JNK

The Effect of Behavioral Therapy with Modeling Techniques on Changes in the Adherence of Diabetes Mellitus Patients

Caturia Sasti Sulistyana[1], Rina Budi Kristiani[2]
[1,2]Nursing Department, STIKes Adi Husada Surabaya, Indonesia

Article Information	Abstract
	Diabetes Mellitus (DM) is a disease whose prevalence is not infectious increases with changes in lifestyle. If not managed properly, it will cause various complications that reduce quality of life, increase morbidity and mortality, and harm the economy. The success of DM management is strongly influenced by the patient's adherence to medication and diet. One of the interventions to improve the adherence of DM sufferers is Behavior Therapy with modeling techniques. The purpose of this study was to analyze the effect of behavioral therapy with modeling techniques on changes in adherence of DM patients. The design of this study was quasy-experimental with pretest posttest and control group, on a sample of 40 DM patients with consecutive sampling technique. The intervention was carried out in 4 sessions for 2 weeks. The results of the statistical test paired sample t-test and independent sample t-test obtained p <0.5 (0.000), which meant that there was an effect of behavioral therapy with modeling techniques on changes in adherence DM patient. Changes in compliance that occurred between before and after the intervention was 16.95 points. Modeling technique is behavioral learning through observation of a model who has successfully controlled his illness to emphasize changes in mindset, beliefs, and commitment to a person's new positive behavior. Modeling has an impact not only on imitating, but also adding or subtracting the observed behavior, so that it can be applied to obtain new behavior, leave old negative behavior, and maintain the desired behavior. © 2021 Journal of Ners and Midwifery

INTRODUCTION

Diabetes Mellitus (DM) is a disease whose prevalence is not infectious increases with changes in lifestyle. The success of DM management is strongly influenced by the patient's adherence to maintain his health, which includes adherence to a therapeutic regimen in the form of medication and diet (Kementerian Kesehatan RI, 2019). This disease if not managed properly can cause chronic complications that can increase the blood sugar, reduce quality of life, increase morbidity and mortality, and bring economic losses (Abidin, 2018).

The World Health Organization (WHO) predicts an increase in the number of people with diabetes in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030. The prevalence of DM in Indonesia ranks fifth in the world in 2008 with a total of 8.4 million(Kementerian Kesehatan RI, 2020). Data from the Health Office of East Java Province (2011), DM is included in the 10 most diseases, namely 69,018 people from 37 million population. The city of Surabaya ranks first with the highest number of DM sufferers, which is 14,377 people every year (Izza, 2019). Non-compliance with DM sufferers from year to year tends to increase, which is 50% in developed countries and lower in developing countries (Abidin, 2018). The average number of patient visits DM in Adi Husada's hospital 10-15 people every day. Information of nurses in there that most patients follow the therapy when were hospitalized.

The Indonesian Endocrinology Association (PERKENI) (2015) explains that the diagnosis of DM can be made if the fasting plasma glucose examination is over 126 mg/dl, plasma glucose examination is over 200 mg/dl, and HbA1c is over 6.5%(Thomas et al, 2016). The main obstacle in managing DM is the saturation of the patient following treatment and diet for a long time, causing failure of blood glucose control. DM sufferers say they are not too restrictive of their diet because they have taken medication, and consume food freely only at certain times, such as attending weddings or parties, and prefer to avoid the side effects of drugs by not taking them without reporting to the doctor. Patients with diabetes will adhere to the therapeutic regimen when they are hospitalized, but when they are at home and carry out their usual routines, the patient returns to his previous lifestyle, ignores diet, and visits the hospital so that the pain gets worse, blood glucose levels are high and are accompanied by complications (Abidin, 2018).

Good glycemic control will minimize the occurrence of long-term complications so that people with diabetes need several management strategies, including control of adherence to drug programs, diet, and physical activity. The American Diabetes Association (ADA) in 2017 recommends weight loss, increased activity physical, counseling, medication, annual monitoring, and cardiovascular screening (American Diabetes Association, 2017). One of the interventions that can improve the compliance of DM patients is behavioral therapy. Behavioral Therapy is a behavior therapy with counseling and psychotherapy approaches to change negative or maladaptive behavior into expected or adaptive behavior. Rahmah (2019) in her study explains that in this therapy the counselor provides positive treatment and stimulus according to the client's problem and directs it to problem solving. The stages of Behavioral Therapy include: 1) Assessment, 2) Setting goals, 3) Applying techniques, 4) Evaluation and Termination. One technique of behavioral therapy is Modeling (Rahmah, 2019).

