Original Article

Effects of ADCES7 Self Care Behavior Application and Acupressure on Changes in Blood Glucose Levels in Obesive, Prediabetic Women

Acce Basri[1]*, Syamsiar Russeng[2], Nurhaedar Jafar[3], Ridwan Amiruddin[4], Yahya Thamrin[5], Masni Masni[6], Muhammad Safar[7], Siti Muslimatun[8], Anwar Mallongi[9]

ABSTRACT

Background: Prediabetes and obesity in women are important health problems today. Appropriate self-management and other methods are needed to overcome this. Objective: To assess the magnitude of the difference in changes in fasting blood glucose levels, before and after carrying out ADCES7 self-care behavior and acupressure. **Method:** This research is quasi-experimental research. The research design used was the Non-Randomized Pre Test - Post Test Control Group, which gathered obese, prediabetic women in the Kalumata Community Health Center, Siko Community Health Center and Posbindu under the PKK Ternate City through screening by excluding those who had suffered from diabetes mellitus and were pregnant. This group was then divided into the ADCES7 self care behavior intervention group, the acupressure group and the combined ADCES7 self care behavior and acupressure group. Multivariate logistic regression was used to assess changes in fasting blood glucose levels. **Results**: Respondents in this study were 102 people who were divided into three groups. The results showed that there was an effect of Self Management intervention $p(0.016)<0.05$, acupressure intervention $p(0.032)<0.05$, and the combination group of Self Management and Acupressure $p(0.011)<0.05$ on changes in fasting blood glucose levels in prediabetic obese women. **Conclusion:** obese prediabetic women who are aware and active in self-management ACDES7 self care behavior and acupressure can reduce blood glucose levels and body weight in obese prediabetic women

Keywords: Obesity, Prediabetes, Acupressure, ADCES7 Self Care Behavior.

Acce Basri[1]*, Syamsiar Russeng[2], Nurhaedar Jafar[3], Ridwan Amiruddin[4], Yahya Thamrin[5], Masni Masni[6], Muhammad Safar[7], Siti Muslimatun[8], Anwar Mallongi[9]

[1]Doctoral Degree of Department of Occupational Health and Safety, Faculty of Public Health, Hasanuddin University, INDONESIA.

[2,5]Department of Occupational Health and Safety, Faculty of Public Health, Hasanuddin University, INDONESIA.

[3]Nutrition science, Faculty of Public Health, Hasanuddin University, INDONESIA.

[4]Department of Epidemiology, Faculty of Public Health, Hasanuddin University, INDONESIA.

[6]Department of Statistics and Demography, Faculty of Public Health, Hasanuddin University, INDONESIA.

[7]Department of Health Promotion and Behaviour Science, Faculty of Public Health, Hasanuddin University, INDONESIA.

[8]Department of Food Science and Nutrition Indonesia International Institute for Life Sciences, INDONESIA.

[9]Department of Environmental Health, Faculty of Public Health, Hasanuddin University, INDONESIA.

Correspondence

Acce Basri

Doctoral Degree of Department of Occupational Health and Safety, Faculty of Public Health, Hasanuddin University, INDONESIA.

E-mail: achebasri@gmail.com

History

• Submission Date: 09-05-2024;

• Review completed: 21-06-2024;

• Accepted Date: 15-07-2024.

DOI : 10.5530/pj.2024.16.124

Article Available online

http://www.phcogj.com/v16/i4

INTRODUCTION

Obesity is defined as excess fat content in adipose tissue due to a situation where, over a certain period of time, the intake of kilocalories in food is greater than the consumption of kilocalories. This disease has become an epidemic throughout the world and is the main cause of several metabolic disorders, especially glucose disorders. The prevalence of prediabetes in Indonesia is very large (10%) so it is necessary to carry out prevention strategies both for prediabetes and the progression of prediabetes to diabetes[1].

Lifestyle interventions are recommended for all individuals with prediabetes[2] because Awareness and early intervention in obese women is one of the modifiable risk factors for prediabetes, weight loss of up to 10% of body weight remains an important and effective intervention in the treatment of prediabetes and preventing the progression of prediabetes to diabetes [3]

Lifestyle modification should be a major part of therapy and should be provided to all patients. Lifestyle interventions improve all risk factors for diabetes and components of metabolic syndrome, obesity, hypertension, dyslipidemia and hyperglycemia. According to the results of the Diabetes Prevention Program (DPP), prediabetes patients should lose 5 – 10% of their body weight and maintain it sustainably. The recommended physical activity program is regular moderate intensity physical activity of 30 – 60 minutes per day, at least 4 days a week or a minimum of 150 minutes/week. The recommended diet is calorie restriction, increasing fiber intake and limiting carbohydrates. Especially for hypertension sufferers, the recommended diet is salt intake and limiting alcohol[4]

