0.065
Doesn't work	20	66.7	19	63.3	
Laborer	1	3.3	2	6.7	
Private employees	2	6.7	0	0.0	
Civil servants	1	3.3	7	23.3	
Self-employed	6	20.0	2	6.7	
Age	Mean ± SD	Mean ± SD	Total		0.459
	58.97 ± 12.25	57.20 ± 10.67	58.08 ± 11.43		
Long Suffering DM	8.53 ± 9.53	7.20 ± 6.62	7.87 ± 8.16		0.947

Table 2. HbA1c levels before and after treatment in the intervention and control group (n=30)

HbA1c		Intervention Group	Control Group	p-value
Pre	Mean ± SD	9.06 ± 1.79	9.13 ± 2.34	0.897
Post	Mean ± SD	5.98 ± 0.95	10.59 ± 2.64	0.000

Table 3. The effect of health coaching psychoeducation and HbA1c levels on intervention and control group (n=30)

Variable	Group	Pre-test	Post-test	p-value
		Mean ± SD	Mean ± SD	
HbA1c	Intervention	9.06 ± 1.79	5.98 ± 0.95	0.000
	control	9.13 ± 2.34	10.59 ± 2.64	0.001