
Effects of modified brief counseling-5A on illness perception, compliance with medication, and fasting blood sugar levels of diabetes mellitus patients

Neni Probosiwi¹, Akrom^{*2,3}, Titiek Hidayati⁴, Ginandjar Zukhruf Saputri²

¹Pharmacy Study Program of the Faculty of Medicinal Sciences, University of Kadiri, Jl. Selomangleng No 1, Kediri, East Java, Indonesia

²Postgraduate Program on Pharmacy, Universitas Ahmad Dahlan, Jl. Prof. Dr. Soepomo, S.H, Janturan, Yogyakarta, Indonesia

³Center for Drug Information and Research (PIKO), Universitas Ahmad Dahlan, Jl. Prof. Dr. Soepomo, S.H, Janturan, Yogyakarta, Indonesia

⁴Faculty of Medicine and Health Sciences, Muhammadiyah Universitas of Yogyakarta, Jl. Brawijaya, Bantul Yogyakarta, Indonesia

Submitted: 03-07-2019

Reviewed: 18-07-2019

Accepted: 30-03-2020

ABSTRACT

Diabetes mellitus is a degenerative disease with persistently increasing prevalence. When patients lack knowledge of their illness and compliance with oral drug therapy, it can lead to treatment failure. This study aims to determine the effect of counseling on disease perception and medication adherence for patients with diabetes mellitus. This prospective observational cohort study aimed to determine the effects of counseling on illness perception and adherence to medication among patients with diabetes mellitus. A sample of 72 patients was selected by consecutive sampling technique and, then, evenly divided into two, namely counseling group and non-counseling group. The data were collected prospectively through observation, interview, brief counseling with the 5A strategies, and questionnaire survey. The result show that counseling had a significant effect on illness perception ($p=0.000$). Counseling had a significant effect on adherence to medication ($p=0.027$). Counseling had a significant effect on lowered blood sugar levels ($p=0.028$). Conclusion: counseling is believed to be able to reduce patients' negative perceptions of diabetes mellitus and, consequently, increase adherence to oral drug consumption.

Keywords: brief counseling, compliance, perception, blood sugar levels, diabetes mellitus

***Corresponding author:**

Akrom

Postgraduate Program on Pharmacy, Universitas Ahmad Dahlan

Jl. Prof. Dr. Soepomo, S.H, Janturan, Yogyakarta, Indonesia

Email: akrom@pharm.uad.ac.id

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disease characterized by hyperglycemia or a chronic and variable increase in blood sugar levels caused by abnormalities in insulin secretion, insulin action, or both (PERKENI, 2011; Suraoka, 2012). The prevalence of diabetes mellitus elevates globally, including in Asia and Indonesia. In Southeast Asia, 82 million people aged 20-79 years are diagnosed with diabetes mellitus, which amounts to approximately 19.76% of the prevalence of diabetes mellitus worldwide (IDF, 2017). Meanwhile, in Indonesia, this disease was common in 6.9% of the total population in 2016. Diabetes mellitus with complications is the third leading cause of death (6.7%) (WHO, 2016).

Diabetes mellitus is manageable, both pharmacologically and non-pharmacologically. Pharmacological management includes oral therapy with anti-diabetic drugs. Glycemic control is not only a vital indicator in preventing possible complications of diabetes but also an output that marks the success of DM therapy. Complications occurring in DM patients can be macrovascular and microvascular. The former can develop into heart disease, hypertension, stroke, and kidney dysfunction, while the latter includes neuropathy and retinopathy (Suyono, 2011).

Aside from inadequate knowledge of the disease, non-compliance with drug usage is a leading factor in the failure of DM therapy (BINFAR, 2007). Counseling is expected to help maintain glycemic control (Nugraheni *et al.*, 2015), which can be measured by, among others, fasting blood sugar (FBS) levels. Counseling seeks to improve knowledge about diseases and, by proxy, raise patient's illness perception and personal control. It also provides information about the perceived benefits of therapy, which in turn can increase patient compliance and treatment outcome, that is, a decrease in FBS to its normal level (Petricek *et al.*, 2009; Lee *et al.*, 2017).

