October 2009

ISSN 0215-0158
Volume 25, Number 1

ANIMA

INDONESIAN PSYCHOLOGICAL JOURNAL

ANIMA INDONESIAN PSYCHOLOGICAL JOURNAL

ISSN 0215-0158

Volume 25, Number 1
October 2009

Anima Indonesian Psychological Journal
publishes reviewed articles with reviewers and consultants providing
detailed assistance to authors to reach publication. The journal publishes research reports and scientific papers in psychology and/or related sciences with the aim to advance science, knowledge, and theory of psychology

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Accredited by the Indonesian Directorate General of Higher Education
No. 43/Dikti/Kep/2008

Anima is published quarterly (first published October 1985)
by the Laboratory of General Psychology
Faculty of Psychology Surabaya University

Editors and Administration Address
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Subscription
Inside Java Rp 100,000.00; Outside Java Rp120,000.00
Overseas US$80.00/volume (four issues, including airmail)
Payable through PermataBank Jemursari, Surabaya, Indonesia. Account number: 291 113 9394 (Hary K.L .UBAYA)
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ISSN 0215-0158

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Anima, Indonesian Psychological Journal
2009, Vol. 25, No. 1, 55-65

Self-Control Therapy on the Dietary Behavior of Adolescents with Type 1 Diabetes Mellitus

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Adolescents with Type 1 Diabetes Mellitus (DM-1) usually show a lack of responsibility to maintain their healthy lifestyle, especially the obedience in controlling their dietary behavior. The main factor of this disobedience is lack of self control and self-endurance. This research was aimed to see the impact of self-control therapy on dietary behavior The applied self control therapy was the reformative type to alter the lifestyle, the behavior patterns, and the destructive habits directly. Participants were two adolescents with DM-1, aged 15 and 22 years old participants, who were obtained through a snowball sampling technique. The questionnaire, which was based on the self control and the records of the dietary behaviors before, during and after therapy, was used to collect the data. The results showed that the self control therapy has a significant impact in helping the adolescents with DM-1 to alter their behavior towards a better diet.

Keywords: dietary behavior, self control therapy, adolescents, DM-1

Remaja penyandang Diabetes Mellitus Tipe 1 (DM 1) umumnya menunjukkan kurang bertanggung jawab mengupayakan gaya hidup sehat, terutama kepatuhan dalam mengendalikan perilaku makannya. Faktor utama ketakpatuhan ini adalah kurangnya kendali diri dan ketahanan diri. Penelitian ini bertujuan melihat dampak terapi kendali diri terhadap perilaku makan. Terapi kendali diri terpakai adalah jenis reformatif untuk mengubah gaya hidup, pola perilaku, dan kebiasaan buruk secara langsung. Para peserta adalah dua orang remaja penyandang DM 1, berusia 15 dan 22 tahun yang diperoleh memakai teknik sampling bola salju. Peserta penelitian ini diperoleh memakai teknik snowball. Kuesioner yang didasarkan pada kendali diri dan catatan perilaku makan sebelumnya, terapi selama dan sesudah terapi, dipakai untuk memperoleh data. Hasil-hasil menunjukkan bahwa terapi kendali diri memiliki dampak signifikan dalam membantu remaja penyandang DM 1 untuk mengubah perilaku ke diet yang lebih baik.

Kata kunci: perilaku makan, terapi kendali diri, remaja, DM 1

People still consider Diabetes Mellitus Type 1 (DM-1) as a hereditary disease rather than life style disease. In the past, people thought that only the elderly were liable to DM-1. However, nowadays, almost anybody are also liable even children. It is estimated that 10-20% of all diabetic patients worldwide are suffered by children and adolescents. Based on a DM-1 survey conducted by Tjokroprawiro (2002) in 1986 through urine screening test on 18.118 childrens aged between 6 to 20 years old, the prevalence of DM-1 among children 6 to 10 years old was 0.07%, between 11 to 15 years old 0.20%, between 16 to 20 years old was 0.60% and the overall prevalence was 0.26%. Children or adolescents suffering from DM-1, are also called diabetes mellitus of children or juveniles. In cases of patients with DM-1, 90% of beta cells which produce the insulin cells suffer a permanent damage. This condition causes a severe shortage of insulin production that forces the patient to get insulin regularly.

