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The Effect of Education against Glycemic Control in Type 2 Diabetes Mellitus: Studies of Family Support and Compliance Treatment Supervision

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Abstract

Diabetes mellitus was a chronic disease that will suffer a lifetime. Educating the patient and family aims to provide an understanding of the course of the disease, prevention, and management and complications in patients with diabetes mellitus type 2. In this research, Glycemic Albumin (GA) was used as a marker of glycemic control associated factors increase treatment compliance and support families through the provision of education diabetes in patients with type 2 diabetes mellitus in Makassar and its surroundings. The general objective of this research was to determine the effect of education on glycemic control with Glycated Albumin as an indicator in patients with Type 2 Diabetes Mellitus. The research type was quasy experimental. The research population was patients with Type 2 diabetes who follow treatment to various hospitals and polyclinics of Family Physician from the February 2015 until June 2015 in Makassar and its surroundings.

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The number of samples was 44 and sampling techniques was consecutive sampling technique, data was collected using a questionnaire Hensarling Diabetic Family Support Scale (HDFSS) and Morisky Medication adherence Scale (MMAS) made by officers while providing education about diabetes mellitus to the subject by way of meeting in the home of subject once a week for 4 weeks. The results showed that at the end of the research changes the value of treatment compliance (MMAS) in the treatment group, the positive direction at a rate 3.5 times stronger than the control group. There were changes in the value of Family Support (HDFSS) was better than the control group, with positive direction and 2.7 times the rate of the treatment group compared to the control group. Decreased levels of GA on the subject of the treatment group than the control group (the control actually increased the mean). We suggest, Glycated Albumin (GA) can be recommended as an alternative parameter / indicator of glycemic control and as a diagnostic test Diabetes mellitus. Family support can give impetus to the clinician in the management of patients in order to provide treatment to avoid complications of diabetes mellitus. Similarly, treatment compliance can give encouragement to the clinician in order to provide treatment to avoid complications of diabetes mellitus.

Keywords: Type 2 Diabetes mellitus; Glycated Albumin; Family Support; Treatment Compliance.

1. Introduction

The Research results of Basic Health (RISKESDAS) reported by the Ministry of Health in 2008 showed that the prevalence of diabetes in Indonesia amounted to 5.7% and in South Sulawesi reached 4.6% (Harela, 2013) [1]. Other researchers in Makassar explained that the DM in 1981 amounted to 1.5%, in 1989 amounted to 2.8%, and in 2005 amounted to 12.5%. According to WHO the number of people with diabetes in Indonesia will increase from 8.4 million (in 2000) to about 21.3 million people (2030) [1]. The high rate of morbidity, it makes Indonesia was ranked 4th in the world after China, India, United States [2].

The prevalence of DM in Indonesia increased from 1.5% to 2.3% (Soegondo and his colleagues, 2004). The prevalence can be estimated that the number of people with diabetes in 1994 was 2.5 million; In 1998 as many as 3.5 million; In 2000 there were 4 million which represents 6% of the adult population; In 2010 as many as 5 million; In 2020 as many as 6.5 million. The largest increase will occur in 2030 as many as 21.3 million people with diabetes [2].

Educated patients can positively affect the outcome of the disease. Indeed, through education, patient may be: a) optimizing metabolic control, including self-monitoring of blood glucose or urine, dietary practices, administration of drugs, b) relieving symptoms of the disease or handle emergencies and exacerbation-related illnesses, c) preventing and managing complications such as micro complications and macrovascular, d) adopting a more positive attitude towards the disease, and e) supporting the doctor-patient relationship and plan of care, including follow-up [3].

Diabetes mellitus was a chronic disease that will suffer a lifetime. In the management of the disease, in addition to doctors, nurses, dietitians, and other health professionals, the role of the patient and family are very important. Educating to the patient and family aims to provide an understanding of the course of the disease,

prevention, complications, and management of diabetes, will help increase family participation in efforts to improve the result of management [4]. A family function and treatment compliance were strongly associated with metabolic control. The results of demographic information indicates that these two factors accounted for 49% of the variation of metabolic control [5].

The Controlling glucose effectively and successfully requires the continously use of effectively drugs. Morbidity and mortality as a result of micro and macrovascular complications in type 2 diabetes, provide financial costs surprisingly, both individuals and for society [6].

