



## The effect of counseling on perception, religiosity, adherence, and quality of life of diabetes mellitus patients

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### Abstract

**Background:** Diabetes mellitus is a chronic disease that can overcome complications and decrease quality of life.

**Objective:** The purpose of this study was to determine the effect of counseling religious nuance and pill box on perception, religiosity, quality of life, and adherence in DM patients who get oral antidiabetic in the outpatient of Jetis 1 Primary Health Center, Bantul Regency.

**Method:** This type of research is quasi-experimental, utilizing a pretest and posttest design with a control group. Recruitment of subjects was done by purposive sampling based on exclusion and inclusion criteria with a simple randomization of allocations in order to obtain a sample of 71 people, divided into control (n = 36) and treatment (n = 35) groups. The instrument to assess the success of counseling is the perception questionnaire (B-IPQ), religiosity, and quality of life (EQ5D-3L) that has been validated, while to measure compliance, it is calculated using the pill count method. Statistical analysis using chi square, t test, independent t-test, Wilcoxon test, and Mann-Whitney test with 95% confidence level.

**Results:** The results showed that the treatment group after being given counseling and pill boxes had a better perception (31.37±6.44) than the control group (34.47±7.16) (p<0,05). The treatment group religiosity score was higher (64.28±3.44) compared to the control group (62.17±4.64), p<0.05. The adherence value of treatment group (96.28±10.32) is greater than that of the control group (88.37±12.39), (p<0.05). The majority of patients are still able to walk, perform self-care independently, and carry out daily activities. The highest mean quality of life score was in the treatment group (0.95±0,08) with a mean VAS (77.40±6.31).

**Conclusion:** Based on the results of this study, it can be concluded that there is an influence of giving counseling religious nuance and pill box, which is marked by an increase in perception, religiosity, quality of life, and adherence.

**Keywords:** Diabetes mellitus, perception, religiosity, adherence, quality of life

### 1. Introduction

Indonesia ranks 6th in the top 10 countries with the highest prevalence of Diabetes Mellitus (DM) in adults aged 20-79 (IDF, 2017). The prevalence of DM in Indonesia continues to increase from 6.9% in 2013 to 10.9% in 2018. Yogyakarta is among the top 3 provinces with the highest prevalence of DM, after DKI Jakarta and East Kalimantan (Kemenkes, 2018). DM can lead to long-term complications if it is not properly treated, thereby increasing mortality and morbidity worldwide (Chawla *et al.*, 2016). DM can also affect the psychological state of the sufferers. Psychological disorders that occur can be in the form of depression, anxiety, and excessive worry (Kiani and Hesabi, 2016). Someone who suffers from DM in general will experience a decrease in quality of life (Kiadaliri

*et al.*, 2013). Several factors are known to affect the quality of life, such as knowledge, perception, adherence, age, sex, education, socioeconomics, duration of DM, and DM complications (Yusra, 2010; Mohamed *et al.*, 2016). Negative perceptions of disease can cause feelings, so that it will trigger a person to be disobedient in undergoing treatment, on the contrary positive perceptions will make someone excited, so they can undergo treatment regularly (Ibrahim *et al.*, 2011). Low adherence causes blood glucose levels to be uncontrolled, thereby increasing the risk of complications and decreasing the patient's quality of life (Zioga *et al.*, 2016).

Diabetes Mellitus management requires patient commitment regarding adherence to medication regimens, diet, nutrition selection, physical activity, and weight and stress management (American Diabetic Association, 2019). Adherence is an important factor in the outcome of DM therapy. Patients with high adherence to treatment have a better quality of life (Morello *et al.*, 2011). One effort to increase adherence is by providing counseling and pill boxes. Research Nadia *et al.* (2017) showed that there was an effect of giving pharmacist counseling on adherence and therapeutic outcomes ( $p < 0.05$ ). In this research, counseling is done by integrating religious elements, considering that religiosity is a fundamental belief that can influence one's ideas, values and way of life (How *et al.*, 2011). Religious elements in the counseling given refer to the essence that healing originates from Allah SWT, striving by obedience in undergoing treatment, praying to Allah SWT to ask for healing, facing life difficulties with patience, and following the advice of the Prophets and Messengers in applying the health of life, such as doing regular exercise and maintaining eating patterns so as not to overeat and drink, and maintaining friendships with others so that life becomes more peaceful and calmer (Sari, 2018).

Giving the pill box in this study aims to help patients choose and manage drugs according to the rules of use every day for 1 month, so that with these assistive devices it is hoped that patients will no longer forget to take DM drugs. The success of the pill box to improve adherence has been investigated by Sannulia *et al.* (2016) where the results showed that there was a significant difference between the pill box and medication reminder chart in improving adherence ( $p < 0.05$ ) and reducing diastolic systolic blood pressure ( $p < 0.05$ ). Based on this background, a study was conducted with the aim of finding out the effect of counseling-based religiosity and pill box on perception, religiosity, adherence, and quality of life in DM patients at primary outpatient service of a health center.