DM-1 is a chronic disease. It often makes the patients feel helpless as if he/she is no longer able to change his/her future. This kind of feeling occurs due to many reasons, such as: "healing" and "relapse", and possibly because of physical deterioration resulting from the illness (Miller as cited in Soeharjono, Tjokroprawiro, & Adi, 2002). It requires both physical and psychological adjustments for the patients, including the children or the adolescents. That is why, the children or adoles-

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cents with DM-1 are required to change their lifestyles from their neglectfulness without many rules into disciplinary healthy behaviors in order to routinely carry out various programs related with mealtime, insulin injections every day even before consuming any food, and regular controls of blood sugar level . This step by step guidance is arranged accordingly so that the patient's metabolism can run well (Laron as cited in Soeharjono et al.).

Pranoto (Personal communication, August 18, 2008), one of Surabaya's experts in DM, explained that during the transitional life pattern, a teenage with DM-1 often suffer lack of consistency in obeying the crucial rules and carrying out a disciplinary healthy behavior in order to control his/her blood sugar levels. The most fatal neglectfulness that patients with DM-1 often repeat, is their dietary misbehavior. Truthfully, they need to understand themselves that DM-1 is an incurable chronic disease, but the danger of the more serious complications could still be prevented by an appropriate behavior, particularly diet. It is the main reason that urges the patients to adhere to their dietary programs (Moehyi, 1995).

Contrary to the adults, the adolescents with DM-1 are more lacking in their sense of responsibility to maintain their health, especially their dietary behaviors (Pranoto, personal communication, August 18, 2008). Further, he argued that this condition is caused by many psychological problems, such as, unstable emotional conditions, immaturity, and peer influence. As a result, these conditions make them become easily desperate, frustrated, worried, and helpless. Many of them refuse to be cooperative in maintaining their health by altering their unhealthy lifestyles. Mostly, they are reluctant to perform any urine or blood sugar tests, and worst, they often neglect to take an insulin injection regularly (Bilous, 2002).

To make matter worst, most of them also have a lack of knowledge as well as a lack of awareness about the risks. They often break their continence by consuming the forbidden foods and beverages, especially when they are far away from the family supervision. Soeharjono et al. (2002) found out that 80% of adolescents with DM-1 have difficulty in carrying out their diet, although 70% of them have family support to implement the diet program.

A difficulty to diet can occur particularly during the middle and the late adolescence (15-22 years) because they spend more time with their peer-group rather than with their family. During this developmental stage, the adolescents are in a great need to mingle with their group and accepted by them (Hurlock, 1990). That's why they behave like healthy normal people who are free to do anything, in order to hide their inferiorities due to their illness.. In addition, the influence of the peer group mostly are not supportive for the implementation of the diet (Soeharjono et al., 2002).

Most adolescents are also ambivalent towards the developmental changes. Apart from the unstable emotional factors, they often demand freedom but are too afraid to take responsibility. They also doubt their ability to cope with the consequences of their own conducts (Hurlock, 1990). The same conflict happens to the adolescents with DM-1. Based on the researcher's observation, the adolescents with DM-1 want to be treated like a normal child by their family. They want to be given the freedom to consume any food they like and do activities with their peer groups like the others do with no restriction as a patient with DM-1 This condition makes them lack of self control in managing their diet On the other hand, it also makes them stressful and depressed with the risks of their ignorance; such as the obligation to have a regular diet, insulin injections, exercises, rest, and blood sugar tests as well.

The wish to live normally also makes the adolescent with DM-1 feel depressed due to many interventions from their environments. According to the patients, 50% of them feel that it is the mothers who concern, regulate, and supervise their diet as well as their eating habits. Whilst, the fathers are rarely involved in supporting their diet programs. Only 10% are able to manage their own diet independently and proactively, whereas 40% do not understand their diet very well, for example how to determine an appropriate replacement food choice (Soeharjono et al., 2002).

The main problem in this case is a lack of self control and resilience in managing DM-1. Such maladaptive behaviors, which cause the failure in DM-1 patients' treatment especially the teenagers, will lead the patients to a more serious complication such as heart or kidney failures, nerve and blood vessels damage, and so on. That is why, a detailed information is needed for them.

Many researchers are interested in applying the self-control therapy to modify the adolescents with DM-1 dietary behaviors. The self-control therapy used is the reformative type. It aims to alter the lifestyles, the patterns of individual behavior, and the destructive habits as well. During the program, the patients will be encouraged to overcome their problems independently. The patients will be guided to break down their problems, particularly on their dietary behaviors, then, they will be asked to make a commitment to change, search the source of their problems, design and implement the recovery plans in order to ensure the support for a long term benefit.