Modeling is giving examples based on knowledge and experience so that it can be observed directly or indirectly by clients (Pambudi dkk, 2019). Modeling is formed through direct (imitation) and indirect (vicarious conditioning) observation (Munir, 2018). Behavior therapy with this modeling technique has an impact not only on imitating, but also adding or subtracting, strengthening behaviors that have been formed and leaving old negative behaviors so that new behaviors are formed, and maintain the desired behavior through the observed model (Bisri dkk, 2018).

The results of the Nengsih study (2019) showed that participant modeling therapy given to Schizophrenia patients could improve adherence to taking medication after 4 sessions were given. The patient learns to behave in increasing adherence to taking medication after being directed and guided by the therapist with the model that has been observed. The modeling technique given in this study refers to changes in cognitive, affective, and individual behavior produced through observation of one or several models (Nengsih, 2019).

Rahmah's study (2019) also proves that behavioral therapy with modeling techniques carried out for 7 meetings can handle negative thoughts

and behaviors due *self-efficacy* to lowin an employee. The studyer uses a real model of the employee leader who can be observed and has been able to trade well, according to the Islamic approach, and has successfully responded to various challenges (Rahmah, 2019).

Behavioral Therapy Interventions with Modeling Techniques have specific objectives: 1) Obtaining new attitudes through models, 2) Reducing fear and anxiety after observing the model, 3) Taking new responses or skills and showing them to new behaviors, and 4) Motivating to perform something that may already be known or learned. The modeling implementation sessions include: 1) session 1 identifies behaviors that cause maladaptive behavior and provides role models for adaptive behavior, 2) session 2 assists patients in carrying out adaptive behavior, 3) session 3 motivates patients to perform adaptive behavior, 4) session 4 discusses the benefits therapy and adaptive behavior (Nengsih, 2019)..

In this case, behavior therapy interventions with modeling techniques can produce new behavior changes that are obedient to the DM therapy regimen (Nengsih, 2019). Based on the facts above, studyers are interested in conducting study that will prove the effect of Behavior Therapy with Modeling Techniques on Changes in Compliance with DM Patients.

METHODS

This study was conducted on July 5rd – September 3rd 2021. The study design used was a quasyexperimental with pretest posttest and control group. Samples were taken from DM patients undergoing treatment at Adi Husada's Hospital Surabaya, as many as 40 people divided into 20 people in the intervention group and 20 people in the control group, with consecutive sampling technique. The inclusion criteria for this study sample were: 1) Type 2 DM patients, 2) Age 26-65 years, 3) physically, mentally, cognitively, able to read and write, and willing to be respondents. While the exclusions criteria of this study included: 1) not having a smartphone, 2) DM patients with complications, 3) not participating in the intervention twice.

The instrument used a demographic data questionnaire and also used an observation form for examination of Temporary Blood Sugar (GDS) with a normal value of < 200 mg/dl, a medication adherence questionnaire with the Morisky Medication Adherence Scale (MMAS) with Cronbach's Alpha 0.608, and a diet compliance questionnaire. Perceived Dietary Adherence Questionnaire (PDAQ) with Cronbach's Alpha 0.78. The adherence score is in the range 0-75, the smaller the score, the lower the compliance (Assad et al, 2015).

The implementation of the study in the intervention group was given behavioral therapy intervention with modeling techniques as many as 4 sessions for 2 weeks, 30-45 minutes for each meeting and each client. This intervention consists of: 1) Session 1 for identifying behaviors that cause noncompliance, 2) Session 2 for providing a role model to comply, 3) Session 3 for accompaniing patients in carrying out therapy and helping to overcome boredom and side effects of treatment, 4) Sessions 4 for motivating the application of obedient behavior, intervention benefits. While the control group received hospital standard education.

This study used univariate analysis to calculate the frequency of demographic data and each variable, as well as bivariate analysis used SPSS statistical test Paired sample t-test and Independent sample t-test. The hypothesis accepted if the p value <0.05.

RESULTS

General Data

1. Age

Table 1 shows that there was no difference between the control group and the intervention group, namely most of the respondents in this study were in the 46-55 year age group, namely 12 people (60%) in the control group and 11 people (55%) in the intervention group.

2. Gender

Table 2 shows that there was no difference between the control group and the intervention group, ie most of the respondents in this study were women, namely 14 people (70%) in the controlgroup and 16 people (80%) in the intervention group.

3. Education

Table 3 shows that there was no difference between the control group and the intervention group, i.e. most of the respondents in this study had the last education level of high school/equivalent, namely 13 people (65%) in the control group and 11 people (55%) in the intervention group.