Data from the Nurses' Health Study shows that 90% of type 2 diabetes in women is caused by five risk factors including being overweight, lack of exercise, eating unhealthy foods, smoking and drinking alcohol. Therefore, it is important to treat prediabetes patients through lifestyle and behavioral changes such as increasing physical activity and consuming healthy food components to prevent or delay the progression of prediabetes to diabetes[5]

ADCES7 Self-Care Behaviors is self-management which consists of seven self-care behaviors which include healthy coping, healthy eating, physical activity, taking medication, monitoring, problem solving, and risk reduction[6] Using Adces7 self-management is known, apart from lowering blood sugar levels, it can also help improve energy intake and increase positive behavioral changes. After the ADCES7 intervention there was an increase in self-management skills and there was a statistically significant reduction in A1C levels[7]. Healthy coping focuses on the need to address behavioral problems. Healthy Eating, Being Active, and Taking Medication are important activities for an effective self-management treatment plan, monitoring focuses on data that provides insight into how these behaviors are being managed. Reducing risk and

problem solving are behavioral skills that combine motivation and goal setting into action.

Self-care management is essential for good glucose management. Lifestyle modifications, such as maintaining a healthy diet combined with increasing daily physical activity, are among the important strategies recommended. After the ADCES7 intervention there was an increase in self-management skills and there was a statistically significant reduction in A1C levels [7]. Currently, the use of complementary and alternative medicine has become widespread in controlling various types of diabetes, one of which is acupressure which is a complementary and alternative therapy that has recently emerged as a way to reduce weight and blood glucose levels. [8]state that acupressure is an effective method for reducing blood glucose and is very helpful for reducing complications due to diabetes.

In acupressure, non-invasive finger pressure is applied to meridians or acupuncture points to release endorphins in the brain, which relax muscles, reduce pain and create a sense of comfort [9]. From a practical point of view, acupressure does not require special devices and compared to other treatment techniques is non-invasive, cheap, readily available, and health care providers and even patients can easily apply it [10].

Based on this background, research was conducted to determine the effect of ADCES7 Self Care Behavior and Acupressure on reducing blood glucose levels in obese women with prediabetes.

MATERIALS AND METHOD

The research was conducted in three locations in the city of Ternate, namely at the Kalumata Community Health Center, Siko Community Health Center and Posbindu assisted by the PKK in Ternate City. This type of research is quantitative research, namely Quasi Experimental (quasi-experiment). The research design used was The Non Randomized Pre Test - Post Test Control Group.

The population of this study was obese, prediabetic women in the city of Ternate. The inclusion criteria used in this study were women who were at least 20 - 60 years old, had a body fat percentage ≥32 or abdominal circumference >80, had fasting glucose levels between 100-125mg/dL, were willing to take part in the intervention program, while the exclusion criteria were moderate pregnant and sick. Research subjects were selected using a purposive sampling technique which was chosen based on certain considerations as included in the inclusion criteria to obtain 34 samples in each group so that the total sample in the study was 102 people.

The intervention given to the Kalumata community health center group was ADCES7 self-care behavior self-management, the Siko community health center group was acupressure and the posbindu assisted by PKK Ternate City for the combined group of acupressure and ADCES7 self-care behavior self-management. These three groups were given training for two days to train respondents to do acupressure at certain points on parts of the body that are related to reducing weight and blood sugar levels, namely Pishu (BL 20), Shenshu (BL 23), Zusanli (ST 36), Sanyinjiao (SP 6), Hegu (LI 4), while regarding self-management ADCES7 self-care behavior respondents were given ADCES7 self-care behavior self-management education regarding healthy coping, healthy eating, physical activity, monitoring, problem solving, and risk reduction. monitoring is carried out every week for 12 weeks and at the 16th week while continuing education.

Primary data collected is in the form of respondent characteristics consisting of name, age, address, occupation, education. Anthropometric data includes body weight, height, abdominal circumference and percent body fat. Height was measured using a microtoise while body fat percentage was measured using the Transtek

Body Fat Analyzer GBF-835. Measurement of energy, fat, protein and carbohydrate intake was carried out using 2x24 hour food recall (1 normal day and 1 holiday).

Data normality was tested using the Shapiro-Wilk test. The percent difference in blood sugar levels for each group before and after the intervention was tested using the paired t test if it was normally distributed and the Wicoxon test if the data was not normally distributed. Differences in body fat percentage reduction between the three groups were analyzed using Anova if the data were normally distributed and Kruskal Wallis if the data were not normally distributed.