Compliance with anti-hyperglycemic drug has been proven as a key strategy in achieving long-term blood sugar control. Noncompliance treatment in patients with type 2 diabetes mellitus has been shown to reduce the effectiveness of therapy, increase the risk of hospitalization and mortality [7]. Whatever the chosen word, it is clear that the full benefits of many effective medications available will be achieved only if the patient follows the proper prescribed treatment regimen pretty well [8].

Adherence levels are usually higher among patients with acute conditions, compared to those with chronic conditions, persistence among patients with chronic conditions is low, the most dramatic decline after the first six months of therapy [9].

Basically, The control blood glucose levels in patients with type 2 diabetes mellitus was determined by treatment regimens and patient compliance taking the drug [10] With the standardization of treatment on patients with type 2 diabetes will mean a single only affecting control glucose levels in the blood was the patient compliance in the treatment of diabe type 2 diabetes mellitus [10].

In studies that have been conducted about the compliance of treatment was influenced by a number of factors that can be grouped into four categories: knowledge, attitude, support, and background. Some of these factors will have a major impact on adherence, while others may only have a minimal effect. The factors are grouped in this way, it will likely be used to intervene to reduce non-compliance [10].

Measuring the level of compliance with the respondents were also conducted using questionnaires of Morisky Medication adherence Scale (MMAS) -8. MMAS was the assessment tool from the WHO that has been validated and often used to assess patients' adherence to treatment, especially for chronic diseases such as Diabetes Mellitus. This questionnaire is a revision of the MMAS-4 that has a higher sensitivity and specificity, at 93% sensitivity and 53% specificity in assessing the level of adherence to treatment [11].

The Family support to adult patients with DM provide benefits in the management and adjustment to illness. The Research conducted in 66 patients with type 2 diabetes who have come to control to the Polyclinic Hospital Marmira City Kacaeli Turkey, social support (one of which is the family) and quality of life improved together, In this research it can be concluded that social support can improve quality of life, so that health professionals must develop a strategy to improve social support for patients, especially from the family. Assessment of family support in diabetic patients can help in determining individual objectives and intervention strategies in improving patient self-management of DM to improve metabolic control and psychosocial adaptation of the

Diabetes Mellitus [11].

The concept of Diabetes Family Support (DFS), defined as how patients with diabetes see their family support. The Family support is very important in helping a person who planned care and treatment diabetes. With that, the one can see the importance of support for a well-managed disease. According to A Cure Curriculum for Diabetes Education by the American Association of Diabetes Educators, the main influence of social support on diabetes self treatment of adults in his life by through a spouse, other family members, friends, and coworkers [12].

A family function and treatment compliance attitude were very influential in healthy. The assessment status at a family function with diabetes and then added with treatment compliance were an important factor in understanding the metabolic control [5].

For over 25 years, hemoglobin A1c (HbA1c) has been the result of measurement that widely accepted to assess glycemic control in individuals with diabetes. This test gives an average index of the patient's blood glucose over the past 2-3 months and considered the most objective and reliable measurement for long-term metabolic control. Diabetes Control and Complications Trial conducted to maintain HbA1c levels as close to normal as causing a decline in long-term health complications [13,14]. Then, as the "gold standard" measure of diabetes control, these tests provide important feedback to health workers and patients. It gives an understanding of the patient to the test and its implications for long-term health [14].

Meta-analysis of Norris and his colleagues indicates that the effect of education on diabetes seen in glycemic control. Author identified 31 articles from 1980 to 1999 to evaluate the handling efiksasi to the education in the controlling glikohemoglobin at adults with diabetes type 2. In a meta-analysis, the author state that "On average, the intervention glikohemoglobin decreased by 0.76% (95% confidence interval, 0,34-1.18) more than the control group at 1 to 3 months period of education. An additional finding of this research that glikohemoglobin "more decreased with additional contact time between participants and educators; a decline 1% recorded for each additional 23,6 hours (13.3 to 105.4) contact. The increase of glikohemoglobin causes an increase in HbA1c [15].

The Several studies have demonstrated compliance with treatment aimed at reducing HbA1c value. The HbA1c Value 1.0% lower apparently associated with reduced risk of microvascular complications by 25% with an absolute risk of HbA1c values below 7.5%. Association for the Study of Diabetes and the American Diabetes Association recommends that optimal value of HbA1c values for Diabetes Mellitus was <6.5% [15].

Good glycemic control was associated with reduced complications DM. It was important for the patient to understand these tests and the longer-term implications [16].

