SELF CARE APPLICATION IN IMPROVING THE QUALITY OF CARE AND MANAGEMENT OF TYPE 2 DIABETES MELLITUS CLIENTS

Andi Eka Pranata[1] , Rizki Eko Prasetyo[2]

[1,2] STIKES dr. Soebandi Jember, Jember, Indonesia
Email: andiekapranata@stikesdrsoebandi.ac.id

ABSTRACT

Introduction: Diabetes Mellitus (DM) is a chronic disease (CD) in Indonesia that contributes to high mortality. This disease poses a limitation to self-care. Good self-care prevents complications and improves the quality of life. Self-care application (SCA) is a way to increase understanding of Type 2 Diabetes Mellitus (T2DM) clients and their families to improve the quality of care and good management of T2DM clients. **Objective:** To determine the effect of SCA on improving the quality of care and management of T2DM clients which include blood sugar levels, nutrition management, activity/ exercise management, self aesthetics, and personal hygiene. **Methods:** A quasi-experimental design with a non-equivalent control group design. The population of this study was patients with type 2 diabetes with a total sample size of 50 patients with type 2 diabetes who were evenly divided into 2 research groups. The sampling method used was proportional sampling. The interventions are in the form of SCA with training and mentoring patterns of T2DM clients and their families. Data analysis using independent t-test. **Result:** The application of self-care had no significant impact on blood sugar stability (p 0.540), was able to improve the quality of nutritional management (p 0.018), improve activity/ exercise management (p 0.000), improve self-esthetic behavior (p 0.000), and increase personal hygiene behavior (p 0.000). **Conclusion:** Improving the quality of care and management of T2DM due to SCA is directly related to the understanding and awareness of T2DM clients

ABSTRAK

Latar belakang: Diabetes Mellitus (DM) merupakan penyakit tidak menular (PTM) di Indonesia yang menyumbangkan mortalitas tinggi. Penyakit ini menimbulkan sebuah keterbatasan perawatan diri. Perawatan diri yang baik mencegah komplikasi dan meningkatkan kualitas hidup. Aplikasi self care menjadi cara meningkatkan pemahaman klien DM tipe 2 dan keluarga untuk perbaikan kualitas perawatan dan pengelolaan klien DM tipe 2 baik. Tujuan: Mengetahui pengaruh aplikasi self care terhadap peningkatan kualitas perawatan dan pengelolaan klien DM tipe 2 yang meliputi kadar gula darah, manajemen nutrisi, manajemen aktivitas/ olahraga, estetika diri, dan personal hygiene. Metode: Quasi eksperimen dengan desain non equivalent control group design. Populasi penelitian ini adalah pasien DM tipe 2 dengan jumlah sampel sebanyak 50 pasien DM tipe 2 yang terbagi ke dalam 2 kelompok penelitian. Metode sampling yang digunakan adalah proportional sampling. Intervensi berupa aplikasi self care dengan pola pelatihan dan pembimbingan klien DM tipe 2 beserta keluarga. Analisa data menggunakan uji t-tes independen. Hasil: Aplikasi self care tidak berdampak signifikan pada stabilitas gula darah (p 0.540), mampu meningkatkan kualitas manajemen nutrisi (p 0.018), meningkatkan manajemen aktivitas/ olahraga (p 0.000), meningkatkan perilaku estetika diri (p 0.000), dan meningkatkan perilaku personal hygiene (p 0.000). Kesimpulan: Peningkatan kualitas perawatan dan pengelolaan klien DM tipe 2 akibat aplikasi self care berhubungan langsung dengan pemahaman dan kesadaran klien DM tipe 2 beserta keluarga.

Introduction:

The incidence of DM continues to increase every year in Indonesia. Based on Riskesdas data in 2018, the incidence of DM increased from 6.9% to 8.5%. Increasing the morbidity of T2DM will decrease the public health index. Decreasing the ability of this activity will reduce the ability to take care of yourself as well, such as bathing, shampooing, dressing, eating/ drinking, and toileting (RISKESDAS, 2018).

According to *Self Care Deficit Nursing Theory (SCDNT),* it is explained that everyone must be able to assess and fulfill their needs for self-care and this is related to self-care abilities (self-care agency). Patients with T2DM must be able to meet their personal care needs such as nutrition and activities, even when they are sick. Self-care agencies will determine the quality of life welfare of people with T2DM so that a healthy and prosperous pyramid can be realized in people with T2DM (Surucu et al., 2017).