RESULTS

Of the 102 research respondents, the majority were in the 41-50 age group, namely 43 (42.2%), the highest level of education was high school, amounting to 78 (76.5%), marital status 87 (85.3%) married, employment 88 (86.3%) do not work (housewives), and 72 (70.6%) respondents do not have a history of diabetes mellitus (DM), Body Mass Index (BMI) is highest in obesity category 1, amounting to 49 (48%) respondents and the blood pressure of 41 (40.2%) respondents was in the hypertension category.

Table 1 above also shows that the data in the self-management group, the Acupressure group and the combined group of self-management and Acupressure before being given the intervention had a p value ≥0.05 which means that the data is not significant or is homogeneous, in other words that the respondents in the intervention group and the control group before being given the intervention were in the same condition

In table 2 above, before the intervention, the average GDP in the self-management group was 110.64, in the acupressure group it was 114.64 and in the combined self-management and acupressure group it was 109.32. From the statistics, the p value (0.034) <0.05 was obtained, which means that there was a difference in the average GDP between each treatment group in the observations before the intervention.

The mean GDP post 1 intervention in the self-management group was 102.96, in the acupressure group was 107.00 and in the combined self-management and acupressure group was 98.54. From the statistics, the p value (0.001) <0.05 is obtained, which means that there is a difference in average GDP between each treatment group at post 1 observation.

The average GDP post 2 interventions in the self-management group was 102.61, in the acupressure group was 106.75 and in the combined self-management and acupressure group was 97.18. From the statistics, the p value (0.000) <0.05 is obtained, which means that there is a difference in the average GDP between each treatment group in post 2 observations.

Table 3 above shows the average GDP change between before and after post 1 in the self-management group of -7.88, in the acupressure group of -7.64 and in the combined group of self-management and acupressure -10.79. From the statistics, the p value (0.034) <0.05 is obtained, which means that there is a difference in mean GDP in changes between before and after post 1 between each group.

The average GDP change between pre-post 2 in the self-management group was -8.04, in the acupressure group was -7.89 and in the combined self-management and acupressure group -12.14. From the statistics, the p value (0.107) >0.05 is obtained, which means there is no difference in mean GDP in changes between before and after post 2 between each group.

The average GDP change between post 1 to post 2 in the self-management group was -0.36, in the acupressure group was -0.25 and in the combined self-management and acupressure group -1.36. From the statistics, the p value (0.260) is >0.05, which means there is no

Table 1. Description of Respondent Characteristics.

Characteristics	Group						Number		P Value
	Self Manajement		Acupressure		Adces + Self management				
	n=28	%	n=28	%	n=28	%	n	%	
Age									
20-30	2	5,9	2	5,9	3	8,8	7	6,9	
31-40	6	17,6	5	14,7	9	26,5	20	19,6	0,875
41-50	16	47,1	15	44,1	12	35,3	43	42,2	
51-60	10	29,4	12	35,3	10	29,4	32	31,4	
Education									
Basic school	2	5,9	3	8,8	0	0,0	5	4,9	
Junior High Sc.	5	14,7	5	14,7	2	5,9	12	11,8	0,471
Senior High Sc.	25	73,5	23	67,6	30	88,2	78	76,5	
University	2	5,9	3	8,8	2	5,9	7	6,9	
Status									
Not married yet	1	2,9	1	2,9	2	5,9	4	3,9	
Married	30	88,2	30	88,2	27	79,4	87	85,3	0,838
Widow	3	8,8	3	8,8	5	14,7	11	10,8	
Occupational									
Work	4	11,8	5	14,7	5	14,7	14	13,7	0,921
Not work	30	88,2	29	85,3	29	85,3	88	86,3	
DM history									
Yes	12	35,3	9	26,5	9	26,5	30	29,4	0,654
None	22	64,7	25	73,5	25	73,5	72	70,6	
Knowledge of pre DM									
Know	2	5,9	4	11,8	4	11,8	10	9,8	0,164
Bot Know	32	94,1	30	88,2	30	88,2	92	90,2	
Acupressure Knowledge									
Know	1	2,9	5	14,7	2	5,9	8	7,8	0,171
Not know	33	97,1	29	85,3	32	94,1	94	92,2	
Knowledge ADCES manag.									
Know	0	0,0	0	0,0	0	0,0	0	0,0	-
Not know	34	100,0	34	100,0	34	100,0	102	100,0	
IMT									
Fat	3	8,8	5	14,7	2	5,9	10	9,8	
Obesity I	17	50,0	17	50,0	15	44,1	49	48,0	0,654
Obesity II	14	41,2	12	35,3	17	50,0	43	42,2	
Blood pressure									
Normal	11	32,4	9	26,5	7	20,6	27	26,5	
Pre Hypertension	11	32,4	11	32,4	12	35,3	34	33,3	0,863
Hypertension	12	35,3	14	41,2	15	44,1	41	40,2	

Source : (Primary Data, 2023)

Table 2. Comparison of average GDP between treatment groups.

