International Journal of Nursing and Health Services (IJNHS)

http://ijnhs.net/index.php/ijnhs/home
Volume 4 Issue 3, June 20th, 2021, pp 258-265
e-ISSN: 2654-6310

Medication Adherence Improvement of Patients with Type 2 Diabetes Mellitus

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Artikel info

***Article history*:**
Received; February 03th, 2021
Revised: March 23th, 2021
Accepted: June 20th, 2021

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DOI:
http://doi.org.10.35654/ijnhs.v4i3.430

Abstract. Type 2 Diabetes Mellitus (DM) is a degenerative disease with long-term medication which needs home care service to enhance patients' obedience to medication compliance. The study aimed to investigate the effect of home care counseling on patients' medication adherence in prescribed medicine use. Methods: The research design was quasi-experimental using pre-test post-test without control group approach. A total of 43 patients with type 2 DM at the outpatient unit of Sari Mutiara General Hospital were selected through consecutive sampling techniques. The patients were given counseling in medicine using home care visits over 24 times in July 2017 and September 2017. Results: Patient adherence evaluation on disease medication was carried out through questionnaire administration before the patient received counseling (pre-test) and received counseling (post-test). Data from the Questionnaire were analyzed using the Wilcoxon test with a confidence level was 95%. Before counseling, the average score of patients was 3.26. However, after counseling was carried out to the patients, the average score was 0.72. In conclusion, there was an increase in patient adherence, i.e., 2.54. It was also obtained that there was a significant difference in patients' adherence to medication use before and after receiving counseling in-home care, with a significance value of 0.000 ($p<0.05$). It indicated that home care counseling was effective in enhancing their medication adherence. It is suggested that healthcare practitioners carry out monitoring, particularly during therapy, to prevent diabetic complications.

Keywords: Adherence, counseling, home care, medication, type 2 DM.

INTRODUCTION

Globally, by 2030 epidemiological transition from infectious disease to become non-infectious disease will be more apparent. It is projected that the number of cases of non-infectious disease will increase, and that of infectious diseases will decrease. The increase of non-infectious disease incidents is often correlated to the rise in risk factors caused by lifestyle change. The human lifestyle results come from the more modern lifestyle of human civilization, population growth, and life expectancy. Furthermore, it is predicted that the non-infectious disease which will be significantly increased by 2030 is Diabetes Mellitus (1).

Diabetes Mellitus (DM) is a chronic disease that occurs when the pancreas is no longer able to produce insulin in sufficient amounts or when the ability of the human body to respond to insulin effectively is decreased. The global prevalence of Diabetes Mellitus, based on data from WHO in 2014, was predicted to reach 9% among adults over 18 years old, and 90% of the overall DM cases was Type 2 DM (2). Indonesia is also facing a diabetes threat situation similar to that of the world. The International Diabetes Federation (IDF) Atlas 2017 reports that the Diabetes epidemic in Indonesia is still showing an increasing trend. Indonesia is the sixth country globally after China, India, the United States, Brazil, and Mexico, with around 10.3 million people with Diabetes aged 20-79 years (3). WHO (World Health Organization) predicts the increasing number of diabetic patients in Indonesia, in which, in 2000, the number was 8.4 million and expected to increase to 21.3 million patients by 2030 (4). Based on Research on Primary Health in 2013, the national prevalence of DM was 2.3% and in North Sumatra Province was 1.8%.

Furthermore, the number of patients with DM in Sari Mutiara General Hospital in 2015 was 220, and in February until Mei 2016, the number of patients with DM was 119 (5). Based on the management and prevention consensus of Type 2 DM in Indonesia, there are four major components in managing Type 2 DM, i.e., education, dietary, physical exercise, and pharmacological intervention. The last purpose of the management of Type 2 DM is to decrease morbidity and mortality rates caused by DM. Patients with DM need several treatments to prevent the worse condition and complication, eventually bringing the patients to more severe health problems, either macroangiopathy or microangiopathy. If the level of blood sugar can be controlled well, it is expected that all those chronic diseases can be prevented to live their life normally (6). On the other hand, patients with chronic diseases such as DM who were undergoing medication on a long-term basis will generally experience boredom in medicine consumption.