The GA Measurement also affected by half serum albumin. The Increased turnover serum albumin result in lower levels of GA in relation to glycemia and GA level and otherwise the serum might be higher in conditions of decrease in albumin. Therefore, GA serum levels should be interpreted with caution in cases with disorders show normal albumin, such as nephrotic syndrome, hypothyroidism, hyperthyroidism and liver cirrhosis (Koga

M and his colleagues, 2010) .HbA1c is the standard measure used to monitor long-term (2-3 months) glucose control in diabetics, and currently now used for the diagnosis of diabetes. Glycated albumin is a marker of short-term (2-4 weeks) glycemic control and it can be added complementary prognostic information of HbA1c [17].

Furthermore, Morisky Medication Scale also has been widely used as instruments tend to measure the level of treatment compliance and Hensarling Diabetes Family Support Scale to family support, therefore, the author are interested in doing research related to the development of factors adherence and support families through the provision of diabetes education for control blood glucose levels by measuring GA in patients with type 2 DM in Makassar.

2. Materials and Methods

The research model used was a quantitative research, using a type of experimental research. The design used was an experimental quasy. Model approach used were the subject of pre-test and post-test.

The population of research was patients with Type 2 diabetes who visited a variety of Family Physicians Clinic who become BPJS participants in the research period in 2015. Part of this population who have met the criteria and the corresponding length of time the sample were selected as the research sample.

The number of samples of this research are 44 people corresponding calculation of sample size and sampling technique used was the technique of consecutive sampling, data was collected using a questionnaire Hensarling Diabetic Family Support Scale (HDFSS) and Morisky Medication adherence Scale (MMAS) were used to collect data support family and patient treatment compliance and HDFSS and MMAS were used as a tool in determining educational materials that expected to occur improvement of family support and treatment compliance and GA levels among respondents with type 2 diabetes.

Total Sample were 44, with the youngest sample was 38 years old and the oldest sample was 75 years old. The average age of the respondents 54 years with a standard deviation of 7.789. Seven from every 10 samples were women and only 3 per 10 samples were male.

3. Research Results

3.1 Inter-variable analysis

3.1.1 First Part

For a limited review and to simplify the analysis, scores related MMAS and HDFSS were variable with a scale measuring anisomorf (ordinal) and considered to have units isomorfi, thus serving the data shown mean and SD despite realizing the greater limitations in interpreting the true meaning (in the calculation of probabilities remain non-parametric tests were used according ordinal scale of measurement).

Looked GA at initial of research did not differ significantly between treatment with control, the same thing also

happened in the final condition (ga2).

Table 1: The Comparison of Average GA Value Based Group

Group Statistics

	Groups	N	Mean	Std. Deviation	P
GA1	Treatment	22	32.1933	9.55037	0,074
	Control	22	27.2391	8.37959	
GA2	Treatment	22	27.7513	9.83976	0.567
	Control	22	29.3077	9.61168	
VELOGA	Intervention	22	-12.5605	14.76962	0.001
	Control	22	7.4874	21.73324	

Analysis by Independent t test

The mean GA at the beginning doesn`t differ significantly (so that the intervention group and the control group were considered equivalent).

At the end of the observation found the average difference GA levels between the two groups was not significant. In the treatment group decreased levels of GA until 13.7% and in the control group increased GA levels until 8.6% from beginning values. A gap between the rate of the group treated with control of 22.3% (-13.7% to + 8.6%) which logically can be regarded as profits intervention.

Tentative conclusions: there was the effect of treatment against reduced of GA levels at research subjects than controls (on the control actually increased the mean).

Table 2: Comparison of Average Value MMAS and Rate Based Group

	Groups	N	Mean	Std. Deviation	P
MMAS1	Treatment	22	2.8000	1.35409	0.079
	Control	22	3.4591	1.59386	
MMAS2	Treatment	22	5.3523	1.34664	0.040
	Control	22	4.3409	1.55943	.
VELOMMAS	Treatment	22	118.7225	94.51487	0.006
	Control	22	33.5908	40.17544	

Analysis by Mann Whitney U test

Similarly GA, the median value in the treatment group and the control from aspects of Medication adherence Morisky Value Scale (MMAS) in the initial phase did not differ significantly (p = 0.079) and in the final phase, the two groups differed median (p = 0.040). MMAS in the end of research differ significantly between the treatment and control group despite both treatment and control increased.