Variables		Group						P Value
		Self Manag.		Acupressure		Self Manag + Acupressure		
		Mean	SD	Mean	SD	Mean	SD	
GDP	pre	110,64	7,51	114,64	7,97	109,32	6,62	0.034**
	Post 1	102,96	5,07	107,00	8,73	98,54	7,35	0.001**
	Post 2	102,61	5,37	106,75	10,27	97,18	6,18	0.000**

** Uji Kruskal Wallis

Table 3. Comparison of changes in average GDP between treatment groups.

Variables		Group						P Value
		Self Manag.		Acupressure		Self Manag. + Acupressure		
		Mean	SD	Mean	SD	Mean	SD	
GDP	Pre – post 1	-6,79	8,31	-7,00	8,94	-10,65	5,27	0,006
	Pre – Post 2	-7,29	9,07	-7,50	9,08	-11,82	5,27	0,002
	Post 1 - Post 2	-0,36	2,86	-0,50	4,83	-1,18	3,11	0,234

Uji Kruskal Wallis

Table 4. Comparison of average GDP between two treatment groups.

Variables Post Hoc		Self Manag. Vs Acupressure	Self Manag. Vs Grouped	Acupressure Vs Grouped
GDP	pre	0.117	0.645	0.033
	Post 1	0.240	0.004	0.006
	Post 2	0.316	0.001	0.006

Uji Mann Whitney

Table 5. Comparison of changes in average GDP between two treatment groups.

Post Hoc Variables		Self Manag. Vs Acupressure	Self Manag. Vs Grouped	Acupressure Vs Grouped
GDP	pre – post 1	0.721	0.036	0.008
	pre - Post 2	0.768	0.019	0.001
	Post 1 - Post 2	0.095	0.315	0.459

Uji Mann Whitney

Table 6. Effect of Self-Management, Acupressure interventions and a combination of Self-Management and Acupressure on changes in fasting blood glucose levels from pre, post 1 and post 2.

GDP		Mean±	SD	P Value
Self Management	pre	110,35	7,37	
	Post 1	103,66	5,06	0,016
	Post 2	103,06	5,35	
Acupressure	pre	113,59	8,45	
	post	106,59	8,83	0,032
	Post 2	106,09	10,18	
Self Management +Acupressure	pre	109,29	6,22	
	Post 1	98,65	6,79	0,011
	Post 2	97,47	5,79	

Uji Friedman

Table 7. Compares variable means between two observations in each treatment group.

| Post Hoc Variable		Group					
		Self Management Diri		Acupressure		Self Management +Acupressure	
		Post 1	Post 2	Post 1	Post 2	Post 1	Post 2
GDP	pre	0.000*	0.000*	0.000*	0.000*	0.000**	0.000**
	Post 1		0.530*		0.804*		0.017**

* t tailed Test
** Uji Wilcoxon

Table 8. Effect of 24-hour Recall in the Self-Management, Acupressure group and the combination of Self-Management and Acupressure on changes in energy, carbohydrate, protein and fat levels from pre to post

Group		Acupressure			Manag. ACDES7			Combined of Acupressure and manag. Of ADCES7		
Recall 24 hours		Mean±	SD	P value	Mean±	SD	P value	Mean±	SD	P value
Energy	pre	67,46	27,13		65,35	22,43		65,63	23,20	
	Post	75,16	12,33	0,023**	75,71	15,14	0,010**	76,96	10,97	0.003**
Carbohydrate	pre	58,82	33,02		62,95	22,78		60,04	30,03	
	post	61.03	21,02	0,222**	72,56	13,02	0,007*	73,10	16,60	0.001**
Protein	pre	75,50	34,90		72,81	27,32		75,50	34,90	
	Post	79,47	33,24	0,596**	79,47	33,24	04,62**	80,21	9,99	0.144**
Fat	pre	64,15	15,06		69,36	22,12		72,01	27,88	
	Post	64,49	21,80	0,939**	76,49	15,05	0,015*	80,88	12,55	0.000**