Further, they will bring them to adherence decrease in medicine use. The condition of patients' knowledge, patients' disease, and family support may affect the attitude of adherence and may also act to the clinical output of the patients (7). Previous studies revealed that patient adherence to chronic disease medication was relatively low. One factor which plays a role in the failure of controlling blood sugar level in patients with DM is patient non-adherence in medication (8). The study showed that patients with DM are patients with a high level of non-adherence (9).

Nonadherence in medicine consumption is a factor that brings barriers to control blood sugar levels in patients with Type 2 DM. Blood sugar level that is not well controlled can cause acute or chronic complications (10). Several studies reported that the adherence level of patients with DM was around 70-83%, whereas that of patients with Type 2 DM was around 64%-78%. Therefore, a low level of patient adherence in undergoing medication may cause complications of that disease. Moreover, DM itself is a disease that can increase the risk of stroke, heart disease, kidney disease, blindness, and lower-limb amputations Center for Disease Control and

Prevention, 2011). Therefore, to decrease complication risks and increase patient adherence to medication, home care counseling may be considered the solution.

Home care is a system in which health practitioners provide social and health care services to the disabled or individuals who need to stay at home due to health problems. The goals of this system are to help patients improve, maintain or recover their health, improve their function or lives with greater independence, and minimize the risks resulting from the disease (11). Home health care includes giving counseling which may improve patients' adherence in medicine use or decrease the mortality rate and loss in terms of costs and individual productivity as the adverse effects of DM (12). Education provision to patients plays an essential role in DM management and treatment to optimize medical therapy. If the education can be provided effectively, the adherence and self-management of the patients toward their sickness may be improved. A multidisciplinary approach is needed to facilitate teamwork and health promotion to meet health and social care needs.

Nurses who provide nursing care services to individuals at home (home care) play a role in improving family capability in disease prevention and health maintenance. In nursing care implementation at home, there is gradual role change between the nurse, client, and family (target). Therefore, nurses gradually and sustainably assist a client and family members reach their independence in overcoming their health problems. Nurses are health care providers who are actively involved in the prevention and early detection of Diabetes and its complications. The nurses' Role could be in health care, health, community education, health systems management, patient care, and improving the quality of life.

Home care is a health care service that can monitor therapy effects, side effects, life quality, and diabetic patient adherence. The Role of educators, either formal or informal, educator of DM and practitioners is crucial to decrease incidents of DM (8). One of the successes of home care programs can be seen from improving patients' life quality.

This study aimed to investigate home care counseling on patients' medication adherence in prescribed medicine use.

METHODS

This was a quasi-experimental study using pre and post-test without a control group approach. At the beginning and the end of the study, the participants were given a questionnaire designed to measure the degree of patients' adherence, i.e., the MMAS-8 Questionnaire.

A total of 43 respondents were selected as samples through consecutive sampling techniques. The inclusion criteria of the samples were: 1) patients with Type 2 DM at Sari Mutiara General Hospital who were consuming oral antidiabetic drugs from at least two months earlier or more; 2) the patients were over 40 years of age; 3) the patients were willing to be respondents in the study, and 4) the patients were able to read and write. On the other, the exclusion criteria were pregnant women, patients with Type 2 DM who were using insulin, and patients with Type 2 DM who suffered from other chronic diseases, such as hypertension or kidney disease.

The instrument used to measure patient adherence in medicine use was MMAS-8 Questionnaire. This Questionnaire was selected because this instrument was affordable and easy to administer in health services. In addition, MMAS-8 had been validated and used in many countries (13);(14). The sensitivity and specificity values of this Questionnaire were 48.7% and 69.1%, respectively. Reliability value α was 0.66 and significantly correlated with the blood sugar test (13). Patient adherence was categorized as 'high' if the score of MMAS-8

was 0, 'moderate' if the score was 1-2, 'low' if the score was >2. The high score of MMAS-8 indicated that patients' adherence to medication use was low (15,16).

The present study was conducted after being approved by the ethics committee of the University of North Sumatera and the chief of the Education and Training Center of Sari Mutiara General Hospital. Participants were informed of the study's purpose and design. The researchers clarified that participation was voluntary, the information collected would be treated confidentially, anonymity would be ensured, and free to withdraw at any time. Consenting participants signed the informed consent forms before this study. Steps were taken to ensure that participants' freedom of speech and autonomy was respected.