Good self-care behavior in DM clients is influenced by the knowledge and attitudes of DM sufferers themselves and their families. These two aspects will form an encouragement and ability of T2DM clients and their families 25.5% of 70.4% of T2DM clients are stated to have good knowledge and attitudes towards the perspective of their disease and are relevant to their good self-care behavior in maintaining their health. Therefore, it is necessary to have an effort to increase knowledge and attitudes in T2DM clients and their families to improve self-care behavior (Niguse et al., 2019).

Good self-care behavior in DM sufferers such as monitoring blood sugar, regulating diet, activities, medication, and foot care has a big impact on the health of DM clients. The quality of life for DM clients will improve and prevent complications ranging from mild to severe. Therefore it is necessary to have a breakthrough to introdruce self-care patterns that must be met for T2DM clients. Families as a support system for T2DM clients must also understand and assist with the quality of life of people with T2DM. SCA is a guided module in meeting the self-care needs of T2DM clients. SCA will increase the understanding of T2DM clients in fulfilling their own needs, to improve their treatment patterns and disease management. SCA provides a guided guide for T2DM sufferers in doing self-care independently using modules, so that daily self-care patterns can be good (Chin Choo Yap, 2015).

The purpose of this study was to determine the effect of the Self-Care Application (SCA) on the quality of care and management of T2DM clients. SCA in the form of introducing several items of self-care that T2DM clients must pay attention to as an effort to improve their quality of life, including blood sugar levels, nutrition, activities/ sports, aesthetics, and personal hygiene.

Methods:

The research design is comparative. This research method is a quasi-experimental design with a non-equivalent control group design. The population of this study was patients with type 2 diabetes with a total sample size of 50 patients with type 2 diabetes who were evenly divided into 2 research groups. The sampling method used was proportional sampling. 25 respondents (intervention groups) received treatment in the form of using self-care applications.

In the initial stage, all respondents will be screened in the form of blood sugar checks and self-care score calculations as a determinant of the quality of care and management of T2DM disease. Furthermore, respondents in the intervention group will be given door-to-door exposure to SCA because it was carried out during the COVID-19 pandemic. Respondents in the intervention group will be allowed to test the implementation of SCA. Researchers monitored 2 times in the implementation of SCA in the intervention group respondent over a span of 2 weeks.

Researchers measured the quality of care and management of T2DM during monitoring. In the final stage, the researchers measured the quality of care and management of T2DM in the form of checking blood sugar levels and calculating the score of self-care. SCA is packaged in the form of a creative education

module to facilitate the understanding of respondents. SCA contains the introduction of T2DM disease and T2DM self-care patterns including nutrition management, activities and sports, aesthetic/ dress patterns, and hygiene patterns.

The instrument used to measure the quality of care and management of T2DM clients contains blood sugar levels based on examination results and scores of self-care based on observations and interviews. All data is in the form of a ratio scale. The data analysis of this study used an independent t-test. Approval of the ethical feasibility of this research has been obtained with number 60/SDS/KEPK/TL/VI/2020.

Results:
Table 1. Job Distribution of Respondents

A: Control Group

Job	Total	%
Farmers	15	60
Enterpreneur	2	8
Others	8	32
TOTAL	25	100

B: Intervention Group

Job	Total	%
Farmers	7	28
Enterpreneur	1	4
Others	17	68
TOTAL	25	100

The total respondents in this study were 50 T2DM clients who were divided into two research groups. The distribution of respondent's jobs is shown in Table 1. Most of the control group worked as farmers (60%), and the intervention group did not work/ housewives (68%).

Table 2. The Distribution of The Length of Time to Suffer DM by Respondents

A: Control Group

Length of Time Suffering from DM (year)	Total	%
1.0	6	24
1.2	1	4
1.3	1	4
1.4	1	4
1.5	2	8
1.6	1	4
1.8	2	8
2	7	28
2.5	3	12
3	1	4

Mean = 1.704; STD = 0.5697; Min = 1.0; Max = 3.0

B: Intervention Group

Length of Time Suffering from DM (year)	Total	%
1	8	32
1.2	2	8
1.3	2	8
1.4	1	4
1.5	3	12
1.6	2	8
1.7	1	4
1.9	1	4
2	2	8
2.5	3	12

Mean = 1.488; STD = 0.4994; Min = 1.0; Max = 2.5

The distribution of long-suffering from DM to respondents is shown in Table 2. On average, the control group respondents had suffered from diabetes for 1 year and 5 months, while the respondents in the intervention group had on average had diabetes for 1.5 years.