Drug counseling, as a method of face-to-face education or interview about the treatment, is a form of pharmaceutical services to improve patient's knowledge and understanding of medication. It is expected to not only provide information about drugs but, at the same time, offer education and comprehension of DM, encourage proper perceptions about the illness and its management, and eventually promote behavior change during the treatment to achieve therapeutic targets (BINFAR, 2007). One of the straightforward counseling techniques is brief counseling outlined in the 5A strategy, namely, Assess, Advise, Agree, Assist, and Arrange (Akrom and Nurwijayanti, 2015). Brief counseling is considered practical and time-efficient because it also assesses the condition of the target patient (Vallis *et al.*, 2013). In general, counseling can change the way of thinking, feeling, and behaving (Norisca *et al.*, 2017), as well as increase understanding and knowledge about diseases as two relevant domains that influence one's actions. Drug counseling significantly elevates awareness and compliance among patients (Nugraheni *et al.*, 2015; Neswita *et al.*, 2014).

Proper knowledge of disease makes patients develop a positive way of thinking or perception of health. Illness perception is one of many factors that can affect adherence to medication, and when it shifts toward a positive attitude, it can trigger behavior change (Fahmiyah, and Latra, 2016). In this case, positive means someone understands a particular disease and the way to control it appropriately. On the contrary, negative represents those who are unable to properly understand the illness and the right way to control it. Patients who have a combination of positive perception and adequate knowledge of the disease, including the aspects of risk, therapy, and control, tend to exhibit compliance with the recommended treatment and turn it into a behavior (Aflakseir, 2012). Furthermore, Goh *et al.* (2012) and Winkel and Hastuti (2007) confirm that positive perceptions of disease, along with its management and symptoms, can improve adherence to therapy. Putriana *et al.* (2017) suggest that counseling can improve how patients perceive susceptibility to disease severity and the obtained benefits of following the treatment, and for this reason, patients tend to take actions that prevent the disease from worsening by complying with the therapy. The more information and knowledge obtained about the illness and its management therapy, the more encouraged the patient to continue the treatment properly (Swaroop *et al.*, 2016).

There has been no study about the effects of modified brief counseling-5A on patients' perception of diabetes and compliance with drug consumption procedure at Jetis I Community Health Center in Bantul Regency. Therefore, this paper presents the examined effects of brief counseling-5A by pharmacists on the illness perception and adherence of diabetes mellitus outpatients with the recommended treatment in a primary healthcare service, that is, Jetis 1 Community Health Center in Bantul.

METHODS

This prospective observational cohort study involved diabetes mellitus outpatients who were treated with oral anti-diabetic drugs from May to August 2018 at Jetis I Community Health Center in Bantul, Yogyakarta. The independent variable was brief counseling, while the dependent one consisted of illness perception, adherence to medication, and clinical output, i.e., fasting blood sugar (FBS) levels. Pharmacists were tasked with providing brief counseling using the 5A strategy to the patients. This study has received permission from related agencies in Bantul Regency, the Special Region of Yogyakarta. Also, the informed consent form and research procedure have been reviewed and approved by the research ethics committee of Ahmad Dahlan University.

The sample consisted of 72 patients who had met the selection criteria—both inclusion and exclusion. The inclusion criteria were diabetes mellitus patients with or without comorbidities who received at least one type of oral anti-diabetic drug and underwent outpatient treatment at Jetis I Community Health Center in Bantul, whereas the exclusion was pregnancy and hearing impairment. These patients were selected by non-random consecutive sampling and then divided evenly into two, namely counseling group and non-counseling group. The counseling group consisted of 36 patients who received brief counseling by pharmacists, while the non-counseling one had 36 patients who received routine services from the officers of the pharmacy installation at the community health center. Prospective data collection by interviews and questionnaire surveys produced details on illness perception and patient compliance. Initial fasting blood sugar (FBS) levels were based on the medical records of routine FBS checkups. Since the final FBS levels need to be observed after 10-12 hours of fasting (Putriana *et al.*, 2017), the patients were contacted and informed one day before the examination. Afterward, they were subjected to an aseptic blood draw by health workers using the GOD PAP or glucose oxidase method. Finally, their FBS levels were measured using a photometer.