Table 1 Distribution of Respondents by Age

Age (Years)	Control Group		Intervention Group		Amount	
	N	%	N	%	N	%
26-35 years old	2	10	2	10	4	10
36-45 years old	4	20	3	15	7	17,5
46-55 years old	12	60	11	55	23	57,5
56-65 years old	2	10	4	20	6	15
Total	20	100	20	100	40	100

Source: Primary Data

Table 2 Distribution of Respondents by Gender

Gender	Control Group		Intervention Group		Amount	
	N	%	N	%	N	%
Male	6	30	4	20	10	25
Female	14	70	16	80	30	75
Total	20	100	20	100	40	100

Source: Primary Data

Table 3 Distribution of Respondents by Education

Education	Control Group		Intervention Group		Amount	
	N	%	N	%	N	%
Not in school	0	0	1	5	1	2,5
Elementary School/ Equivalent	1	5	2	10	3	7,5
Junior High School/ Equivalent	1	5	1	5	2	5
Senior High School/ Equivalent	13	65	11	55	24	60
Bachelor's Degree/ Equivalent	5	25	5	25	10	25
Total	20	100	20	100	40	100

Source: Primary Data

Table 4 Distribution of Respondents by Occupation

Occupation	Control Group		Intervention Group		Amount	
	N	%	N	%	N	%
Not Working	4	20	3	15	7	17,5
Entrepreneur	5	25	5	25	10	25
Private	7	35	9	45	16	40
ASN/TNI/POLRI	4	20	3	15	7	17,5
Total	20	100	20	100	20	100

Source: Primary Data

Table 5 Distribution of Respondents by Old Suffers DM Tipe 2

Old Suffers DM Tipe 2	Control Group		Intervention Group		Amount	
	N	%	N	%	N	%
< 1 years	3	15	4	20	7	17,5
1-5 years	6	30	5	25	11	27,5
5-10 years	7	35	8	40	15	37,5
> 10 years	4	20	3	15	7	17,5
Total	20	100	20	100	40	100

Source: Primary Data

Table 6 Distribution of Respondents by History of DM Treatment

History of DM Treatment	Control Group		Intervention Group		Amount	
	N	%	N	%	N	%
Not in school	0	0	1	5	1	2,5
Oral (PO)	14	70	16	80	30	75
Injektion	6	30	4	20	10	25
Total	20	100	20	100	40	100

Source: Primary Data

4. Occupation

Table 4 shows that there was no difference between the control group and the intervention group, ie most of the respondents in this study worked as private employees, namely 7 people (35%) in the control group and 9 people (45%) in the intervention group.

5. Old Suffers DM Tipe 2

Table 5 shows that there was no difference between the control group and the intervention group, most of the respondents in this study suffered from Type 2 DM for 5-10 years namely 7 people (35%) in the control group and 8 people (40%) in the control group.

6. History of DM Treatment

Table 6 shows that there was no difference between the control group and the intervention group, that is, most of the respondents in this study received oral anti-DM treatment, namely 14 people (70%) in the control group and 16 people (80%) in the intervention group.

Specific Data

1. Paired T-Test Analysis of Adherence

Table 7 shows that based on the results of the Paired t-test statistical test, the control group and the intervention group both experienced changes in adherence, namely $p = 0.03$ ($p < 0.05$) in the control group and $p = 0.000$ ($p < 0, 05$) in the intervention group, so it can be concluded that there is a significant change in respondent adherence before and after being given the intervention in both groups. This is also evidenced by the mean 95% CI in both groups that does not involve the number 0, then the results are declared significant. However, the intervention group experienced a greater increase in adherence than the control group, which was indicated by the t-count value of 12.16.

8. Independent T-Test Analisys of Adherence

Table 8 shows that the difference in the average change in adherence before and after being given Behavioral Therapy with Modeling Techniques in the control group and the intervention group

Table 7 The Result of Paired T-Test Analysis of Adherence

Respondent Group	Adherence		95% CI	T	p*
	Pre (Mean ± SD)	Post (Mean ± SD)			
Control Group	29,1±10,45	32,25±9,04	-6,72±-0,38	2,35	0,03
Intervention Group	23,55±11,79	49,6±12,57	-30,53±-21,57	12,16	0,000

Source: Primary Data

Table 8 The Result of Independent T-Test Analysis of Adherence

Adherence	Control Group (Mean ± SD)	Intervention Group Post (Mean ± SD)	Mean Difference	95% CI	p*
Value Difference	32,65 ± 9,03	49,6 ± 12,57	16,95	-23,96 : -9,95	0,000

Source: Primary Data

was 16.95 points. The results of the statistical independent sample t-test obtained a value of p = 0.00 (p <0.05) so it can be concluded that there is a significant difference in changes in adherence between the control group and the intervention group.