Table 3. Average Blood Sugar Levels of T2DM

Item	Mean	Median	Mode	St. Deviation
Control Group Blood Glucose_Pre	156.12	128	110	70.882
Control Group Blood Glucose_Post	141.08	120	110	46.583
Intervention Group Blood Glucose_Pre	162.08	160	129	64.002
Intervention Group Blood Glucose_Post	131.88	129	120	18.523

Normality test = 0.001; Mann-Whitney Test, p = 0.540 (p > 0.05)

The average blood sugar levels are shown in Table 3. There was a decrease in the average blood sugar levels in the control group between pre and post conditions of 15.04 gr/dl. In the intervention group, there was a decrease in the average blood sugar level between the pre and post conditions by 30.2 gr/dl. The decrease in blood sugar levels was more in the intervention group with the difference between the two groups of 15.16 gr/dl. Based on the results of the Mann-Whitney test (distribution not normal, Sig value. $0.000 < 0.05$), the value of p = 0.540 ($p > 0.05$) was obtained. In conclusion, there is no difference in blood sugar levels between the control group and the intervention group at the final measurement.

Table 4. Distribution of Self Care on Nutritional Aspects of T2DM

Item	Mean	Median	Mode	St. Deviation
Control Group Nutrition_Pre	7.88	8	8	2.108
Control Group Nutrition_Post	7.68	8	6	2.015
Intervention Group Nutrition_Pre	4.40	5	3	1.291
Intervention Group Nutrition_Post	8.96	9	9	1.060

Normality Test = 0.000; Mann-Whitney Test, p = 0.018 (p < 0.05)

The distribution of self-care in the nutrition/ diet aspect is shown in Table 4.

There was a decrease in self-care scores on the nutrition/ diet aspects of the control group between pre and post conditions of 0.2. The nutritional condition of the control group was better in pre than post.

Conversely, there was an increase in self-care scores on the nutrition/ diet aspects of the intervention group between pre and post conditions by 4.56. The nutritional condition of the intervention group was better at post than pre. Based on the results of the Mann-Whitney test (abnormal distribution, Sig value. $0.008 < 0.05$), the value of p = 0.018 ($p < 0.05$) was obtained. In conclusion, there is an effect of SCA on the quality of care and management of T2DM clients on the nutritional aspect.

Table 5. Distribution of Self Care on The Activity/ Sports Aspects of T2DM

Item	Mean	Median	Mode	St. Deviation
Control Group Activity_Pre	10.24	11	11	2.047
Control Group Activity_Post	9.12	9	9	2.068
Intervention Group Activity_Pre	6.76	7	7	1.363
Intervention Group Activity_Post	13.76	13	12	2.803

Normality Tes = 0.200; t-test independent, p = 0.000 (p < 0.05)

The distribution of self-care in the activity/ sports aspect is shown in Table 5. There was a decrease in self-care scores in the activity/ sports aspect between the pre and post conditions of 1.12 in the control group. In the intervention group, there was an increase in self-care scores in the activity/ sports aspect between the pre and post conditions by 7. Based on the results of the independent t-test (normal distribution, Sig 0.136 & 0.423 > 0.05), the p-value = 0.000 ($p < 0.05$). In conclusion, there is an effect of SCA on the quality of care and management of T2DM clients in the activity/ sports aspect.

Table 6. Distribution of Self Care on Aesthetic Aspects of T2DM

Item	Mean	Median	Mode	St. Deviation
Control Group Esthetic_Pre	4.12	4	5	1.364
Control Group Esthetic_Post	3.92	4	4	1.152
Intervention Group Esthetic_Pre	2.96	3	3	0.978
Intervention Group Esthetic_Post	7.16	7	8	1.724

Normality Test = 0.007; Mann-Whitney Test, p = 0.000 (p < 0.05)

The distribution of self-care in the aesthetic aspect is shown in Table 6. In the control group, there was a decrease in self-care scores in the aesthetic aspect between pre and post conditions of 0.2. In the intervention group, there was an increase in self-care scores on aesthetic aspects between pre and post conditions of 0.42. Based on the results of the Mann-Whitney test (abnormal distribution, Sig value. $0.013 < 0.05$), the pa value = 0.000 ($p < 0.05$). In conclusion, there is an effect of SCA on the quality of care and management of T2DM clients on aesthetic aspects.