The self-control training program will be supported by a counseling meeting about DM-1, especially about diet for the adolescents with DM-1. The purpose of the counseling is to provide an appropriate knowledge about dietary behavior. It is an open behavioral pattern, actions and habits of teenagers with DM-1 in obeying the rules to maintain, restore, and advance health condition. The researcher used the aspects that had been put forward by Moehyi (1995) in measuring the adolescents' dietary behavior with DM- I. Those aspects are the right time, the right amount, and the right way, known as the three rights (properness).

Self-control training will apply a group discussion to increase adolescents' knowledge of DM-1 thoroughly and also provide an understanding for them about the consequences of their behaviors. The aim of this research is to determine the impact of the self-control therapy to the adolescents' dietary behavior with DM-1 aged between 15 to 22 years old. Furthermore, this study will provide a useful knowledge for the patients to apply a proper dietary behavior which in turn, can improve their quality of life.

Although self-control therapy is not the main factor in maintaining the stability of the blood sugar level, it is necessary as a psychological management tool, particularly as an assistance of the self regulations of adolescents with DM-1 optimally. There are several argumentations behind the importance of self management education for people with diabetes mellitus (Brown et al, as cited in Nagelkerk, Reick & Meengs, 2006): (a) diabetes is a serious long term illness, (b) people with diabetes need detailed information, (c) people with diabetes want a stable condition, (d) diabetes requires a specific independent treatment,and (e) diabetes is a personal responsibility.

This therapy is intended to help the adolescents with DM-1 in applying the appropriate coping strategy in order to get a more optimal healing effort. In addition, the medical treatment, the insulin injections, and the appropriate dietary pattern, are also the main factors determining the stability of the patient's blood sugar level.

Method

The self-control therapy used in this study is the reformative type. It is chosen because of its objective to alter the participants' lifestyle pattern, particularly their dietary behaviors and coping skills. Its objective has a considerable future oriented impact (heterostatis), with the technique reinforcing the subject's resistance to temptation. In term of the adolescents with DM-1, structured practices and homeworks such as self-recording their own dietary behaviors and self-practising their dietary behavior programs.

The Reformative *self-control* therapy is appropriate when it is applied to adolescents above 11 years old in accordance with the participant's age in this research. According to Smith et al. (cited in Nagelkerk, Reick & Meengs (2006), there are five steps to implement the educational program for the adolescents' *self-control* of DM-1: (a) Specifying the problems. What do you want to change? How do the adolescents with DM-1 know that they have achieved success? To answer these questions, the adolescents with DM-1 need to break down the problems in quantitative terms. The first step is to identify the issues that occur based on their point of views; (b) Making a commitment to change. A commitment to change will lead the adolescents with DM-1 to make a statement to themself (and perhaps to the others as well) that they will change their behavior. They need to do the things that keep them committed in order to achieve a higher probability in altering their behaviors; (c) Collecting data and analyzing the causes. The next step is to retrieve the data about the emerging problems of when, where, and how often they occur. In the earlier examinations, it is very important to analyze the consequences that might retain the undesired behavior and also the instant consequences of the developing behavior. This information be-

comes very useful for the next step; (d) Designing a program. It is an important step to help the adolescents with DM-1 to identify the necessary action in order to start a step forward to their goals; (e) Evaluating the results. At this stage, the adolescents with DM-1 will be asked to describe what is already learned and attained from this process, what the support is and the motivation they get, as well as what the next steps will be, no matter what the obstacles are. In this process, they will face two choices whether they will continue the previous action or start a new one.

The self-control counseling and the training sessions will be divided into three parts and conducted in a two week program. The first session is a time to build a relationship between the researchers and the participants as well as between the participants themselves. Then, they will be explained about the self-control therapy thoroughly. Lastly, they will be asked to sign the informed consents and given a task to record their eating behaviors during the first week.

The next session will be preceded by an introduction and a brief explanation from the nutritionists, followed by a brief counselling on diabetes, which contains any information, knowledge and explanation about diabetes, such as: its symptoms, types, causes, effects, and how it can be overcome, especially about the proper behavior for the participants' diet and the group discussion. After the counselling session, the participants will be asked to try applying the self-control therapy in four stages. Then, they will be given a task to make a plan for their healing practices in one week and keep its records, The last session is the follow up process to the fifth stage of the self control therapy and the overall evaluation on its training and group discussion program. It involves the following elements:

Cognitive. The participants are able to remember the material given for the dietary behavior and the self-control therapy of DM-1 during the counselling session.