The final point score achieved by treatment group was 5.362, while the control was only 4.341, both of the directions were positive but Velocity or rate of change MMAS (defined by (MMAS2-MMAS1) / MMAS1 in units per cent) were found differ significantly in both groups at a rate high enough on treatment until 118.723% where in control group was only 33.591%.. The speed rate was 3,534 times stronger than the control group.

Tentative conclusions: the treatment of different gives positive effects on the score MMAS and more powerful than the untreated group (control), the positive direction at a rate was 3.5 times compared to the control.

Table 3: Comparison of Average Value Variable HDFSS and rate Based Group

	Groups	N	Mean	Std. Deviation	P
HDFSS1	Treatment	22	64.3182	13.99451	0./897
	Control	22	64.9091	13.79409	
HDFSS2	Treatment	22	81.2727	12.50212	0.015
	Control	22	71.3636	12.32321	
	VELOHDFSS	22	29.6757	25.65998	0.014
	Treatment				
	Control	22	11.1657	10.93410	

Analysis by Mann Whitney U test

The Family support in early phase between the treatment group and the controls were similar (median 22.5 to the treatment and 22.75 to the control.

The P value 0.897). After treatment there was a change in the group treated with increasing of family support (median 27.23) while in control group, there was decreasing support controls (median of 17.77). The two groups differed significantly (p = 0.015), which standardized by using a percentage rate shows scores HDFSS drove 2.7 times in the treatment group compared to the control.

Tentative conclusions: the treatment effect better on HDFSS score than control, with positive direction and the rate of 2.7 times compared to the control.

3.1.2 Second Part

3.1.2.2 The Special Analysis of Treatment and Control Groups

Table 4: Special Analysis of Treatment Group

Wilcoxon Signed Ranks Test

		N	Average (Mean Rank)	Sum of Ranks
GA2 - GA1	Better (Negative Ranks)	22(100,00%)	11.50	253.00
	Worse (Positive Ranks)	0[b]	.00	.00
	Ties (No Changes)	0[c]		
	Total	22(100,00%)		
MMAS2 MMAS1	- Worse (Negative Ranks)	0[d]	.00	.00
	Better (Positive Ranks)	22(100,00%)	11.50	253.00
	Ties (No Changes)	0[f]		
	Total	22(100,00%)		
HDFSS2 HDFSS1	- Worse (Negative Ranks)	1(4,55%)	4.00	4.00
	Better (Positive Ranks)	21(95,45%)	11.86	249.00
	No Changes (Ties)	0[i]		
	Total	22(100,00%)		

a. GA2 < GA1

b. GA2 > GA1

c. GA2 = GA1

d. MMAS2 <MMAS1

e. MMAS2 >MMAS1

f. MMAS2 = MMAS1

g. HDFSS2 < HDFSS1

h. HDFSS2 > HDFSS1

i. HDFSS2 = HDFSS1

Wilcoxon Signed Ranks Test Rank:

In GA2-GA1 from N = 22, gain mean rank negative as much as 11.50, where the total rank is 253.00, indicating GA2 <GA1. There was no value for the positive ranks was GA2> GA1. All these values indicate that GA2

<GA1 and none grades ties (equal between the initial and final value). The test values found p = 0.000, conclusion: there was a decrease in the value of GA1 from GA2 significantly as a result of treatment.

In MMAS2-MMAS1 there were no negative ranks and vice versa, obtain positive rank as 11.50, with a total of 253.00, indicating the results of MMAS2> MMAS1, there are no ties, significance value = 0.000. Conclusion: The treatment causes a change in the MMAS significantly.

In HDFSS 2 - HDFSS 1 gain only one negative rank, with a mean rank 4.00 per case, which signifies HDFSS2 <HDFSS1. Positive rank as many as 21, with a mean of 11.86 indicating rank HDFSS2> HDFSS1. Ties are not obtained. Value test results p = 0.000, Conclusion: the treatment causes changes in HDFSS positively and significantly from the initial conditions to final conditions.