## **2. Method**

### *2.1 Sample preparation*

This study was quasi-experimental research with pretest-posttest control group design. Prospective data collection was held on December-March 2019 at Jetis 1 Health Center Bantul Yogyakarta. The research samples were DM patients who were examined at Jetis 1 Bantul Health Center with a number of inclusion criteria: patients who were >20 years old, received at least one oral diabetes drug, and were willing to become research respondents. The total respondents in the study were 71 patients. Sociodemographic data retrieval of patients including gender, age, educational status, BMI, DM history, disease complications, smoking status, and habits were carried out using data collection.

The perception assessment used the BIPQ questionnaire, which was validated. Patients who had a positive perception got  $\leq 34$  scores and patients who were a negative perception got  $> 34$  scores. Assessment of religiosity using a religiosity questionnaire developed from Kartikasari (2014) research. The category of religiosity is divided into 5: very low with a score of 19-28.5, low with a score of 28.5-38, medium with a score of 38-57, high with a score of 57-66.5, and very high with a score of 66.5-76. The patient received a pill box that had been modified by the researcher. Assessment of compliance using the pill count method. Pill count is counting the remaining medication the patient has received over a certain period of time. Patients are adherent with score  $\geq 80$  and non-adherent with score  $< 80$ . The patient's quality of life was assessed using the validated EQ5D-3L questionnaire. Patients with good quality of life with a total score of 5 and not good with a total score of  $< 5$ .

### *2.2 Method and data analysis*

This research was approved by the Ethics Committee of Ahmad Dahlan University number 011802025. All patients were asked to fill out an interview-based questionnaire during their visit to the clinic for a pretest assessment, and education was carried out for the treatment group only, in the following month an interview was conducted by visiting the patient's home for a posttest assessment. For participants who had difficulty in understanding or could not read the questionnaire, trained interviewers were available to read and explain it to them. The patient's answer data on the questionnaire was then grouped and analyzed using SPSS 21. The non-parametric Wilcoxon test was used to compare the paired data (pre-posttest) in each group. The significance value was  $p < 0.05$ .

### 3. Result and discussion

The demographic characteristics of patients are presented in Table 1. A total of 71 patients who met the inclusion criteria were divided into two groups. The control group consisted of 36 patients who received counseling from pharmacists at the primary healthcare, and the treatment group consisted of 35 patients who received religious counseling and pill box from the researcher.

**Table 1.** Patients' characteristics

No	Characteristics subject	Control	Treatment
		n=36 (%)	n=35 (%)
1.	Gender		
	Male	12 (33.3)	13 (37.1)
	Female	24 (66.7)	22 (62.9)
2.	Age		
	≤50 year	4 (11.1)	16 (45.7)
	>50 year	32 (88.9)	19 (54.3)
3.	Education level		
	Basic education	28 (77.8)	28 (80.0)
	Further education	8 (22.2)	7 (20.0)
4.	BMI		
	Underweight <18.5	3 (8.3)	4(11.4)
	Normal 18.5 – 22.9	15 (47.1)	14 (40.0)
	Overweight 23 – 24.9	18 (50.0)	17 (48.6)
5.	History of DM		
	≤5 year	16 (44.4)	17 (48.6)
	>5 year	20 (55.6)	18 (51.4)
6.	Complication		
	Yes	19 (52.8)	18 (51.4)
	No	17 (47.2)	17 (48.6)
7.	Smoking habit		
	Yes	4 (11.1)	5 (14.3)
	No	32 (88.9)	30 (85.7)
8.	Exercise habit (3 times a week)		
	Yes	16 (44.4)	20 (57.1)
	No	20 (55.6)	15 (42.9)

In the control group, 66.7% of the patients were female, in the treatment group, 62.9% of the patients were female. This result is in line with previous research in Indonesia which stated that the majority of DM patients were women. Female gender and diabetes are associated with more obesity in women than men (Rasdianah, 2016; Rafiah & Perwitasari, 2017). Age in the control and treatment groups was dominated by age >50 years, respectively 88.9% and 54.3% of patients. Increasing age is related to insulin resistance and a decrease in beta cell function which causes changes and decreases in insulin sensitivity, so that blood sugar levels will increase with age (Dai *et al.*, 2012).