Affective. The Participants feel comfortable with the therapy.

Conative. A change in the participant's dietary behavior as an effort to improve his or her own health. The counselling program for the adolescents with DM-1's dietary behaviors was adjusted according to the participants' different conditions, such as weight, height, health conditions, and daily activities. The theory used to determine the needs of the participants' diet was based on Tjokroprawiro's proposal (2006), which steps are:

1. Calculating the Relative Weight of every participant (see Table 1).
2. Determining the nutritional status of the participants based on the RW (see Table 2).
3. Determining the amount of calories required by the participants. Practically, the daily amount of calories needed for the working people with diabetes are:
   a. Underweight : Body Weight × 40-60 calories/day
   b. Normal (Ideal) : Body Weight × 30 calories/day
   c. Overweight : Body Weight × 20 calories/day
   d. Obesity : Body Weight × 10-15 calories/day

Table 1
Formula for Calculating Relative Weight

$$\textbf{RW} = \frac{\text{BW}}{\text{H} - 100} \times 100\%$$

Description :
BW = Body Weight
H = Height

Table 2
Nutrition Status Classification Based on the Relative Weight

Nutritional Status Classification	Relative Weight (RW)
Undernutrition	< 80%
Underweight	< 90%
Normal (Ideal)	90-100%
Overweight	>110%
Obesity, when RW ≥ 120%	Light Obesity RW 120%-130%
	Moderate Obesity RW > 130%-140%
	Heavy Obesity RW > 140%
	Morbid Obesity RW > 200%

Table 3
Implementation of Diet Based on Total Calorie Count

Calorie	Diet type	Calories Distribution			
		Protein	Fat	Carbohydrate	Cholesterol
1100	Type I	36.49gr	22.81 gr	179.35 gr	93.25 gr
1300	Type II	41.74 gr	28.55 gr	217.88 gr	93.25 gr
1500	Type III	47.3 gr	34.3 gr	253.5 gr	93.75 gr
1700	Type IV	49.82 gr	36. 28 gr	300.58 gr	112.5 gr
1900	Type V	53.97 gr	38.88 gr	328.41 gr	112.5 gr
2100	Type VI	65.49 gr	45.89 gr	377.45 gr	112.5 gr
2300	Type VII	67.85 gr	50.89 gr	395.73 gr	112.5 gr
2500	Type VIII	75.11 gr	57.29 gr	424.98 gr	112.5 gr
2700	Type IX	82.33 gr	62.5 gr	479.39 gr	150 gr
2900	Type X	92.3 gr	67.69 gr	511.32 gr	175 gr

4. Determining an appropriate dietary plan for the participants according to their health condition and the amount of calories needed in a day. Below is an example of a dietary plan for diabetes that is adjusted to the participants' condition and divided according to the amount of the calories (see Table 3).

The Four-steps counseling guidance can be seen in Table 4.

Table 4
Determination of an Appropriate Diet For Each Participant

Participant M				Participant N			
Diet Type	Time	Nutrition Type	Amount	Diet Type	Time	Nutrition Type	Amount
BW=56 H=155 RW=102 (Normal) Calorie =BWx30	06.00- 07.00	Carbohydrate - Animal protein - Plant protein - Vegetable - Fruit/Milk	90gr 25gr 25gr 90gr 40gr	BW=53 H=156 RW=95 (Normal) Calorie =BWx30	06.00- 07.00	Carbohydrate - Animal protein - Plant protein - Vegetable - Fruit/Milk	75gr 25gr 25gr 90gr 40gr
=1680	09.00- 10.00	- Snack	175 gr	=1590	09.00- 10.00	- Snack	175 gr
Type IV Calorie : 1700 gr Protein : 49,82 gr Fat : 36,28 gr	12.00- 13.00	Carbohydrate - Animal Protein - Vegetable - Fruit	130gr 40gr 100gr 57,5 gr	Type III Calorie: 1500gr Protein : 76,12gr Fat: 31,79gr	12.00- 13.00	Carbohydrate - Animal Protein - Vegetable - Fruit	120gr 40gr 100gr 57,5 gr
Carbohydrate: 300,56 gr Cholesterol:	15.00- 16.00	- Snack	150gr	Carbohydrate: 224,07gr Cholesterol:	15.00- 16.00	- Snack	150gr
112,5 gr	18.00- 19.00	Carbohydrate - Animal protein - Vegetable - Fruit/Milk	130gr 25gr 100gr 57,5gr	106,25gr	18.00- 19.00	Carbohydrate - Animal protein - Vegetable - Fruit/Milk	120gr 25gr 100gr 57,5gr
	21.00- 22.00	- Snack	175 gr		21.00- 22.00	Snack	175 gr