Table 5: Special Analysis of Control Group

		N	Average (Mean Rank)	(Sum of Ranks)
GA2 - GA1	Better (Negative Ranks)	7 (31,82%)	9.14	64.00
	Worse (Positive Ranks)	15(68,18%)	12.60	189.00
	No Changes (Ties)	0(0,00%)		
	Total	22(100.00%)		
MMAS2 MMAS1	- Worse (Negative Ranks)	1(4,55%)	8.00	8.00
	Better (Positive Ranks)	16(72,73%)	9.06	145.00
	No Changes (Ties)	5(22,72%		
	Total	22(100,00%)		
HDFSS2 HDFSS1	- Worse (Negative Ranks)	0	.00	.00
	Better (Positive Ranks)	19(86,36%)	10.00	190.00
	No Changes (Ties)	3(13,64%)		
	Total	22(100,00%)		

a. GA2 < GA1

b. GA2 > GA1

c. GA2 = GA1

d. MMAS2 <MMAS1

e. MMAS2 >MMAS1

f. MMAS2 = MMAS1

g. HDFSS2 < HDFSS1

h. HDFSS2 > HDFSS1

i. HDFSS2 = HDFSS1

Test Statistics[b]			
	GA2 - GA1	MMAS2 - MMAS1	HDFSS2 - HDFSS1
Z	-2.029[a]	-3.271[a]	-3.826[a]
Asymp. Sig. (2-tailed)	.042	.001	.000
a. Based on negative ranks.			
b. Wilcoxon Signed Ranks Test			

In GA2-GA1, from N = 22, there are 7 people (31.818%) get mean rank negatively on the ratings 9.14, where the total rank was 64.0 (compared with the similar condition to treatment with 22 people or 100% down to the total rank 253.00). There were 15 people who experienced a ratings increase (68.182% with a median score of 9.05 and the total score of 12.60 and a total ratings of 189). None grades ties (equal between the initial and final value).

The test Values found p = 0.042, conclusion: there was a change in the value of GA2 from GA1 significantly in the control (different direction from the treatment).

In Morisky Medication adherence Scale (MMAS) MMAS2-MMAS1 there was one sample (4,545%) negative ranks from median of 8,000 and total 8.000. Sample in control group consist of positive rank with 16 people (95.455%) with a median 9:06, with total reach 145.00, 5 people ties, a significant value of p = 0.001. Conclusion: there are significantly change of MMAS in the control group.

Family support as measured by a score HDFSS sample with negative rank of 0. Positive rank as many as 19 people (86.364%) median of 10 with a total of 190, ties obtained 3 people (13 636%). Value test results p = 0.000, conclusion: the control group experienced a positive and significantly change in HDFSS from the initial conditions to final conditions.

4. Discussion

4.1 The Level and Dynamics Analysis of the Average GA Value Based Group

At the initial research, the level of GA initial conditions (GA1) seems not significantly different between treatment groups and the control group, the same thing also happened in the levels of GA on the final conditions (ga2).

In the independent t test, mean GA at the beginning doesn`t differ significantly (so that the intervention group

and the control group were considered equivalent). At the end of the observation found the average difference GA levels between the two groups was not significant. In the treatment group levels of GA decreased until 13.7% and in the control group GA level increased until 8.6% from baseline values. A gap between the rate of the group treated with control of 22.3% (-13.7% to + 8.6%) which logically can be regarded as profits intervention. This means there was a treatment effect (Education) to decrease the levels of GA in research subjects while in the control group , there are increased the mean.

Glycated albumin (GA) are known to reflect short-term glycemic levels, and could be a monitor DM therapy for age albumin (17 days) shorter than erythrocytes (28 days) [18, 19].

The several studies have shown that GA better monitor DM also a better marker of glycemic control than HbA1c in patients who undergoing hemodialysis also in patients with type 2 diabetes or poorly controlled fluctuate. In addition, serum GA was not affected by factors that affect metabolism hemoglobin.[7] The International Expert Committee (IEC) has recently proposed a new diagnostic criteria based on the measurement of HbA1c.

However, little attention was focused on estimating the ability of GA compared with HbA1c in diagnosis of DM. However, the ability test of GA was not widely available and it was not standard. Thus, there was little data to show that the GA will be useful as a diagnostic tool.

In a cross-sectional research aims to establish the validity of the GA as glycemic control and evaluate its utility as a diagnostic tool for diabetes in community-based population [18, 19].

4.2 The correlation between GA and PG or HbA1c

There was a positive and significant correlation of serum GA with FPG (Figure 1a: $r = 0.8097$, $p < 0.0001$) and HbA1c (Figure 1b: $r = 0.8976$, $p < 0.0001$). Similarly, there are positive and significant correlations of GA was also found with PG (Figure 1c: $r = 0.6545$, $p < 0.0001$) 2 hours after the initiation of a 75 g TTGO, which did not differ significantly from the HbA1c with FPG ($r = 0.8259$, $p < 0.0001$) and 2 - h PG ($r = 0.7142$, $p < 0.0001$), based on the lack of a significant difference in the value of r. The analysis of regression showed there are no correlation between GA and other biochemical measurements in our research. Thus, GA correlate better with FPG than with 2h - PG, whereas HbA1c showed similar correlations with both FPG and 2h - PG.