* t tailed Test
** Uji Wilcoxon
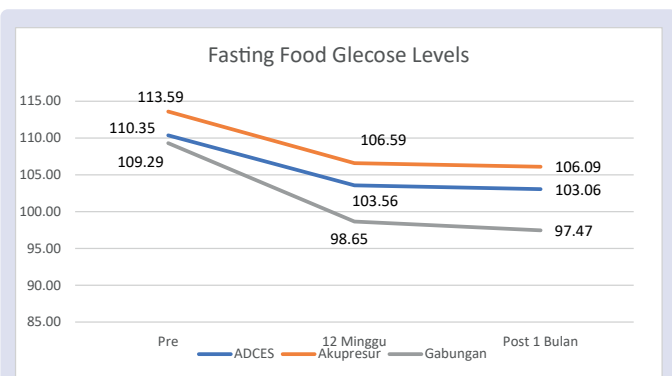
Graph 1. Curve of decreasing fasting blood glucose levels at pre, post 1 and post 2 in the acupressure, self-management ADCES7 self-care behavior group and the combined acupressure and self-management group ADCES7 self-care behavior.
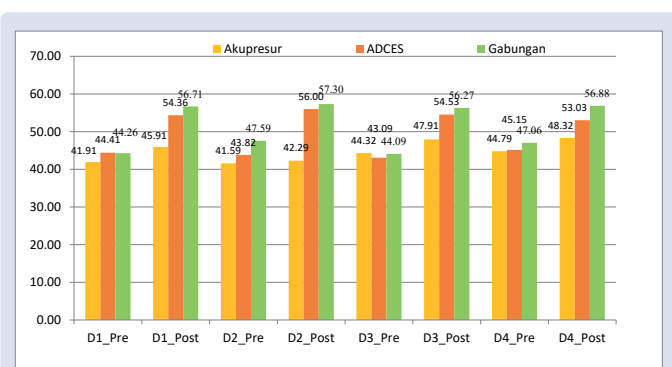
Graph 2. Differences in quality of life before and after intervention in the Acupressure, ADCES7 self care behavior management group and the combined group of acupressure and ADCES7 Self care behavior management in domains 1 to domain 4.

difference in mean GDP in changes between post 1 to post 2 between each group.

In the table above, the previous observations show significant results, namely between the acupressure group vs the combination. In post 1 significant results were obtained comparing self vs combined management and acupressure vs combined. Then for post 2 the results are the same as post 1.

On the table above, for changes between pre and post 1, the results are significant, namely between the acupressure group vs the combination. In the changes between before and post 2 and post 1 and post 2, the comparison between the 2 groups did not produce significant results.

Table 6 above for self-management shows that the average GDP result before intervention is 110.35, at post 1 it is 103.66, post 2 is 103.06. From the statistical test results, it is obtained that the p value (0.016) is <0.05, which means there is a difference in the average GDP between before , post 1 and post 2 for acupressure, the average GDP result before the intervention was 113.59, in post 1 it was 106.59, and in post 2 it was 106.09. From the statistical test results, the P value (0.032) was <0.05, which means there was a difference in the average GDP between before, post 1 and post 2 for the combined group of self-management and acupressure, the mean GDP result before intervention was 109.29, at post 1 it was 98.65, and at post 2 it was 97.47. From the results of the statistical test, the p value (0.011) was <0.05, which means there is a difference in the mean GDP between pre, post 1 and post 2

The graph in Figure 1 is an illustration of a decrease in blood sugar levels. In the graph, it can be seen that the group that did a combination

of self-management and acupressure showed a greater decline than the group that only did self-management or acupressure, namely 109.29 to 98.65 with a mean difference of 10.64 to post one and 98.65 to post two with a mean difference of 1.18 while the smallest decrease was in the ADCES7 group, namely from 110.35 to 103.56 (mean difference 6.79) in post one and to 103.06 from post one to post two with a mean 0.5.

From Table 7 above shows the statistical test results for the self-management group, significant results were obtained between before and post 1 and between before and post 2. In the acupressure group, significant results were obtained between before and post 1 and between before and post 2. Then in the group The combination obtained a significant value between before and post 1 and between before and post 2, as well as post 1 and post 2.

Table 8 above in the acupressure group for energy intake obtained a p value (0.023) <0.05, which means there is a difference in mean energy intake between before and after intervention, while for carbohydrate intake the p value (0.222)> 0.05, protein p value (0.596)>0.05 and fat intake p value (0.939)>0.05, which means there is no difference between carbohydrates, protein and fat before and after the intervention.

In the ADCES7 self-care behavior self-management group, the value for energy intake was P(0.010)<0.05, carbohydrate intake P(0.007)<0.05, and fat intake P(0.015)<0.05, which means there is a mean difference. between energy, carbohydrates and fat before and after intervention, while protein intake p value (04.62)> 0.05 which means there is no difference in mean protein before and after intervention

for the combined ADCES7 self care behavior and self management intervention group acupressure on energy intake obtained a value of p(0.003) <0.05, carbohydrate p(0.001) <0.05, fat p(0.000) <0.05, which means there is a mean difference between energy, carbohydrates and fat before and after the intervention whereas protein intake p value (0.144)> 0.05 which means there is no difference in mean protein before and after intervention.