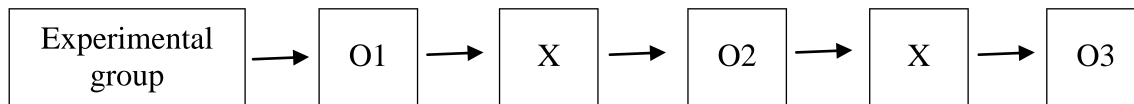

Figure 1. Diagram of the research design

Note:
O1 = The First measurement is before the treatment (baseline).
O2 = The Second measurement is after the four stages of the self-control therapy.
O3 = The Third measurement is after the fifth stage of the self-control therapy.
X = Self-control therapy

The participants were two adolescents with DM-1, aged 15 and 22 years old from Surabaya. They were chosen by the snowball technique, which was searching the information from the previous participants to get a new one. This technique was chosen because of the difficulty to find the required participants, especially, the ones with a dietary behavior problem. Then, it was followed by an interview to identify them.

This research applicate the experimentaldesign, particularly the one pre-post test and single-case experimental design. It was selected based on the research purpose to evaluate the effects of the treatment (or the intervention), which in this case, the self control therapy for the participants' dietary behavior in one group with its analysis. The effects of the treatment was evaluated by the repeated measurement to compare the participants' conditions from time to time (see Figure 1).

The data was collected using the informed consent from the participants, the open questionnaire (self-identity, which includes the name, age, gender, educational/occupational status), the participant's condition including how long the participants suffered from DM-1, how they felt when they were told about their condition at the first time, what kind of efforts they had done to overcome it (especially in their dietary behavior), what obstacles they had faced during their attempts to overcome their condition and how their family, friends, as well as their surroundings had supported them.

The informed consent and both of the questionnares were given before the self-control therapy began. The worksheet consisted of two sheets, which were the self-recording sheets or the diary of the participant's dietary behavior and the self-control therapy assignment sheets. The sheets for the assignment of the self control therapy consisted of each participant's activities for implementing their dietary behavior in each column. They were asked to record their meal, the type and the amount of the food consumed everyday. The scoring was based on the appropriateness of the participant's dietary behavior in their diary, which contained the self-recording of their dietary behavior.

The guidelines for the scoring was conducted by the participant on the recording sheet, which was based on the rules of each participant's diet. The rules had been prepared in accordance with the needs of each participant (see Table 4). Its arrangement were based on Tjokroprawiro's theory (2006). The scoring of the participants' dietary behavior were written in their self-recording sheet: 0 = inappropriate dietary behavior; 1 = appropriate dietary behavior

The sheets of the Self-control therapy contained the application of the participant's self-control therapy to address their maladaptive dietary behavior. They were guided by the researcher as the facilitator to implement the five steps in self-control therapy, such as, specifying the problem, making a commitment to change, collecting the data and analyzing the causes, designing a program for implementing the recovery plans and evaluating the results. The Evaluation sheet was used as a complementary data of the research results. The participants were given an evaluation, which contained their feelings during the training process, the changes occurred after attending the training process, the things that have not changed

in themselves, the strength and the weakness of the training process that made them better, the critics and the suggestions about the materials, the researchers, the time, place, language, and the questionnaire from the participants. The Observation sheets were filled out after the training process. Its goal was to see the frequency of the participants involvement, their intensive attention, their chosen role in the dialogue, and their responses during the training process.

Results

Based on the researcher's observation, both participants had the same problem in their dietary behavior especially in balancing the accuracy of the meal time, the amount and type of the consumed food. Although basically, the participants already understood DM-1 quite well, they often ignored the risks that might occur in the future if they didn't properly manage their condition, such as consistent with their diet. In accordance with the results of this research, generally, the people with DM-1's knowledge and understanding are not accompanied by appropriate coping strategies. It is generally due to lack of their own self-control so no wonder, they are less consistent in adhering to the rules that support their efforts to cure themself (Kardina, 2004).