Normal FBS in patients with diabetes mellitus is ≤ 100 mg/dl (ADA, 2014). In this study, the final FBS levels were grouped into two categories: normal with FBS ≤ 100 mg/dl and abnormal with FBS > 100 mg/dl. Illness perception was measured by a Brief Illness Perception Questionnaire (B-IPQ) questionnaire consisting of 9 question items assessed on an 11-point response scale (0-10) (Putriana *et al.*, 2017). Adherence to medication was measured by a Medication Adherence Rating Scale (MARS) questionnaire consisting of 5 question items measured on a Likert scale of 1-5 (Lee *et al.*, 2017). Any score differences between the initial (pre) and final (post) illness perceptions were calculated and categorized into either decreased or unchanged/increased, while the ones between the initial (pre) and final (post) patient compliances were grouped into decreased/unchanged and increased. The counseling and non-counseling groups were statistically compared using the chi-square test based on categories of FBS levels, illness perceptions, and patient compliance.

RESULTS AND DISCUSSION

Characteristics of sampled patients

This study involved 72 diabetes mellitus patients who took oral therapy (Table I). These samples were divided into two, namely non-counseling group (36 patients without counseling) and counseling or treatment group (36 patients receiving modified brief counseling-5A).

Table I. The characteristics of sampled DM Outpatients at Jetis 1 community health center in Bantul regency from May to August 2018

Characteristics	Counseling Group		Non-counseling Group		p-value
	N (36)	%	N (36)	%	
Age (years old)					
< 60	20	55.6	19	52.8	1.000
≥ 60	16	44.4	17	47.2	
Routine medical visit					
Yes	36	100	35	97.2	1.000
Not	0	0	1	1	
Sex					
Male	11	30.6	10	27.8	1.000
Female	25	69.4	26	72.2	
Education					
High	1	2.8	3	8.3	0.304
Medium	13	36.1	8	22.2	
Low	22	61.1	25	69.4	
Employment					
Unemployed	20	55.6	24	66.7	0.468
Employed	16	44.4	12	33.3	
Payment of hospital bills					
With BPJS*	33	91.7	35	97.2	0.614
Without BPJS	3	8.3	1	2.8	
DM duration (years)					
≤ 5	19	52.8	15	41.7	0.479
>5	17	47.2	21	58.3	
Smoking					
Not	32	88.9	32	88.9	1.000
Yes	4	11.1	4	11.1	
Physical exercises					
Yes	18	50	14	38.9	0.477
Not	18	50	22	61.1	
Oral DM drugs					
Single	22	61.1	23	63.9	1.000
Combination	14	38.9	13	36.1	
Comorbidities					
Without	15	41.7	14	38.9	1.000
With	21	58.3	22	61.1	

*BPJS refers to Social Insurance Administration Organization (*Badan Penyelenggara Jaminan Sosial*)

The comparison analysis showed that the entire characteristics of patients belonging to the counseling and non-counseling groups had insignificant differences ($p > 0.05$). Age, routine medical visit without counseling at the hospital, sex, education, employment, payment of hospital bills, duration of diabetes mellitus, smoking habit, physical exercises, consumption of oral DM drugs, and comorbidities of the counseling group did not differ significantly with the non-counseling group.

Effects of modified brief counseling-5A on perception, compliance, and FBS levels

The effects of counseling with the modified Brief Counseling-5A technique were observed by comparing the perceptions, adherence, and FBS levels of the counseling and non-counseling groups. The results are explained below.

Effects of modified brief counseling-5A on illness perceptions

The results of comparative analysis between the illness perceptions of the counseling and non-counseling groups are presented in [Table II](#).