Tabel 7. Distribution of Self Care on Personal Hygiene Aspects of T2DM

Item	Mean	Median	Mode	St. Deviation
Control Group Personal Hygiene_Pre	11.80	11	11	2.160
Control Group Personal Hygiene _Post	11.92	12	10	2.482
Intervention Group Personal Hygiene _Pre	10.16	10	10	1.491
Intervention Group Personal Hygiene _Post	20.64	20	19	2.430

Normality Test = 0.009; Mann-Whitney Test, p = 0.000 (p < 0.05)

The distribution of self-care on the aspect of personal hygiene is shown in Table 7. In the control group, there was an increase in self-care scores on the personal hygiene aspects between pre and post conditions of 0.12. In the intervention group, there was an increase in self-care scores on the personal hygiene aspects between the pre and post conditions of 10.48. Based on the results of the Mann-Whitney test (abnormal distribution, Sig. 0.04 , 0.05), the p-value = 0.000 ($p < 0.05$). In conclusion, there is an effect of SCA on the quality of care and management of T2DM clients on the personal hygiene aspects.

Table 8. Differences in Self Care Scores between The Control and Intervention Groups

Item	Mean	Median	Min.	Max.	St. Deviation
Self Care Score of Control Group	32.64	33	25	42	3.546
Self Care Score of Intervention Group	50.52	49	41	67	5.591

Normality Test = 0.200; t-test independent, p = 0.000 (p < 0.05)

The difference in self-care scores between the two groups in shown in Table 8. The average self-care score was greater in the intervention group by a difference of 17.88. Data distribution is normal (Sig. 0.339 & 0.110 > 0.05). The independent t-tes results obtained p value = 0.000 ($p < 0.05$), so the conclusion is that there is an effect of SCA on the quality of care and management of T2DM clients.

Discussion:

The results showed that in general, the SCA was able to improve the quality of care and management of T2DM clients which included aspects of blood sugar control, nutrition/ diet regulation, activity/ exercise regulation, maintaining aesthetics, and personal hygiene. Self-care is very important for people with DM because it will fulfill all the basic needs of the client. Self-care can

improve the quality of life and prevent complications from the disease. DM clients must be able to manage their disease independently to control their health status. The ability of DM clients in managing good self-care can control blood sugar. Controlled blood sugar will reduce the risk of disease complications (AlQahtani et al., 2020; Helou et al., 2016).

The Chinese Diabetes Society recommends self-care as an important point in the management of T2DM clients. In this study, the decrease in blood sugar that received self-care intervention was more effective at 15.16 gr/dl. Self-care affects the blood sugar control behavior of people with diabetes. Self-care is able to maintain blood sugar levels better than DM clients who do not apply self-care properly. Self care is not directly related to the stability of the blood sugar levels of DM clients, but good self-care behavior can create awareness of the importance of periodic monitoring of blood sugar and managing the lives of DM clients according to health recommendations (Gao et al., 2013).

In addition to monitoring blood sugar, self-care also affects nutrition fulfillment behavior in DM clients. One aspect that must be emphasized in the self-care of T2DM clients is nutritional management. The results of this study indicate that the nutritional fulfillment behavior of DM clients is more effective in the group receiving self-care intervention (p 0.018). The pattern of fulfilling the nutrition of DM clients who get self-care intervention is more regular following the dietary standards of DM clients. Improving the quality of DM management in the nutritional aspect of post SCA cannot be separated from the increased understanding and awareness of DM clients and their families. The application of a good diet in DM clients has a significant relationship with blood sugar levels.

Based on the results of Chourdakis' research, 76% of people with diabetes who follow dietary recommendations from nutritionists have managed to maintain their blood sugar levels in a stable condition. DM patients who do not follow the recommended diet experience an increase in blood glucose

and cholesterol levels, which can lead to complications. There needs to be a support system from a good family and good communication between health workers and patients to maintain self-care status so that it is implemented optimally. A good family support system will increase the efforts of clients and families in managing DM disease. Good communication between health workers and clients will create a consulting room that is conducive to realizing good DM care (Chourdakis et al., 2014).