From the evaluation, both participants felt happy and comfortable after taking the self-control therapy for two consecutive weeks. Both also stated that they got a benefit from the therapy. In addition to the changes in their physical condition, the self-control therapy also provided them with a new insight that they are able to manage themselves in dealing with DM-1, especially in terms of diet. From the recording of each participant's dietary behavior, there was some progress in implementing the right diet pattern.

The Self-control therapy basically has its own advantages and disadvantages. One of its advantages is to help the individual to recognize the problems and lead him/her finding the solution. The Self-control therapy is also very effective for controlling the undesirable habits, but such changes require individual determination. This kind of therapy is not effective without the individual's strong will and awareness. This is the weakness of the *self-control* therapy.

In addition to the group discussion, the researchers also want to discuss each participant's results:

Participant N. There are changes in N's dietary behavior based on the recording before and after self-control therapy The changes are the eating schedules and the amount of food taken in every mealtime. It also fits her evaluation during the fifth stage of the self-control therapy. N was able to manage her eating schedule properly. She did not take large amounts of food at one time anymore as she did before the self control therapy (which was visible in the baseline measurement). She received a great benefit from her changing dietary behavior, which made her free from nausea due to a high acidity and hyperglycemia (an increase in the blood sugar level drastically).

Participant M. There are changes in M's dietary behavior before and after self-control therapy. The changes are the eating schedules, the amount, as well as the type of the food taken in every mealtime. Based on the evaluation of the fifth stage of the self-control therapy, M felt a positive change after participating the self-control therapy. She was able to regulate and control her dietary behavior. Her favourite types of food was forbidden for DM-1 such as brownies, chocolate, milkshakes, drink cans or boxes. Previously, she consumed them uncontrollably in a large number

Based on the evaluation from the behavioral intervention, the *self-control* therapy can help altering the participants' dietary behavior (see Table 5). Its success is highly influenced by the participants willingness and determination to make a positive useful change for their health. Some external conditions beyond the participant's control could lead to the ineffectiveness in altering their dietary behaviors, such as tight working schedule, difficulty in finding the appropriate food, difficulty in calculating the portion of food properly, influence of their peer group, and the family's dominant role as well, that can affect their self-confidence to overcome their DM-1 independently.

Table 5
Target and Participants Achievement in the Process of Self Control Therapy

Stages *Self-Control*	Target	Achievement	
		N	M
Stage 1: Specify the problems	Participants are aware of their conditions, able to accept DM-1 and able to identify their problems related with DM-1.	The Participant can: o Analyze her problem detailed and clearly o List the most frequent problems that distract the participant, like eating excessively and disorderly o Specify her feelings as a result of a problematic behavior, which is sad, angry, and annoyed. o Determine her goal in this therapy: to have a proper meal in schedule and portion.	The Participant can: o Specify the problem related with her dietary behavior, such as the inability to control the portion of the food. o Realize that the desire to consume food that she likes higher than her body needs. The participant does not write her feelings about the impact of her maladaptive behavior and specific purpose
Stage 2 : Make a commitment to change	The Participant has the courage to commit continuously and is able to handle the temptations that appear later.	The Participant can: o Determine the scale of her commitment to change her behavior equal to 5. o Determine her goal to regulate her eating schedule so she can maintain the stability of her blood sugar level and overcome her gastric acid. o Create a picture of an anticipation when an unwanted condition occurs by making eating schedule and asking the other's support	The Participant can: o Have the courage to change and determine the scale of her commitment in the process equal to 6-10. o Design an anticipation for the future by manipulating the participant's cognition in her memory about the size of her clothes, and her body weight.
Stage 3 : Collect the data and analyze the causes	The Participant can overcome the weakness and strengthen the commitment to change	The Participant can: o Recognize the situation of the emerging behavioral problem when the participant felt that she was unable to present at the meal with friends or families and was often unable to refuse her friends to eat something even though she was already full. o Understand the advantages and the disadvantages of her self-change program.	The Participant can: o Explain the situation of the emerging behavioral problem behavior when the participant was away from home and was traveling alone. o Recognize that her behavioral problem occurred from her ownself and understand what the advantages and the disadvantages of the self-change program.