Table II. The effects of brief counseling on the illness perception of sampled DM outpatients at Jetis I Community Health Center in Bantul Regency

Groups	Illness perception		P	RR (5%CI)
	Decreased	Increased/unchanged		
Counseling	26 (72.2%)	10 (27.8%)	0.000	2.600 (1.479-4.572)
Non-counseling	10 (27.8%)	26 (72.2%)		

The test results showed that changes in illness perceptions between the counseling and non-counseling groups differed significantly ($p=0.000<0.005$). Such difference resulted in a relative risk (RR) of 2.600, meaning that patients who receive counseling likely experience a decrease in their negative perceptions by 2.6 times greater than the ones who do not. Ten patients (27.8%) in the non-counseling group reported a reduction in their negative attitude toward diabetes mellitus, while 26 patients (72.2%) in the counseling group had decreased negative perception after receiving counseling.

Effects of modified brief counseling-5A on patient compliance

The comparison analysis between the counseling and non-counseling group revealed various levels of changes in adherence to oral drug consumption. The results are summarized in [Table III](#).

Table III. The effects of brief counseling on DM Outpatients' adherence to medication at Jetis I Community health center in Bantul Regency

Groups	Patient Compliance with Medication		P	RR (5%CI)
	Increased	Decreased/unchanged		
Counseling	18 (69.2%)	18 (39.1%)	0.027	2.250 (1.125-4.499)
Non-counseling	8 (30.8%)	28 (60.9%)		

The test results showed that changes in patient compliance with medication in the counseling group were significantly different from the non-counseling group ($p\text{-value}=0.027<0.05$). This difference resulted in a relative risk (RR) of 2.250, indicating that patients who are exposed to counseling likely experience an increase in their adherence to medication by 2.25 times greater than the ones who are not. In the non-counseling group, eight patients (30.8%) showed better compliance, while in the counseling group, 18 patients (69.2%) reported the same improvement after receiving counseling.

Effects of modified brief counseling-5A on fasting blood sugar (FBS) levels

The comparison analysis results between the FBS levels of the counseling and non-counseling groups are described in [Table IV](#).

Table IV. The effects of brief counseling on the fasting blood sugar (FBS) levels of sampled DM Outpatients at Jetis I Community Health Center in Bantul Regency

Groups of Intervention	GDP		P	RR (5%CI)
	< 100 mg/dl	≥100 mg/dl		
Counseling	8 (88.9%)	28 (44.4%)	0.028	8.000 (1.054-60.723)
Non-counseling	1 (11.1%)	35 (55.6%)		

The test results showed that the fasting blood sugar (FBS) levels of the counseling and non-counseling groups differed significantly (p -value=0.028<0.05). Such difference led to a relative risk (RR) of 8.000. In other terms, compared with patients who do not receive counseling, those exposed to one are eight times more likely to have FBS lower than or equal to 100 mg/dl. One patient in the non-counseling group (11.1%) had normal blood sugar levels. After counseling, eight patients in the counseling group (88.9%) reported normal blood sugar levels.

Discussion

Counseling by pharmacists seeks to help patients to manage their therapy. It is believed to trigger perceptual changes among the target patients. The results showed that changes in illness perception among DM outpatients in the counseling and non-counseling groups were significantly different and that patients' belief in the advantages of DM treatment increased after being exposed to brief counseling. Through brief counseling, patients can find out the benefits of undergoing the recommended therapy properly, from which the desire to initiate action and behavior that can reduce or prevent disease emerges. Here, the actions taken by patients depend on the experienced benefits and obstacles while carrying out a particular behavior (Suyono, 2011). It means that brief counseling can create positive behavior in the case of diabetes mellitus. The results of this study correspond to Adepu *et al.* (2007), which affirm that counseling has a considerable impact on patients' perceptions of type 2 diabetes mellitus (p <0.05). Counseling has been reported to increase positive attitudes toward diseases (Swaroop *et al.*, 2016). Furthermore, Putriana *et al.* (2017) and Norisca *et al.* (2017) state that counseling can remarkably increase knowledge (p <0.05) and positive perception (p <0.05) of warfarin therapy in patients with heart disease.