The majority of DM patients in this study had basic education levels (elementary and junior high schools) with a percentage of 77.8% of control group patients and 80.0% of treatment group patients. Another study conducted by Palimbunga *et al.* (2017) showed that 77.2% of T2DM patients

had low education and 22.8% had high education. Statistical analysis result showed that odd ratio 0.64 (95%, CI:0.27-1.47;  $p = 0.40$ ) which means that the level of education has a risk of 0.64 times to the incidence of T2DM and there is no significant relationship between the level of education and the incidence of T2DM. The majority of patients in both groups were overweight with a BMI value of 23-24.9 (50.0% of control group patients and 48.6% of treatment group patients). Overweight patients have a risk of developing T2DM of 1.5 times, while patients who are classified as obese class 1 have a risk of 2.5 times and obese patients' class 2 have a risk of 3.6 times (Ganz *et al.*, 2014).

Based on the history of suffering from DM and complications, it is known that most patients have suffered from DM > 5 years and have complications. The duration of DM is one of the factors that can affect the patient's quality of life, in addition to physical activity, frequency of blood glucose checks, complications, wrong diet and depression (Jing *et al.*, 2018). The patient's habits such as smoking showed that most patients did not smoke (88.9% of control group patients and 85.7% of treatment group patients). According to research by Sari *et al.* (2018) diabetes patients who smoked had higher GDP, GD2PP, and HbA1C values of 23.64 mg/dL ( $p=0.325$ ), 58.00 mg/dL ( $p=0.016$ ) and 0.39% ( $p= 0.412$ ) than diabetic patients who do not smoke. Exercise habits done 3x in one week, showed that 57.1% of patients in the treatment group had the habit of exercising done 3x in one week, and 55.6% of patients in the control group did not have this habit. Physical activity such as exercise can increase insulin sensitivity. The systematic review conducted by Umpierre *et al.* (2013) showed that structured exercise performed with a duration of more than 150 minutes/week was associated with a decrease in HbA1C of 0.89%.

Table 2 presents the perception scores measured using the BIPQ questionnaire. The average pretest score of DM patients' perceptions in the control group was  $36.28 \pm 7.23$  and the posttest average was  $34.47 \pm 7.16$  ( $p = 0.06$ ). The average pretest of the treatment group was  $36.60 \pm 7.38$  and the average posttest was  $31.37 \pm 6.44$  ( $p = 0.00$ ).

**Table 2.** The effect of counseling on the total perception score of BIPQ

<b>Group</b>	<b>Pretest (Mean±SD)</b>	<b>Posttest (Mean±SD)</b>	<b>p-value</b>
Control	36.28±7.23	34.47±7.16	0.06
Treatment	36.60±7.38	31.37±6.44	0.00*

Note : Wicoxon test; (\*) significance value  $p < 0.05$

These results indicate that counseling with religious nuances and pill boxes has a positive influence on the perception of diabetic patients. Every patient who suffers from a chronic disease will form a perception related to his illness. The higher the perception score indicates a more serious condition of the disease, so that a negative perception of the patient can be formed. Patients who have

a negative perception will think that they are not able to manage the disease they are suffering, so that it has an impact on decreasing the quality of life. The lower perception score indicates that the patient has a positive perception, because the patient thinks that he is in good condition so that it will improve his quality of life (Rafiah & Perwitasari, 2017).

Table 3 shows the religiosity score measured using a questionnaire designed by Kartikasari (2014). All patients in the research group are Muslim, so that the religious nuances given by researchers during counseling refer to Islamic teachings, for example increasing patient awareness that illness is a test from Allah SWT, and as an expiration of sins, for that humans are expected to be patient and persevere in facing trials. In addition, humans must also surrender, remembering that healing comes only from Allah SWT. The form of effort that humans can do is to diligently undergo treatment, because Allah SWT does not bring disease except also brings medicine, except for one, old disease. Another form of endeavor is to apply the prophet's healthy lifestyle. Religiosity in this study aims to provide a positive influence from the religious side on the success of the therapy being undertaken by the patient.

The mean value of pretest religiosity control group was  $60.39 \pm 3.46$  and posttest  $60.75 \pm 3.02$  ( $p = 0.58$ ). The mean value of the pretest religiosity of the treatment group was  $62.17 \pm 4.643$  and the posttest was  $64.28 \pm 3.44$  ( $p = 0.00$ ). Research related to the influence of religiosity and DM was also conducted by How *et al.* (2011) involving 212 patients. The results of the study stated that religiosity has a correlation with GDP and HbA1C, with a negative correlation direction, each of the correlation values ( $r = -0.15$ ,  $p = 0.041$ ) and ( $r = -0.34$ ,  $p = 0.007$ ).

**Table 3.** The effect of counseling and pill boxes on total religiosity score

Group	Pretest (Mean $\pm$ SD)	Posttest (Mean $\pm$ SD)	p-value
Control	60.39 $\pm$ 3.46	60.75 $\pm$ 3.02	0.58
Treatment	62.17 $\pm$ 4.64	64.28 $\pm$ 3.44	0.00*

Note : Wicoxon test; (\*) significance value  $p < 0.05$

According to research Yuniarti *et al.* (2013) religiosity has a relationship with the incidence of stress triggered by low self-acceptance, with a negative correlation direction ( $r = -0.69$ ;  $p < 0.05$ ). These results indicate that the higher the value of religiosity, the lower the incidence of stress. According to research conducted by Malone & Dadswel (2018), it is stated that religion, spirituality, and/or belief have an important role in the daily life of older patients, because they are used as a source of strength and hope in the midst of the difficult times they are experiencing.