Before doing the intervention, a pre-test was carried out by administering MMAS-8 to assess the patient's adherence to consuming oral antidiabetic drugs. Then, the patient respondent was given counseling intervention during the home care visit, which was conducted three times a week over eight weeks. Finally, in week 8, after giving intervention, a post-test was given to the patient respondent using MMAS-8.

The results of counseling in-home care on patient adherence in medicine use were analyzed through the Wilcoxon test. In addition, the Wilcoxon test was employed to analyze the score change from MMAS-8 of the respondents before and post-intervention. This test was also performed because the collected data were not distributed normally. IBM SPSS Statistics 21 was used for statistical analyses.

RESULTS

Forty-three patients were willing to participate in the study. Based on data in Table 1, it is seen that the majority of the respondents were female (74.4%), and the rest was male (25.65%). The age of the respondents mostly ranged from 45-49 years (58.1%). The others were ≥60 years of age (41.0%). The number of unemployed respondents was 27 (62.8%), while the number of employed respondents was 16 (37.2%). There were 16 (67.3%) respondents who graduated from senior high school level, 14 (32.5%) respondents graduated from higher education level, and 13 (30.2%) respondents from primary to junior high school level. Most of the respondents had been suffering from DM for over 1-5 years (48.8%), 21 (27.9%) respondents over >5 years, less than one year was ten respondents (23.3%).

Table 2 shows the average score of patient adherence is 3.26 (SD = 2.7), and the score after eight weeks of home care counseling was 0.72 (SD =1.56). Thus, it can be seen that there is an increase in patient adherence. Furthermore, the statistical calculation was obtained that p= 0.000 at α= 0.05, indicating a significant difference in patient adherence in medicine use before and after home care counseling.

Table 1: Respondent Distribution Based on Sex, Age, Employment Status, Education Level, and Length of Suffering from Type 2 DM (n = 43 respondents)

Variable	N	%
Sex		
Male	11	25.6
Female	32	74.4
Age		
45-59 years	25	58.1
≥ 60 years	18	41.9

Employment Status		
Unemployed	27	62.8
Employed	16	37.2
Education Level		
Primary-Junior High	13	30.2
Senior High	16	37.3
University	14	32.5
Length of Suffering from Type 2 DM		
<1 year	10	23.3
1-5 years	21	48.8
>5 years	12	27.9

Table 2: The Average Score of MMAS-8 Before and After 8 Weeks of Home Care Counselling

Variable	Before counseling	After 8 Weeks of Home Care	P
The average score of MMAS-8 ± SD	3.26±2.7	0.72±1.56	*0.000

Note : SD = Standard Deviation

* Significant at $\alpha < 0.05$

DISCUSSION

The Characteristics of Patients with Type 2 DM

This study showed that more female respondents were suffering from Type 2 DM than male respondents. This considerable frequency of DM among female respondents may indicate that female is more vulnerable to suffer from DM. This result supports what is found in previous studies that sex is a factor of DM which cannot be changed. Furthermore, a study argues that the incidents of Type 2 DM in females are found more than in males (17). In America, the prevalence of Type 2 DM among females is higher than that of males, even though the mechanism of these findings is not year clear. The distribution of patient respondents with Type 2 DM based on sex shows that the prevalence of Type 2 DM is relatively higher among respondents whose ages were over 45 years old. This data is also in accordance with the American Diabetes Association (ADA) states that individuals whose age is over 45 years old are more vulnerable to suffer from DM (2).

A total of 62% of the respondents were unemployed. Many respondents were housewives and retirees whose ages ranged from 56-65 years old or in the non-productive age group (>55 years). Moreover, most respondents had been suffering from Type 2 DM for over 1-5 years. The literature argues that the length of DM is correlated with the function decrease of pancreas beta cells. It is argued that patients who have suffered from DM for longer than six years incline to experience acute complications such as hypoglycemia or chronic complications. It was included heart disease, vascular disease, kidney failure, vision disorders, impotence, foot ulcers, and gangrene (18). It was found that 37.4% of the respondents were senior high school

graduates. However, as far as it is known, no literature can explain the relationship between education level and risk of Type 2 diabetes mellitus.