DISCUSSION

The Effect of Behavioral Therapy with Modeling Techniques on The Adherence of Diabates Mellitus (DM)

The results of the measurement of the adherence variable in DM patients in the intervention group showed that all respondents experienced an increase in adherence after being given intervention of *Behavioral Therapy* with Modeling Techniques. Paired t-test results showed that the control group and the intervention group had the same change with p=0.03 in the control group and p=0.00. The average there was an increase adherence, but in the control group there was only a slight increase in t count, which was 2.35. Meanwhile, in the intervention group, the t-count was greater, which was 12.16. The intervention group received *Behavioral Therapy* with Modeling Techniques for 2 weeks. as many as 4 sessions, which means that *Behavioral Therapy* with Modeling Techniques has an effect on increasing the compliance of DM patients

The results of data analysis used independent sample t-test obtained p value = 0.00 (p <0.05), so it can be concluded that there is a significant difference in changes in DM management adherence

(diet and medication) between the control group and the intervention group.

Most of the respondents before being given *Behavioral Therapy* with Modeling Techniques were found to be irregular in taking treatment because they felt that their bodies had no complaints, were afraid to inject DM, or forgot, and neglected their diet because they experienced boredom, the disease did not go away and felt weak if they limited their food. Most of the respondents were aged 46-55 years. A young person is at risk of disobedience because when he is suffering from a chronic disease, he will experience internal conflicts when he is declared sick but his body has no complaints so that it causes him not to follow the advice of health workers. However, with increasing age, disease control irregularities can also occur due to boredom undergoing treatment that does not cure, forgetting the control schedule, taking medication, or consuming allowed and prohibited foods. In addition, with increasing age, a person needs and depends on his family to take control to the hospital so that it can often cause delays in control (Susanti dan Sulistyana, 2020).

Increased adherence in the intervention group experienced a lot of female respondents. Women are more concerned and careful about their health. While men tend to be disobedient because they do more physical activity outside the home than women, so they consume more high-calorie foods to meet the energy expended. This is what can underlie men tend to not care or ignore the recommendations

suggested by health workers (Susanti dan Sulistyana, 2020).

The results showed that the increase in adherence was experienced by many respondents with a high school education level/equivalent. Another factor that supports a person's success in complying with the therapeutic regimen is knowledge. Someone who has a good level of knowledge is more likely to be more obedient (Susanti dan Sulistyana, 2020). Education shapes a person's way of thinking so that it is broader, including understanding the factors that cause illness and maintaining his health. In addition, the higher a person's education level, the easier it is for that person to access information from various sources (Sulistyana, 2020). A mindset person's will change for the better and wiser with age, in this case the *mindset* of his health condition.

Another factor that can affect adherence to DM management is the length of time suffering from DM. The main obstacle in managing DM is patient saturation in following a diet and taking anti-DM drugs for a long time or for life. Someone who undergoes treatment for a long time will be bored and want to feel free to try various foods (Sulistyana, 2020). An action that is carried out continuously and monotonously will cause boredom or boredom so that it causes someone to try new things, in this case people who suffer from DM undergoing regular treatment for years can cause the person to become bored because the impact cannot be seen directly.

This modeling therapy can be given to patients who experience ineffectiveness of the therapeutic regimen due to non-adherence to a treatment program. In a study conducted by Nengsih (2019), modeling therapy conducted on 112 respondents for 4 sessions with a duration of 30-45 minutes/session/client was proven to be effective in increasing patient compliance in carrying out previously non-adherent treatment (Nengsih, 2019).

While in this study, the modeling technique was carried out in 4 sessions for 2 weeks, containing material related to sharing experiences when sick, providing support, motivation, enthusiasm, and solutions from fellow DM sufferers who have successfully controlled their disease. This modeling technique is given by emphasizing on changing one's way of thinking (*mindset*) and behavior because of a sense of compatriots' fate when suffering from the same disease, so that it can increase the confi-

dence and commitment of other DM sufferers to follow the diet program and DM treatment obediently in order to reach the highest level. optimal health, reduce morbidity and disability, and death due to DM.

This is in line with Smith's study (2018), namely modeling or observational learning which emphasizes changes in one's cognitive and behavioral aspects after observing other people who act according to what they experience. Empirically identified modeling can overcome one's fears and phobias after observing other people who can overcome these fears (Smith, 2018). This is also in line with Sulistyana's study (2020) that the experience of peers in similar illness conditions can lead to confidence and enthusiasm for DM sufferers to return to adherence with their health care management.