In this study, patients in the treatment group received a pill box. Table 4 shows the adherence score measured using the pill count method.

**Table 4.** The effect of counseling and pill boxes on compliance score

Group	Pretest (Mean±SD)	Posttest (Mean±SD)	p-value
Control	83.33 ±18.59	88.37 ±12.39	0.20
Treatment	90.04 ±12.09	96.28 ±10.32	0.02*

Note : Wicoxon test; (\*) significance value  $p < 0.05$  The mean value of the control group's pretest adherence was  $83.33 \pm 18.59$ , the posttest value was  $88.37 \pm 12.39$  ( $p = 0.20$ ). In the treatment group the mean score of the pretest compliance was  $90.04 \pm 12.09$  and the post test was  $96.28 \pm 10.32$  ( $p = 0.02$ ). Counseling interventions with religious nuances and pill boxes have a positive impact on drug adherence. Giving pill boxes aims to make it easier for patients to remember when to take drugs and prevent the risk of losing drugs due to the absence of a place or drug storage box. Research using tools to improve compliance has been conducted by Susanto *et al.* (2019). The tool used is a digital pill box reminder application. This tool is proven to be able to increase adherence in chronic disease patients who have health insurance from the government. Research using a digital pill box reminder application was also carried out by Agustianuri (2015) on DM patients, the results stated that patient adherence after receiving the intervention was higher (52.63%), compared to before receiving the intervention (5.27%). Research Nadia *et al.* (2017) showed that the counseling provided by the pharmacy had an effect on the level of adherence to drug use and therapeutic outcomes in T2DM patients in primary health care, and there was also a significant relationship between age and level of adherence ( $p < 0.05$ ). Adherence is crucial to the success of treatment therapy. The success of therapy will not be achieved optimally if there is no awareness from the patient to adhere to the treatment (Ghembaza *et al.*, 2014). Quality of life assessment was measured using the EQ5D-VAS questionnaire which is presented in tables 5 and 6.

**Table 5.** The effect of counseling and pill boxes on the total quality of life score EQ5D

Group	Pretest (Mean±SD)	Posttest (Mean±SD)	p-value
Control	0.94±0.09	0.91±0.09	0.09
Treatment	0.92±0.09	0.95±0.08	0.00*

Note : Wicoxon test; (\*) significance value  $p < 0.05$

Quality of life is measured using an index value where if the average value is close to 1,000, the quality of life is getting better (Purba *et al.*, 2017). Counseling and pill boxes have a significant effect on the quality of life of DM patients. The effect of counseling in improving the quality of life has been observed by Sriram *et al.* (2016), the results stated that if pharmaceutical interventions given to outpatient DM patients were able to improve the patient's quality of life, this was also reinforced by another study conducted by Shareef *et al.* (2016) where counseling to improve medication

adherence will help in optimizing blood sugar levels and improving the quality of life of DM patients. The VAS (Visual Analog Scales) measurement tool can be used to measure the best imaginable health state (the best imaginable health status), and the worst imaginable health state (the worst imaginable health status), with a rating scale of 0-100.

**Table 6.** The effect of counseling and pill box on the mean score of EQVAS

Group	Pretest (Mean±SD)	Posttest (Mean±SD)	p-value
Control	74.28 ± 7.88	74.69 ± 7.88	0,50
Treatment	75.66 ± 7.87	77.40 ± 6.31	0,04*

Note : Wicoxon test; (\*) significance value  $p < 0.05$

The mean value of VAS for the control group, at the pretest was  $74.28 \pm 7.88$ , and the posttest was  $74.69 \pm 7.88$  ( $p = 0.50$ ). In the treatment group the mean value of VAS at pretest was  $75.66 \pm 7.87$ , while at posttest the value increased to  $77.40 \pm 6.31$  ( $p = 0.04$ ). According to Szende *et al.* (2014), the results of research in 15 countries regarding the VAS value in normal people, for Asian people are 77.71. The quality of life of DM patients is getting better after giving interventions in the form of counseling with religious nuances and pill boxes. The many factors that affect the quality of life require patients to have good blood sugar control, making it possible to maintain a good quality of life and prevent the severity of the disease (Prajapati *et al.*, 2018).

#### 4. Conclusion

Giving counseling with religious nuances and pill box can increase the score of perception, religiosity, compliance and quality of life of outpatients with diabetes mellitus in primary health centers. Interventions provided by pharmacy must be more in-depth in order to increase the success of chronic disease therapy.

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