4.3 The characteristic Performance of GA for DM undiagnosed

Figure 2 shows the ROC analysis for GA in predicting undiagnosed diabetes among 1,211 people. AUC ROC curve for GA (confidence interval, 0.861 (95% (CI); 0.787 to 0.917)) with a cut-off point of 15.7% predicting undiagnosed diabetes is similar to the FPG (0.882 (95% CI; 0.812 -0.934)) and HbA1c (0.861 (95% CI; 0.812-0.934)). According to ROC analysis, cut-off point for the best prediction of GA to the DM was 15.7%, with 73.3% sensitivity and 80.1% specificity.

The researcher tested the significance of GA as an indicator in the diagnosis of diabetes mellitus, relating with

FPG PG at the end of the two-hour 75-g TTGO. 2h-PG after initiation of TTGO correlate with GA unlike in HbA1c. GA correlate with FPG than with 2h-PG, whereas HbA1c shows similar correlation with both of FPG and 2h-PG. Overall, we found a very positive correlation between GA level and HbA1c (r = 0.898) and FPG (r = 0.810). The correlation coefficient was equal to that reported by previous studies.

The ROC analysis showed that the value of GA 15.7% represents the best value for distinguishing patients with diabetes than those who did not, with a 73,3% sensitivity and a 80,3% specificity The area under the ROC curve was 0.861. These data support the contention that the GA was a reasonable marker for the diagnosis of diabetes in a medical evaluation. Although, in this case, its performance was similar to the use of HbA1c, but there are other advantages to be gained from measurements GA. For example, GA has an advantage compared HbA1c in some cases, because it reflects the level of GA average for 2-3 previously weeks. [13] So, it was better as a potential monitor glycemic control for patients with diabetes who suffer from severe fluctuations in their glucose levels. It can also be used to confirm the treatment effect when starting or changing medications.

The Japan Society of Clinical Chemistry (JSCC) has reported a recommended method for the measurement of serum. But International Standarization for GA was clearly needed if this test becomes widely used. The Lucica® GA - L enzymatic kit that we used in this research has been automated high throughput analysis, and more suitable for such analysis than HPLC or other liquid chromatography method

5. Conclusion

5.1 The Effect of Educaton against the Compliance of Treatment

The median value in the treatment group and the control from the aspects of Medication adherence Morisky Value Scale (MMAS), or treatment compliance in the initial phase did not differ significantly (p = 0.079) and in the final phase, the two groups differed median (p = 0.040). MMAS at the end of the research differ significantly between treatment groups and control despite treatment and control both increased. The final point score achieved by treatment group was 5362, while the control was only 4,341, both of the directions was positive but Velocity or rate of change MMAS (defined by (MMAS2-MMAS1) / MMAS1 in units per cent) were found differ significantly in both groups at a rate high enough on treatment to 118. 723% and in control group was only 33.591%. The pace of the treatment group was 3,534 times stronger than the control group.

Conclusion The treatment groups influence different positive on the value of treatment compliance (MMAS) and more powerful than the untreated group (control), the positive direction at a rate of 3.5 times compared to the treatment groups.

5.2 The effect of education against the family support

The Family support in the early phase between the treatment group and the controls group were similar (median 22.5 to treatment and 22.75 to the control. The P value 0.897). After trreatment there was change in the treatment group with increasing family support (median 27.23) while in control group, there are decreasing support of family (median of 17.77). The two groups differed significantly (p = 0.015), which standardized

using cent rate shows scores HDFSS drove 2.7 times in the treatment group compared to the control group.

Conclusion The treatment group to influence better the value of Family Support (HDFSS) than the control group, with positive direction and the rate of treatment group was 2.7 than the control group.

5.3 The effect of education to Glycated Albumin

The mean GA at the beginning does not differ significantly (so that the intervention group and the control group were considered equivalent). At the end of the observation found the average difference GA levels between the two groups was not significant. In the treatment group, levels of GA decreased until 13.7% and in the control group, increased GA levels until 8.6% from baseline values. A gap between the rate of the group treated with control of 22.3% (-13.7% to + 8.6%) which logically can be regarded as profits intervention.

Conclusion There are no effect of treatment to the decline level of GA in the subject compared to the control group (the control actually increased the mean).

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