Graph 2 above shows the acupressure group's average quality of life in D1_pre-post physical health (41.91-45.91), D2_pre-post psychological health (41.59-42.29), D3_pre-post social health (44.32-47, 91), D4_ environmental health pre-post (44.79-48.92). Self-management group ADCES7 self care behavior mean D1 pre-post (44.41-54.36) D2 Pre-post (43.82-56.00), D3 pre-post (43.09-54.53) and D4 pre-post (45.15-53.03). Meanwhile, in the combined intervention group of acupressure and self-management ADCES7 self care behavior at D1 pre-post (42.26-56.71), D2 pre-post (47.59-57.30), D3 pre-post (44.09 -56.27), D4 pre-post (47.06-56.88). From the results above, it can be concluded that there was an increase in quality of life in all groups, but the highest occurred in the combined acupressure and self-management intervention group.

DISCUSSION

Increased awareness and appropriate management are essential to improve diabetes prevention, management revolves around diet and physical activity. Management strategies should be person-centred and include healthy eating and physical activity. Concomitant drug therapy, other psychological or lifestyle support, and health interventions may be considered if necessary. This is the same as one of the interventions used to overcome a decrease in blood glucose levels, namely self-management ADCES7 self-care behavior. This self-management is a series of ongoing care, education and support activities that include healthy coping, physical activity, healthy eating, taking medication, monitoring, reducing risks and solving problems[6]. In this study, obese women with prediabetes need to carry out ADCES7 self-care behavior self-management to help change the subject's behavior in terms of eating, physical activity so that blood sugar levels decrease and it is hoped that weight loss will occur. Because one of the causes of obesity in women is a poor lifestyle.

According to Lawrence Green, behavior is influenced by 3 main factors, namely predisposing, supporting and driving factors[11], ADCES7 self care behavior has these three things. The influence of predisposing factors can be seen from increased knowledge which leads to improved food intake and physical activity so as to achieve healthier behavior. ADCES7 self care behavior also acts as a motivating factor by providing support and motivation for behavioral changes carried out every week. Kurt Lewin revealed that changes in behavior can occur if there are changes in the driving and restraining forces[12]. ADCES7 self-care behavior self-management in obese prediabetic women in this study played a role in increasing the driving force by providing material and motivation to behave healthily while reducing the restraining force by convincing the subjects that they could make behavior changes through simple steps.

After the intervention, there was a significant change in blood glucose levels in the ADCES7 self-care behavior self-management group with a value of p 0.000 (p<0.05). This result is the same as a randomized study conducted by[13] which found ten out of 11 diabetes sufferers with HbA1c > 10.8% experienced a decrease to <9% after intervention with ADCES7 self care behavior. Another study found that ACDES7 self-care behavior management is the latest self-management that can provide guidance and supervision to diabetes patients for self-care[14]. This is also supported by the results of the average nutritional intake in table 8 which shows a p value <0.05 both in the ADCES7 self care behavior group and in the combined ADCES7 self care behavior and acupressure group. This means that there is a change in behavior in managing a better lifestyle. This will also indirectly affect the respondent's weight loss and can delay prediabetes from becoming type 2 diabetes mellitus (T2DM). Just like the statement of Khaodhiar et al.[15] that the development of T2DM can be delayed or sometimes prevented in obese sufferers who can lose weight. Weight loss can be achieved medically with behavioral therapy that combines diet and exercise therapy or behavioral therapy.

Apart from a decrease in blood sugar levels, there was also an increase in the quality of life in obese women, where before the intervention the quality of life was good in domain_1 only: 29.4% increased to 44.1%, domain-2: 41.2% to 50%, domain_3: 26 .5% to 44.1% and domain_4: 41.2% to 55.9%. Research from[16] concluded that ADCES7 can improve quality of life and increase knowledge about the positive impact of self-perception on quality of life in people with type I and type II DM. The results of this study are the same as the results of a randomized controlled trial conducted by[17] that ADCES7 self-management has the potential to influence quality of life outcomes in people with Type I DM.

The results of the analysis in table 6 also show a significant value of p (0.003) <0.05 after respondents were intervened with acupressure. This study shows that acupressure is effective for reducing blood glucose and is very helpful for reducing complications due to diabetes, in line with the results of this study[18] also stated that acupressure is a form of therapy that can be used to stabilize blood sugar in diabetes mellitus sufferers because acupressure can activate one of the enzymes involved in carbohydrate metabolism and works on the hypothalamus.