The results also proved that the counseling and non-counseling groups exhibited significantly different changes in patient compliance with medication. Aiming to help patients to manage their treatment, brief counseling provides critical information and can thereby increase patients' understanding of therapies and risks of a specific disease. The more information and knowledge the patients obtain about their illness and corresponding therapy management, the higher the likelihood of continuing therapy compliantly (Norisca *et al.*, 2017). According to Petricek *et al.* (2009), significantly better adherence to the recommended dietary regimen is reported in treatment group who has better understanding of type 2 diabetes and personal control over it (p =0.009). This finding is in line with Swaroop *et al.* (2016) and Presetiawati *et al.* (2017), which claim that counseling and information booklets can effectively improve patient compliance. Presetiawati *et al.* (2017) highlight a significant difference (p <0.001) in HbA1C and MMAS-8 scores before and after both interventions.

In addition to illness perception and patient compliance, a statistically significant difference was detected in fasting blood sugar (FBS) levels between the counseling and non-counseling groups. Counseling is a process to improve patients' ability to cope with illness and make decisions based on information about management and treatment. According to the American Diabetes Association (ADA, 2014), blood sugar levels of lower than 100 mg/dl are considered normal. In diabetes mellitus, these levels are the expected outcome of oral therapies. This study found that DM patients exposed to counseling had lowered FBS levels. It is similar to Kandasamy *et al.* (2017) who emphasize a drop in mean blood glucose levels in the treatment group after receiving

counseling. In other words, there is a significant lowering of FBS levels from before to after counseling. Moreover, Iyer *et al.* (2010) suggest that after two months of counseling, blood sugar levels lower considerably ($p < 0.05$), from 193 mg/dl (pre) to 158 mg/dl (post).

CONCLUSIONS

This study has proven that counseling significantly affects illness perception ($p = 0.000$) and patient compliance with medication ($p = 0.027$). Therefore, counseling can reduce negative attitudes toward diabetes mellitus and, subsequently, increase patient adherence to proper consumption of oral anti-diabetic drugs.

ACKNOWLEDGMENT

The authors would like to thank the respondents (diabetes mellitus patients) for their willingness to participate as research subjects and the staff of Jetis I Community Health Center in Bantul Regency for their assistance during the study. Our profound gratitude is also extended to other relevant parties for their help during the completion of the research.

REFERENCES

- Adepu, R., Rasheed, A., and Nagavi, B.G., 2007, Effect of patient counseling on quality of life in type-2 diabetes mellitus patients in two selected South Indian community pharmacies: A study, *Indian Journal of Pharmaceutical Sciences*, 69(4): 519-524.
- Aflakseir, A., 2012, Role of illness and medication perceptions on adherence to medication in a group of Iranian patients with type 2 diabetes, *Journal of diabetes.*, 4(3): 243–247.
- Akrom, and Nurwijayanti, A., 2015, Brief Counseling and Mobile Phone Short Message Service (SMS) Increase Patient Compliance, *International Journal of Pharma Medicine and Biological Sciences*, 4(3): 175-179.
- American Diabetes Association (ADA), 2014, *Standards of Medical Care in Diabetes*, Retrieved from http://care.diabetesjournals.org/content/37/Supplement_1/S14.
- Goh, C.S.Y., Mohamed, A., Lee, Y.S., Loke, K.Y., Wee, H.L., Khoo, E.Y. H., and Griva, K., 2016, The associations of self-care, illness perceptions and psychological distress with metabolic control in Singaporean adolescents with Type 1 Diabetes Mellitus, *Health Psychology and Behavioral Medicine*, 4(1): 1–14.
- Direktorat Bina Farmasi Komunitas dan Klinik (BINFAR), 2007, *Disaster Health Service*, Jakarta: Departemen Kesehatan RI, p. 18.
- Fahmiyah, I., and Latra, I.Y., 2016, Faktor yang memengaruhi kadar gula darah puasa pasien diabetes mellitus tipe 2 di poli diabetes mellitus RSUD dr. Soetomo Surabaya dengan menggunakan regresi probit biner, *Jurnal Sains & Seni ITS*, 5(2): 1-10.
- International Diabetes Federation (IDF), 2017, *IDF Diabetes ATLAS Eight edition*.
- Iyer, U., Joshi, A., and Dhruv, S., 2010, Impact of interpersonal counseling on the blood sugar and lipid profile of type 2 diabetes mellitus subjects (nutrition health education and diabetes mellitus), *International Journal of Diabetes in Developing Countries*, 30(3): 129-133.
- Kandasamy, K., Konakalla, M., Sam, R., Sebastian, J., Natarajan, A., Rajagopal, S., and Ramanathan, S., 2017, A Pilot Study on the Impact of Pharmacist Intervention in Type-2 Diabetes Mellitus Counselling Program in a Rural Community, *Indian Journal of Pharmaceutical Sciences.*, 79(5): 701-706.
- Lee, C.S., Tan, J.H.M., Sankari U., Koh Y.L.E and Tan N.C, 2017, Assessing oral medication adherence among patients with type 2 diabetes mellitus treated with polytherapy in a developed Asian community: a cross-sectional study, *BMJ Open*, 2017(7): 1-7.
- Neswita, E.D., Almasdy, and Harisman, 2014, Pengaruh Konseling Obat Terhadap Pengetahuan dan Kepatuhan Pasien Congestive Heart Failure, *Jurnal Sains Farmasi & Klinis*, 2(2): 295-302.