The balance of activity and exercise also affects the quality of management of DM clients. The results of this study indicated that the group of DM clients who received SCA was more effective in managing their activities and sports (p 0.000). The adjustment of the activity/ sports load is adjusted to the ability of the DM clients without neglecting the benefits of the activity/ sport.

The American Diabetes Association (ADA) recommends that DM clients do 150 minutes/ week of exercise with moderate intensity and a load on the heart between 50-70%. A balanced and recommended exercise will maintain the body's metabolism, especially in breaking down blood sugar. The SCA helps T2DM clients independently to manage their activities/ sports by DM management standards so that the balance between activities/ sports and sleep habits will be maintained (Bagchi & Sreejayan, 2012).

It should also be noted that humans will not be separated from their comfort, including DM clients. The meaning of everyday self-comfort is aesthetics in dressing and decorating oneself. The results of this study indicated that the group of DM clients who received SCA had a better aesthetic pattern (p 0.000). DM clients of this group pay more attention to their aesthetics for the convenience of their daily lives.

According to Smalls's research, there is a significant relationship between aesthetics and self-care behavior in T2DM clients. DM clients understanding of their aesthetics affects their self-care behavior so that their level of comfort depends on their level of understanding of aesthetics. Good self-care

behavior will reconstruct the mindset of DM clients related to their appearance, so that understanding of self-aesthetics will increase (Smalls et al., 2015).

The last aspect of care and management of T2DM is personal hygiene. In this study, the personal hygiene behavior in the group of DM clients who received SCA was better (p 0.000). Good personal hygiene, especially hygiene on the feet, will reduce the risk of infection. The infection that occurs will worsen the health condition of people with diabetes.

Patients with T2DM are at risk for foot ulcers due to circulatory stagnation secondary to increased blood sugar levels. Based on Mariam's research, it was explained that 13.6% of 279 DM clients experienced foot ulcers. Based on Souza's research, the incidence of foot ulcers will reduce the quality of life of people with T2DM which will be inversely proportional to an increase in the complication rate of DM. In addition to blood sugar control and foot care for people with diabetes, personal hygiene status also affects the foot health of people with diabetes (D'Souza et al., 2016; Mariam et al., 2017).

According to Zukic's research, there was a significant relationship (p < 0.05) between foot hygiene and the incidence of diabetic foot in people with diabetes. Poor foot hygiene will increase the risk of infection when there is a wound on the foot so that the wound on the foot of the person with DM gets worse. The risk of infection (OR) in the foot wound of people with diabetes is 21 times greater than that of people with diabetes who do not have injuries to their feet. Therefore, maintaining personal hygiene status in people with T2DM, especially foot care and hygiene is very important (Zukic et al., 2015).

The foot care behavior of DM clients in Indonesia is bad. This condition is influenced by several conditions such as age, education level, diabetes distress, family support, and knowledge about foot care for people with diabetes. There needs to be an approach to enhance this behavior. Self-care will be a pattern for maintaining personal hygiene independently in DM clients (Sari et al., 2020).

The limitation of this research is the difficulty in controlling external factors, such as family support, that can affect the pattern of care and management of T2DM clients. Variations in the respondent's occupation can also affect the quality of T2DM care and management because it can affect blood sugar levels and self-care compliance patterns. Besides, local cultural factors can have a big influence on the mindset of T2DM clients and their families, so that they can affect the quality of care and management of the disease.

Acknowledgment:

Conclusion:

SCA can improve the quality of care and management of T2DM. Improved quality of care and management of T2DM clients is reflected in the description of blood sugar level stability, the fulfillment of nutritional status, adjustment of activity/ exercise patterns, improvement of personal aesthetics, and improvement of personal hygiene. SCA can to provide an understanding for T2DM and their families to pay more attention to their care needs in managing their disease so that the risk of complications can be avoided and their health can be maintained.

There needs to be an analysis of the significance of local culture for self-care for people with T2DM so that nursing services can be even better.

Reference:

AlQahtani, A. H., Alzahrani, A. S., Alzahrani, S. H., Alqahtani, S. M., AlOtaibi, A. F., & Khan, A. A. (2020). Levels of Practice and Determinants of Diabetes Self-Care in Primary Health Care in Jeddah City, Saudi Arabia. *Cureus*. https://doi.org/10.7759/cureus.8816

Bagchi, D., & Sreejayan, N. (2012). Nutritional and Therapeutic Interventions for Diabetes and Metabolic Syndrome. In *Nutritional and Therapeutic Interventions for Diabetes and Metabolic Syndrome.*

Jurnal Kesehatan dr. Soebandi

https://doi.org/10.1016/C2010-0-66168-2

Chin Choo Yap, C. (2015). Personal Attributions, Emotion Managements, Social Supports, and Diabetes Knowledge in Diabetes Self-care Adherence. *International Journal of Collaborative Research on Internal Medicine & Public Health [E]*.