In contrast to the randomized trial study of Najafi et al.[19] which showed that there was no significant difference in reducing fasting blood glucose levels in the intervention group compared to the control group, this is because only one acupressure point was used in the study, so it is recommended to use all acupressure points for more effective benefits. so in this study more Acupressure Points were used to treat high blood sugar levels, namely: Pishu (BL 20), Shenshu (BL 23), Zusanli (ST 36), Sanyinjiao (SP 6), Hegu (LI 4)[20]

Acupressure can activate glucose-6-phosphate (a carbohydrate metabolism enzyme) and have an effect on the hypothalamus.

Acupressure affects the pancreas by increasing insulin synthesis, increasing one of the receptors on target cells and accelerating the use of glucose in cells, resulting in a decrease in blood sugar[21]. Acupressure is a therapy based on the principle of healing touch which shows more caring behavior towards the respondent so that it can provide calm, comfort, a feeling of more care so that it can bring closer to a therapeutic approach. relationship between researchers and respondents. From a psychological perspective, acupressure helps reduce respondents' anxiety. Most respondents stated that acupressure treatment made them feel more cared, calm, comfortable and relaxed. In accordance with the results of this study in graph 2, there was an increase in quality of life in all domains after intervention with acupressure

Acupressure works on the pancreas to increase insulin synthesis, increase one of the receptors on target cells, and speed up the use of glucose in cells so that blood sugar levels fall. In addition, the effect of acupressure on reducing appetite and suppressing hunger can be used to regulate eating patterns so that it has implications for reducing fasting glucose levels in obese women with prediabetes[22-28]. As Heni Setyowati[22] said, acupressure is also defined as pressing healing points using fingers gradually which stimulates the body's ability to heal itself naturally.

Acupressure massage is carried out using the fingertips, starting with a gentle massage and slowly and gradually adding force to the pressure until a light sensation is felt but does not make the patient feel pain. Emphasis can be done for 30 seconds to 40 seconds and pressure on the acupoint can be done for 15 to 20 seconds[23].

The effectiveness of these two interventions in each group resulted in a greater reduction in blood sugar levels in the group that carried out a combination of ADCES7 self-management and acupressure with a pre-post difference of 10.64 compared to the group that only carried out ADCES7 management with a mean difference of 6.79 or acupressure alone with mean difference[7].

CONCLUSION

The application of self-management ADCES7 self care behavior and acupressure is effective in lowering blood sugar levels and can improve diet and improve quality of life and in the future can reduce weight in obese women with prediabetes, both of which can be done easily and without incurring costs.

REFERENCES

1. Indonesia PEJPP. Pengelolaan dan pencegahan diabetes melitus tipe 2 di Indonesia. 2015.

2. Bell K, Shaw JE, Maple-Brown L, Ferris W, Gray S, Murfet G, et al. A position statement on screening and management of prediabetes in adults in primary care in Australia. 2020;164:108188.

3. Ely EK, Gruss SM, Luman ET, Gregg EW, Ali MK, Nhim K, et al. A national effort to prevent type 2 diabetes: participant-level evaluation of CDC's National Diabetes Prevention Program. 2017;40(10):1331-41.

4. PERKENI. KONSENSUS PENGELOLAAN DAN PENCEGAHAN DIABETES MELITUS TIPE 2 DI NDONESIA PERKUMPULAN ENDOKRINOLOGI INDONESIA. 2011 ed. ACADEMIA2011.

5. Karimi-Nazari E, Nadjarzadeh A, Masoumi R, Marzban A, Mohajeri SA, Ramezani-Jolfaie N, et al. Effect of saffron (Crocus sativus L.) on lipid profile, glycemic indices and antioxidant status among overweight/obese prediabetic individuals: A double-blinded, randomized controlled trial. 2019;34:130-6.

6. Care AoD, Specialists E, Kolb L. An effective model of diabetes care and education: the ADCES7 Self-Care Behaviors™. The Science of Diabetes Self-Management and Care. 2021;47(1):30-53.

7. Miller RS, Mars D. Effectiveness of a diabetes education intervention in a faith-based organization utilizing the AADE7. ADCES in Practice. 2020;8(1):10-4.

8. Rousdy AJJoa, studies m. Effectiveness of acupressure at the Zusanli (ST-36) acupoint as a comfortable treatment for diabetes mellitus: a pilot study in Indonesia. 2017;10(2):96-103.

9. Mood MS, Yavari Z, Taghanaki HB, Mahmoudirad GJCticp. The effect of acupressure on fasting blood glucose, glycosylated hemoglobin and stress in patients with type 2 diabetes. 2021;43:101393.

10. Koh KB. Approach to Stress and Mental Disorders in Patients with Diabetes. Stress and Somatic Symptoms: Springer; 2018. p. 239-50.