- Norisca, A.P., Barliana, M.I, and Lestari, K., 2017, Pengaruh Konseling Apoteker terhadap Pengetahuan dan Persepsi Pasien Penyakit Jantung Terapi Warfarin di RSUP Dr. Hasan Sadikin Bandung, *Jurnal Farmasi Klinik Indonesia*, 6(4): 282–289.
- Nugraheni, A.Y., Sari, I.P., and Andayani, T.M., 2015, Pengaruh konseling apoteker dengan alat bantu pada pasien diabetes melitus, *Jurnal Manajemen dan Pelayanan Farmasi*, 5(4): 233-243.
- Perkumpulan Endokrinologi Indonesia (PERKENI), 2011, *Konsensus Pengelolaan Diabetes Mellitus tipe 2 di Indonesia*, Jakarta: PERKENI, p. 12.
- Petricek, G. Vrcic-Keglevic, M., Vuletic, G., Cerovecki, V., Ozvaric, Z., and Murgic, L., 2009, Illness Perception and Cardiovascular Risk Factors in Patients with Type 2 Diabetes: Cross-sectional Questionnaire Study, *Croatian Medical Journal*, 50: 583-593.
- Presetiawati, I., Andrajati, R., and Sauriasari, R., 2017, Effectiveness of a Medication Booklet and Counseling on Treatment Adherence in Type 2 Diabetes Mellitus Patients, *International Journal of Applied Pharmaceutics*, 9(1): 27-31.
- Putriana, N.A., Melisa, I.B., and Lestari, K., 2017, Pengaruh konseling apoteker terhadap pengetahuan dan persepsi pasien penyakit jantung terapi warfarin di RSUP Dr. Hasan Sadikin Bandung, *Jurnal Farmasi Klinik Indonesia*, 6(4): 282-289.
- Suiraoaka, I. P., 2012, *Penyakit Degeneratif*, Yogyakarta: Nuha Medika.
- Suyono, S., 2011, *Penatalaksanaan Diabetes Terpadu*, Jakarta: Badan Penerbit FKUI, p. 86.
- Swaroop, A.M., Thomas, J.A., Snigdha, K.S., and Karanath P.M., 2016, Impact of Patient Counselling on Knowledge, Attitude, Practice and Medication Adherence in Type 2 Diabetes Mellitus Patients, *European Journal of Pharmaceutical and Medical Research*, 3(4): 231-235.
- Vallis, M., Piccinini-Vallis, H., Sharma, A.M., and Freedhoff, Y., 2013, Modified 5 As: Minimal intervention for obesity counseling in primary care, *Canada Family Physician*, 59(1): 27-31.
- Winkel, W.S., and Hastuti, S.M.M., 2007, *Bimbingan dan konseling di institusi pendidikan*. Yogyakarta: Media Abadi, p. 86.
- World Health Organization (WHO), 2016, *Diabetes Fakta dan Angka*. Retrieved from <http://www.searo.who.int/indonesia/topics/8-whd2016-diabetes-facts-and-numbers-indonesian.pdf>.