The Adherence of Patients with Type 2 DM

The result of this study revealed that there was a significant difference in patient adherence in medicine use before and after home care counseling was provided. At the beginning of the study, the average score of respondents' adherence through MMAS-8 was 3.26, and around 48.9% of the respondents' adherence was low. Did not regularly consume the prescribed drugs was proof of patients' non-adherence. The majority of the respondents (65.11%) reported that they forgot to take their medicine. This result supports the finding in the study of Hernandez-Ronquillo et al. (2013); said that the reason for patients' non-adherence was non-remembrance. After home health care counseling was carried out, the average score of the respondents was 0.72 (19). The score of patient adherence was increased after home care counseling was provided, i.e., 2.54. This increase indicates that the purpose of the counseling was achieved. The purpose of home core counseling is to increase patients' adherence (20). Cipolle et al. advocated that patients who were not obedient in medicine use showed higher adherence after receiving home care counseling 3 to three times. A study conducted by Suryani, Wirasuta, & Susanti (2013) also revealed an adherence increase of patients after counseling in medicine use was provided in-home care. Counseling can enlarge patients' knowledge and correct their assumptions toward diabetic medication. The patients are given important information about medicine, including drug use, dosage, time of drug-taking, and appropriate medication.

Providing education through counseling to diabetic patients is an integral and essential part of nursing care services. Home care is done in interdisciplinary teamwork for the patient to achieve the maximum quality of life. Diabetic counseling involves providing education, understanding, and training related to knowledge and skills in DM management given to diabetic patients to bring a solution to each problem. Malathy et al. (2011) reveal that nurses' counseling becomes a vital element in diabetic management programs (20). Education intervention through counseling given by nurses can also increase the control on blood sugar level and adherence of patients with Type 2 DM (21-23). If patients could undergoing education intervention effectively, it can improve their adherence and self-control toward their disease (24). Besides, it is also expected that providing education and counseling to diabetic patients can prevent or at least hinder the emergence of chronic or acute diseases, which often bring anxiety to them. In the implementation of education and counseling to patients, a counselor should have a goal to change his or her patient's knowledge, attitude, and behavior. Thus, the implementation of counseling in-home care continuously can improve patient adherence in medicine use.

LIMITATIONS

The sample in this research was small, and the selection of respondents did not base on random, so the possibility of bias can happen. However, the duration of this study was also short, only eight weeks, so the level of compliance of respondents in this study still tends to be high.

CONCLUSIONS AND RECOMMENDATIONS

The implementation of counseling in-home care affects the improvement of patient adherence in medicine use. It can be seen through the average score increase of patient adherence, i.e., 2.54. Besides, there is a significant difference in patient adherence in medicine use before and after implementing counseling in-home care. Therefore, it is suggested for future research to involve the level of hemoglobin binding (HbA_1C) to measure diabetic patients' adherence in controlling blood sugar levels.

ACKNOWLEDGEMENTS

This study was supported by a grant from the Ministry of Research and Higher Education, The Republic of Indonesia [137/K1.1/LT.1/2017]. Furthermore, we thank the participants from Sari Mutiara General Hospital for their assistance in the study. Moreover, the author expresses his gratitude to the beneficial study subjects, without whose contribution, the present study would not have been possible.

REFERENCES

(1) World Health Organization (WHO). Use of Glycated Haemoglobin (HbA1c) in the Diagnosis of Diabetes Mellitus. Zeitschrift für Wahrscheinlichkeitstheorie und Verwandte Gebiete. 2011;2–25.

(2) Marathe PH, Gao HX CK. American Diabetes Association. Standards of medical care in Diabetes. J Diabetes. 2017;9(4):378–85.

(3) Anonim. CEGAH, CEGAH, dan CEGAH: Suara Dunia Perangi Diabetes [Internet]. Kementerian Kesehatan Republik Indonesia. 2018. Available from: https://www.kemkes.go.id/article/view/18121200001/prevent-prevent-and-prevent-the-voice-of-the-world-fight-diabetes.html

(4) Kementerian Kesehatan Republik Indonesia. Tahun 2030 Prevalensi Diabetes Melitus di Indonesia Mencapai 21,3 Juta. 2015.

(5) Medical Report RSU Sari Mutiara. Laporan Tahunan Penyakit Diabetes Mellitus. Medan; 2016.

(6) Abdo NM, Mohamed ME. Effectiveness of health education program for type 2 diabetes mellitus patients attending zagazig university diabetes clinic, Egypt. J Egypt Public Health Assoc. 2010;85(3–4):113–11330.