11. Yanty RDJJIKSH. Faktor Yang Mempengaruhi Pemilihan Jenis Kontrasepsi Pada Wanita Usia Subur. 2019;8(2):121-4.

12. Rosdiana N, Aslami NJJA, Manajemen dan Bisnis Digital. The Main Models of Change Management in Kurt Lewin's Thinking. 2022;1(2):251–6—6.

13. Gomes A. Implementing a Telephone Follow-Up Process for Patients with Poorly Controlled Type 2 Diabetes: A Nurse-Led Quality Improvement Project. 2022.

14. Wu G, Xia A, Zhao W, Tien K, Chien DJJotES. ODP160 ADCES7 Guidelines and Free Diabetes Apps: Do They Help Our Patients? 2022;6(Suppl 1):A297.

15. Khaodhiar L, Cummings S, Apovian CMJCdr. Treating diabetes and prediabetes by focusing on obesity management. 2009;9(5):348-54.

16. Kavookjian J, LaManna JB, Davidson P, Davis JW, Fahim SM, McDaniel CC, et al. Impact of diabetes self-management education/support on self-reported quality of life in youth with type 1 or type 2 diabetes. 2022;48(5):406-36.

17. Davidson P, LaManna J, Davis J, Ojeda MM, Hyer S, Dickinson JK, et al. The Effects of Diabetes Self-Management Education on Quality of Life for Persons With Type 1 Diabetes: A Systematic Review of Randomized Controlled Trials. 2022;48(2):111-35.

18. Jumari J, Waluyo A, Jumaiyah W, Natashia DJJoT. Pengaruh Akupresur terhadap Kadar Glukosa Darah Pasien Diabetes Melitus Tipe 2 di Persadia RS Islam Jakarta Cempaka Putih. 2019;1(1):38-50.

19. Najafi SS, Ghorbani H, Yoosefinejad AK, Kalyani MNJIJoCBN, Midwifery. The Effect of Acupressure on Fasting Blood Glucose and Glycosylated Hemoglobin Levels in Diabetic Patients: A Randomized Controlled Trial. 2021;9(2):152.

20. Fitrullah RA, Rousdy A. Effectiveness of Acupressure at the Zusanli (ST-36) Acupoint as a Comfortable Treatment for Diabetes Mellitus: A Pilot Study in Indonesia. JAMS J Acupunct Meridian Stud [Internet]. 2017; 10 (2): 96â€"103.

21. Shengchun W, Yiming J, Lirong Q, Meng SJJoTCM. Efficacy of needling acupoints of Guanyuan (CV4), Sanyinjiao (SP6), Zusanli (ST36), Pishu (BL20), Shenshu (BL23), Zigong (EX-CA1) on expression of p38 mitogen-activated protein kinase in ovarian tissue in rats with premature ovarian failure induced by cyclophosphamide. 2021;41(6).

22. Heni Setyowati E, Kp S. Akupresur untuk kesehatan wanita berbasis hasil penelitian: Unimma press; 2018.

23. Muhith A, Winarti E, Perdana SSI, Haryuni S, Rahayu KIN, Mallongi A. Internal Locus of Control as a Driving Factor of Early Detaction Behavior of Servical Cancer by Inspection Visual of Acetic Acid Method. Open Access Maced J Med Sci [Internet]. 2020 Apr. 20 [cited 2022 Nov. 10];8(E):113-6.

24. Azis ASFW, Darmawansyah, Razak A, Arifin A, Syafar M, Mallongi A. Analysis of Policy Implementation of The First 1000 Days of Life Program in Overcoming Stunting in Phcogj.com Maros District. Pharmacogn J. 2023;15(3): 405-410.

25. Hilda, Supriadi, Widiastuty HP, Arsyawina, Mallongi A. Development of Patient Safety Management Learning Model Based on Problem Based Learning Integrated Soft Skill Phcogj.com Higher Level Thinking for Health Students in Samarinda. Pharmacogn J. 2023;15(2): 418-423

26. Syahriani N, Palutturi S, Birawida AB, Hidayanty H. Clean Water Supply as an Indicator for Healthy Island in Makassar City. Open-Access Maced J Med Sci. 2022 Feb 24; 10(E):320-325. https://doi.org/10.3889/oamjms.2022.8350

27. Posmaningsih, S., Aryasih, S. K. M., Made, I. G. A., Choirul Hadi, M., Marwati, S. P., & Mallongi, A. (2018). The influence of media booklet in behavior change of waste management in elementary school students, South Denpasar, Bali. *Indian Journal of Public Health Research & Development*, *9*(8), 1506-1511.

28. Butcher HK, Bulechek GM, Dochterman JMM, Wagner CM. Nursing Interventions classification (NIC)-E-Book: Elsevier Health Sciences; 2013.