Modeling has an impact not only on imitating but also sorting out, adding or subtracting the observed behavior, so that new positive behaviors can be obtained, leaving old negative behaviors, and maintaining the desired behavior. In this case, if someone sees other people of the same age successfully running a healthy lifestyle for DM, it will foster a sense of confidence and enthusiasm so that they can comply with the therapy regimen they are undergoing. Furthermore, if you have grown a sense of confidence and enthusiasm, you will get a new attitude and take a response to new behavior. The modeling technique has the effect of strengthening the behavior that has been formed and weakening inappropriate behavior so that new behavior can be formed according to the observed model

CONCLUSION

The above discussion can be concluded that there was a significant difference in changes in adherence of DM sufferers between the control group and the intervention group, and there was a significant effect behavioral therapy with modeling techniques on changes in adherence of Diabetes Mellitus patients.

SUGGESTION

The further studers can involve other dependent variables in order to analyze the positive effect of behavioral therapy with this modeling technique for people with DM

REFERENCES

Abidin, Z. (2018). *Health Education dengan Pendekatan Social Media Reminder dan Audiovisual terhadap Kepatuhan dan Kadar Glukosa Darah Pasien DM Tipe 2 di Rumah Sakit Universitas Airlangga Surabaya.*

American Diabetes Association (AD). (2017). *Panduan Terbaru ADA 2017 Berfokus pada Pendekatan Holistik.*

Assad G, Sadegian, M, Lau R, Xu Y, Contreras D.C, Bell R.C, Chan, C. . (2015). The reliability and validity of the perceived dietary adherence questionnaire for people with type 2 diabetes. *Nutrients*, 7, 5484–5496. https://doi.org/10.3390/nu7075231

Bisri, M., Purwanto, E., Japar, M. (2018). The effectiveness of group counselling with modelling technique to improve self-efficacy in senior high school students decision making of study continuation. *Jurnal Bimbingan Konseling*, 7(1), 17–22. https://doi.org/10.15294/jubk.v7iL

Izza, Elfa Lailatul.. (2019). *Kepatuhan Penderita Diabetes Mellitus Tipe-2 Yang Menjalani Terapi Diet Ditinjau Dari Theory of Planned Behaviour. PROGRAM STUDI MAGISTER KEPERAWATAN.* Universitas Airlangga.

Kementerian Kesehatan RI. (2019). *Hari Diabetes Sedunia Tahun 2018.*

Kementerian Kesehatan RI. (2020). *Tetap Produktif, Cegah, dan Atasi Diabetes Melitus.* Kementerian Kesehatan RI.

Munir, A. (2018). *Teknik modelling sebagai upaya penanganan untuk mengurangi perilaku adiktif smartphone pada anak di Kelurahan Teritip, Kota Balikpapan, Kalimantan Timur.* Universitas Islam Negeri Sunan Ampel Surabaya.

Nengsih, Novida. (2019). Pengaruh Terapi Modeling Partisipan Terhadap Kepatuhan dalam Minum Obat Pasien Skizofrenia di Rumah Sakit Jiwa Daerah Provinsi Jambi Tahun 2018. *Scientia Journal*, 8(1), 241–247.

Pambudi, A.T., Mulawarman, Japar, M. (n.d.). Psychoeducational group with modelling technique to improve career adaptability through career decision self efficacy. *Jurnal Bimbingan Konseling*, 8(1), 20–31. https://doi.org/10.15294/jubk.v8i1.26617

Rahmah, H. S. (2019). *Behavioral Therapy dengan Teknik Modelling untuk Meningkatkan Self Efficacy Rendah pada Seorang Karyawan di Perusahaan Faza Grafis Sidoarjo.* Universitas Islam Negeri Sunan Ampel Surabaya.

Smith, H. (2018). *The Use of Video Modelling to Reduce Fear, and Teach Appropriate Response and Safe Behaviours in Children with Autism Spectrum Disorder wit a Fear of Dogs* (Issue August). University of Canterbury.

Sulistyana, C. S. (2020). *Peer Support for Dietary Compliance Patients with Diabetes Mellitus.* 7(3), 432–438. https://doi.org/10.26699/jnk.v7i3.ART.p432

Susanti dan Sulistyana, Caturia Sasti. (2020). *Pengaruh Coaching Support Terhadap Kepatuhan Penderita Chronic Kidney Disease (CKD).* 5(4).

Thomas, J.J., Moring, J.C., Harvey, T., Hobbs, T., Lindi, A. (2016). Risk of type 2 diabetes: health care provider perceptions of prevention adherence. Applied Nursing Study. *Elseviier*, 32, 1–6. https://doi.org/10.1016/j.apnr.2016.03.002