(7) Morisky DE, DiMatteo M. Improving the Measurement of Self-Reported Medication Nonadherence: Response to Authors. J Clin Epidemiol. 2013;64(3):255–63.

(8) Nadia H, Murti andayani T, Wiedyaningsih C. Pengaruh konseling farmasis terhadap kepatuhan penggunaan obat serta hasil terapi pasien diabetes melitus. 2017;(February):623–30.

(9) Cipolle RJ, Strand LM, Morley PC. Pharmaceutical Care Practice: The Patient-Centered Approach to Medication Management Services, 3e. Third Edit. Newyork: McGraw-Hill; 2012.

(10) Mengesha AY. Hypertension and related risk factors in type 2 diabetes mellitus (DM) patients in Gaborone City Council (GCC) clinics, Gaborone. 2007;7(4):244–5.

(11) Nies MA, McEwen M. Community/Public Health Nursing: Promoting the health of Population. 5th Edition. Philadelphia: W.B. Saunders Company; 2011.

(12) Schnipper JL, Kirwin JL, Cotugno MC, Wahlstrom SA, Brown BA, Tarvin E, et al. Role of pharmacist counseling in preventing adverse drug events after hospitalization. Arch Intern Med. 2006;166(5):565–71.

(13) Lee WY, Ahn J, Kim JH, Hong YP, Hong SK, Kim YT, et al. Reliability and validity of a self-reported measure of medication adherence in patients with type 2 diabetes mellitus in Korea. J Int Med Res. 2013;41(4):1098–110.
(14) Chua SS, Chan SP. Medication adherence and achievement of glycaemic targets in ambulatory type 2 diabetic patients. J Appl Pharm Sci. 2011;1(4):55–9.
(15) Krapek K, King K, Warren SS, George KG, Caputo DA, Mihelich K, et al. Medication adherence and associated hemoglobin A 1c in type 2 diabetes. Ann Pharmacother. 2004;38(9):1357–62.
(16) Coppell KJ, Kataoka M, Williams SM, Chisholm AW, Vorgers SM, Mann JI. Nutritional intervention in patients with type 2 diabetes who are hyperglycaemic despite optimized drug treatment—Lifestyle Over and Above Drugs in Diabetes (LOADD) study: a randomized controlled trial. BMJ. 2010;341:c3337.
(17) Awad AI, Alsaleh FM. 10-year risk estimation for type 2 diabetes mellitus and coronary heart disease in Kuwait: a cross-sectional population-based study. PLoS One. 2015;10(1):e0116742.
(18) Smeltzer SM, Bare BG. Buku ajar keperawatan medikal-bedah Brunner dan Suddarth (Brunner and Suddarth Textbook of medical-surgical nursing). Edisi 8. Ester M, Panggabean E, editors. Jakarta: EGC; 2013.
(19) Adisa R, Fakeye TO, Fasanmade A. Medication adherence among ambulatory patients with type 2 diabetes in a tertiary healthcare setting in southwestern Nigeria. Pharm Pract (Granada). 2011;9(2):72.
(20) Malathy R, Narmadha Mp, Ramesh S, Alvin JM, Dinesh BN. Effect of a Diabetes Counseling Programme on Knowledge, Attitude, and Practice among Diabetic Patients in Erode District of South India. 2011;3(1):65.
(21) Jennings DL, Ragucci KR, Chumney ECG, Wessell AM. Impact of clinical pharmacist intervention on Diabetes-related quality-of-life in an ambulatory care clinic. 2007;5(4):169–73.
(22) Pamungkas RA, Chamroonsawasdi K. Self-management based coaching program to improve diabetes mellitus self-management practice and metabolic markers among uncontrolled type 2 diabetes mellitus in Indonesia. Diabetes & Metabolic Syndrome: Clinical Research & Review. 2020; 14(1): 53-61
(23) Pamungkas RA, Chinnawong T, Kritpracha C. The effect of dietary and exercise self-management support program on dietary behavior, exercise behavior, and clinical outcomes in Muslim patients with poorly controlled type 2 diabetes mellitus in Indonesia. Nurse Media Journal of Nursing. 2015; 5(1):1-14
(24) Chow EP, Azmi M, Saleem F, Aljadhey H. Effects of pharmacist-led patient education on diabetes-related knowledge and medication adherence : A home-based study. Health Educ J. 2015;1–13.