(table continued)

Table 5 *(continued)*

Stages *Self-Control*	Target	Achievement N	Achievement M
Stage 4 : Design a program	The Participant can implement the strategy effectively in order to change their behavior	The Participant can: o Design and choose the suitable program for a specific change, such as reminding her meal schedule by using an alarm clock, asking her parents to remind her, and eating first or bringing some snack when she go out with her friends. o Follow the plan consistently	The Participant can: o Design the self-change program but it is not specific so it might be ineffective to deal with the participant's behavioral problem. Her self-change program is to reduce the intake of carbohydrate.
Stage 5 : Evaluate the results	The Participant can decide whether she will continue her former habit or start a new one	The Participant could proceed the self-change program quite well and achieved her goal in this therapy. During this stage, she was able to make a decision to continue her program. Her achievement scale in self-change was 9.	The Participant was not able to proceed the self-change program effectively. The goal in this therapy could not be achieved because of the participant's lack of commitment. She made up her mind to continue her program and tried to strengthen her commitment

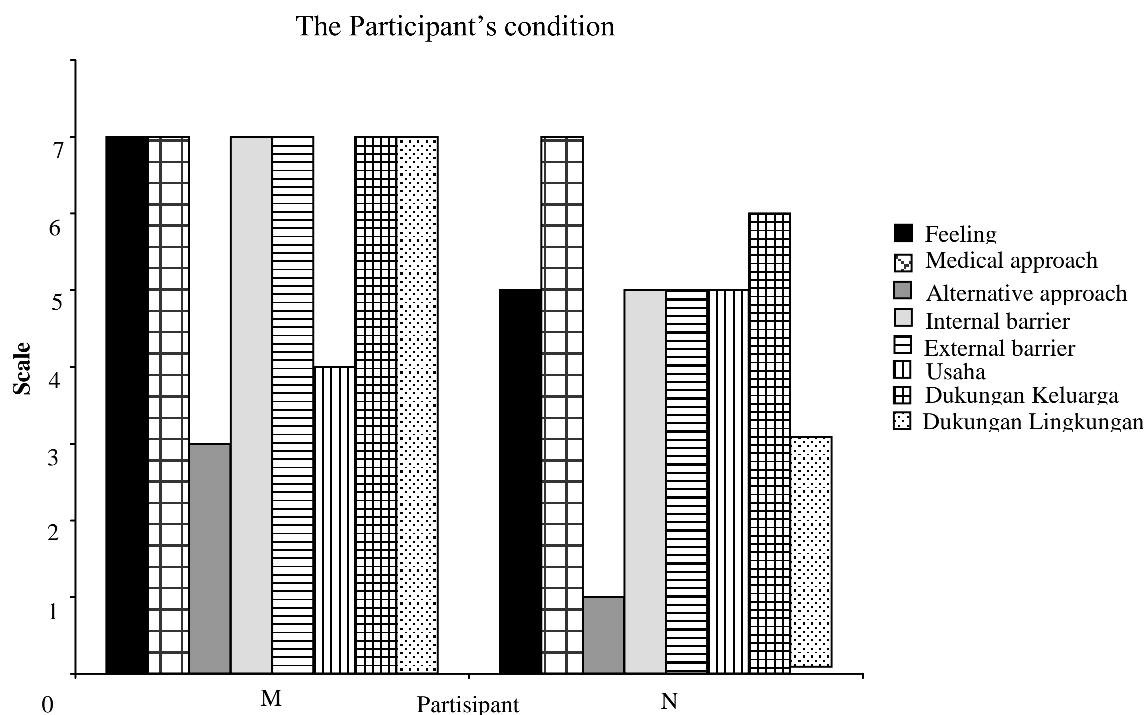

Figure 2. The participant's condition

Figure 2 is based on the questionnaire of the participant's self-condition that contains of their feelings, efforts, problems, attempts to overcome the problems, and the support for the participants. According to the data, participant "M" felt more comfortable with her condition as a DM-1 patient than participant "N" did. Both of them had the same efforts in improving their health condition, but in the alternating efforts, M was inclined to try harder than N was, eventhough both of their alternating treatment were low. M had greater obstacles internally as well as externally than N did. However, they both were still at a high level. N's effort to overcome these barriers was better than M's. M's support from her family and her surroundings was high. Whilst, N had a family's support higher than her surroundings, which was relative at a low level.

The Comparation of the time, the type and the number of the participants' dietary behavior from the self-recording before and after their self-control therapy.

Figure 3 indicates that there is an increased score especially in the accuracy of the meal time and the amount of the served food consumed by and a decreased score in terms of the accuracy of the type of food consumed.

Based on the graph at Figure 4, there is an increased score on all aspects of M's dietary behavior such as accuracy of the meal time, amount and type of food consumed.