Chourdakis, M., Kontogiannis, V., Malachas, K., Pliakas, T., & Kritis, A. (2014). Self-Care Behaviors of Adults with Type 2 Diabetes Mellitus in Greece. *Journal of Community Health*. https://doi.org/10.1007/s10900-014-9841-y

D'Souza, M. S., Ruppert, S. D., Parahoo, K., Karkada, S. N., Amirtharaj, A., Jacob, D., Balachandran, S., & Al Salmi, N. M. D. (2016). Foot care behaviors among adults with type 2 diabetes. *Primary Care Diabetes*. https://doi.org/10.1016/j.pcd.2016.04.002

Gao, J., Wang, J., Zheng, P., Haardörfer, R., Kegler, M. C., Zhu, Y., & Fu, H. (2013). Effects of self-care, self-efficacy, social support on glycemic control in adults with type 2 diabetes. *BMC Family Practice*. https://doi.org/10.1186/1471-2296-14-66

Helou, N., Talhouedec, D., Shaha, M., & Zanchi, A. (2016). The impact of a multidisciplinary self-care management program on quality of life, self-care, adherence to anti-hypertensive therapy, glycemic control, and renal function in diabetic kidney disease: A Cross-over Study Protocol. *BMC Nephrology*. https://doi.org/10.1186/s12882-016-0279-6

Mariam, T. G., Alemayehu, A., Tesfaye, E., Mequannt, W., Temesgen, K., Yetwale, F., & Limenih, M. A. (2017). Prevalence of Diabetic Foot Ulcer and Associated Factors among Adult Diabetic Patients Who Attend the Diabetic Follow-Up Clinic at the University of Gondar Referral Hospital, North West Ethiopia, 2016: Institutional-Based Cross-Sectional Study. *Journal of Diabetes Research*. https://doi.org/10.1155/2017/2879249

Niguse, H., Belay, G., Fisseha, G., Desale, T., & Gebremedhn, G. (2019). Self-care related knowledge, attitude, practice and associated factors among patients with diabetes in Ayder Comprehensive Specialized Hospital, North Ethiopia. *BMC Research Notes*. https://doi.org/10.1186/s13104-019-4072-z

RISKESDAS. (2018). Riset Kesehatan Dasar 2018. *Kementrian Kesehatan Republik Indonesia*.

Sari, Y., Upoyo, A. S., Isworo, A., Taufik, A., Sumeru, A., Anandari, D., & Sutrisna, E. (2020). Foot self-care behavior and its predictors in diabetic patients in Indonesia. *BMC Research Notes*. https://doi.org/10.1186/s13104-020-4903-y

Smalls, B. L., Gregory, C. M., Zoller, J. S., & Egede, L. E. (2015). Assessing the relationship between neighborhood factors and diabetes related health outcomes and self-care behaviors. *BMC Health Services Research*. https://doi.org/10.1186/s12913-015-1086-7

Sugiyono. (2013). Metode Penelitian Pendidikan Pendekatan Kuantitaif, Kualitatif, dan R&DSugiyono. 2013. "Metode Penelitian Pendidikan Pendekatan Kuantitaif, Kualitatif, dan R&D." Metode Penelitian Pendidikan Pendekatan Kuantitaif, Kualitatif, dan R&D. https://doi.org/10.1. In *Metode Penelitian Pendidikan Pendekatan Kuantitaif, Kualitatif, dan R&D*.

Surucu, H. A., Kizilci, S., & Ergor, G. (2017). The Impacts of Diabetes Education on Self Care Agency, Self-Care Activities and HbA1c Levels of Patients with Type 2 Diabetes: A Randomized Controlled Study. *International Journal of Caring Sciences*.

Zukic, E., Gojak, R., Novakovic, A., & Gazibera, B. (2015). Predictive Role of Preventive Measures in Preventing the Progression of Diabetic Foot. *Materia Socio Medica*. https://doi.org/10.5455/msm.2015.27.234-236