1. Partisipant N

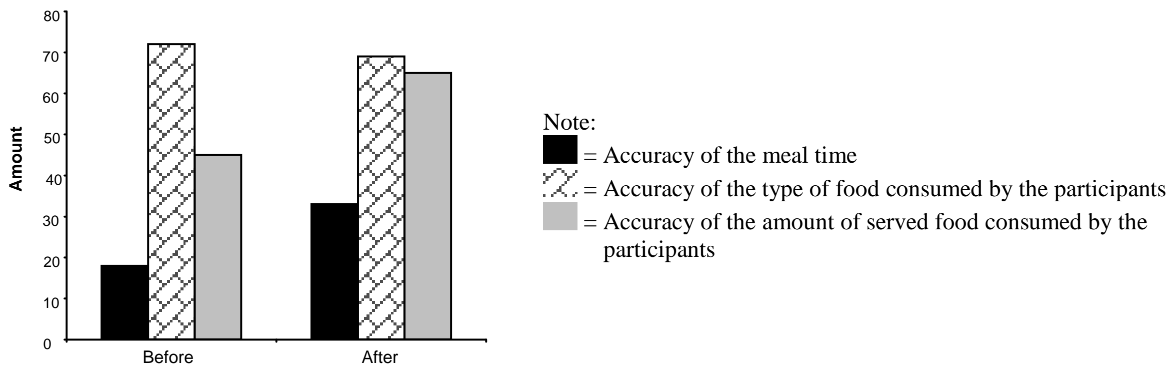

Figure 3. Time, type and amount in N's dietary behavior before and after the self-control therapy

2. Partisipant M

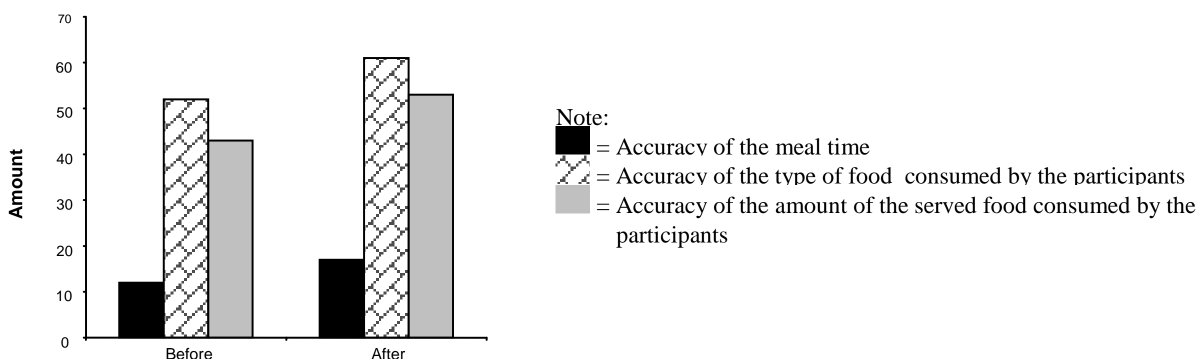

Figure 4. Time, type, and amount in M's dietary behavior before and after the self- control therapy

Conclusion

There is a significant difference in the participants' dietary behavior based on self-recording after following the self-control therapy. Its success is also dependent on the participants' strong commitment to achieve a better dietary behavior personally. The stability of the blood sugar level in adolescents with DM-1 is not determined solely by the dietary behavior alone, but also the regular insulin injection, the routine blood sugar check, the exercise, and the lifestyle. These aspects greatly affect the quality of DM-1 adolescent's health.

The variety of the DM-1 adolescents with psychological problems can make a prolonged stress. It can affect the patient's blood sugar fluctuations, despite of their discipline in following the rules. The benefits from the patient with DM-1's self changes is not only about the physical aspects such as the stability of blood sugar level or the avoidance from complications, but also about the psychological aspects that influence positively, such as the freedom from fear, anxiety, guilty as well as stressful condition. It is due to their health conditions that encourage them to find a solution for their problems.

Research Limitations

Based on the findings, there are some limitations in this research, which are (a) all of the participants are females. This factor particularly affected the results. From the observation, the dynamical conflicts of the female adolescents with DM-1 are lower than the male are. Female are more concerned about their health conditions and pay more attention to themselves compared to their opposite sex. Whilst, the male has a greater desire for freedom and breaking the rules related with their health conditions; (b) the researchers faced great limitations and unsatisfactory expectations in exploring the participants' problems, especially about their surrounding influence, control and support.

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