(RESEARCH ARTICLE)

Check for updates

Personal and environmental factors related to self-care behavior of diabetes mellitus patients at public health center Mojo Surabaya

Amira Rishanda *, Nur Alifia Hera Puspitasari and Mochammad Bagus Qomaruddin

Department of Biostatistics, Population Studies, and Health Promotion, Faculty of Public Health, Airlangga University, Surabaya, Indonesia

Abstract

Diabetes Mellitus is a chronic disease characterized by high blood sugar levels. According to the International Diabetes Federation, Indonesia was projected to have 19.5 million diabetics by 2021, placing it among the top 5 countries with the highest diabetic population globally. Long-term complications of Type 2 Diabetes Mellitus might require particular self-care. Diabetes self-care consist of various activities aimed at controlling blood glucose and minimizing complications. Personal factors and environmental factors influence a person's health behavior as social cognitive theory. Using said theory, this study objective is to determine personal and environmental factors that influence the diabetic self-care behavior of those with Type 2 Diabetes Mellitus patients at the Mojo Public Health Center. There were 69 respondents in this cross-sectional study who met the inclusion criteria. Simple random sampling was applied on this study. The Chi-Square test and the Spearman-rho Correlation test are used for statistical analyses. The study's findings indicated a correlation between family functioning (p=0.02; r=0.265) and the role of cadres and paramedic (p=0.00; r=0.512) on Type 2 Diabetes Mellitus patients self-care behavior. This study found that there was no significant correlation between the levels of knowledge (p=0.19), self-efficacy (p=0.052), and outcome expectation (p=0.72) and self-care behavior of individuals with Type 2 Diabetes Mellitus at the Mojo Public Health Center. The participation of several society segments, such as paramedic, cadres, families, and the local community is also necessary for patients to successfully perform self-care behavior.

Keywords: Diabetes Mellitus; Diabetes Self-Care: Personal Factor: Environmental Factor

1. Introduction

Diabetes mellitus (DM) is a chronic condition characterized by high blood sugar levels. This condition occurs when the pancreas no longer produces insulin or when the body no longer uses insulin properly. Several systems in the body, mainly the cognitive and cardiovascular system, are potentially harmed by diabetes (1). According to the International Diabetes Federation, the number of people diagnosed to live with diabetes reached 537 million in 2021 and expected to increase up to 783 million by 2045. Indonesia is one of the five nations with the biggest number of diabetics worldwide with 19.5 million people (2). Diabetes caused 1.5 million deaths worldwide in 2019. Diabetes also cause 20% of cardiovascular deaths (3).

Type 2 Diabetes Mellitus can lead to long-term complications that necessitate specific self-care measures that can affect the quality of life and productivity of diabetic patients (4). Self-care encompasses any actions taken to maintain or improve patients' health and well-being. In the case of diabetes mellitus, self-care activities (referred to as diabetes self-care) involve various activities aimed at controlling blood glucose levels and minimizing the occurrence of complications. These activities include dietary regulation, exercise, medication adherence, blood sugar monitoring, foot care, and avoidance of smoking (5).

---

* Corresponding author: Amira Rishanda

The implement of self-care can be influenced by several factors as social cognitive theory explains that there is a correlation between the individual (personal) and the environment and behavior (6). Personal factors that can influence self-care diabetes behavior are knowledge, self-efficacy, and outcome expectations of type 2 diabetes mellitus patients. Knowledge related to the disease experienced by patients can change their behavior and improve their ability to care for themselves better (7). Self-efficacy also has an important role to help diabetic patients so that they can carry out better self-care. Bandura's Cognitive Social Theory states that belief in one's abilities can lead individuals to exhibit behaviors that are perceived as goals (8). In the case of diabetes self-care, a person who believes in himself is able to practice self-care so as to create behaviors that prevent complications.

The environmental factors that can influence diabetes self-care behavior are functioned family and the role of health workers and cadres in diabetes mellitus control program activities. Family, cadres, and health workers can play a role in providing various supports that enable patients to make behavior changes that support the treatment process (9).

Personal and environmental factors become the basis for health workers to create programs to improve diabetes care and control in a health center. The research was conducted in the working area of the Mojo Public Health Center (*Pusat Kesehatan Masyarakat*, Puskesmas), East Surabaya, namely the Mojo, Airlangga, and Gubeng villages. The location was chosen based on the results of preliminary data conducted at three Public Health Center with the highest number of diabetes mellitus cases in Surabaya, namely Public Health Center Gading, Public Health Center Mojo, and Public Health Center Banyu Urip. The Summary Diabetes Self-Care Activities (SDSA) questionnaire was used to obtain preliminary data. The results showed that 75% of type 2 diabetes mellitus patients at Mojo Public Health Center had not carried out appropriate treatment behavior to control glucose levels in the blood and avoid complications.

Based on this, this study was conducted with the aim of analyzing personal and environmental factors related to self-care diabetes behavior of type 2 diabetes mellitus patients in the Mojo Public Health Center work area using a cognitive social theory (SCT) approach according to Albert Bandura.

2. Material and methods

This study utilized an analytical observational study using a cross-sectional design. The samples consisted of 69 patients residing in Airlangga, Mojo, and Gubeng villages. The respondents were selected randomly using probability sampling techniques, based on specific inclusion criteria. These criteria required the respondents to have the ability to independently carry out daily activities, possess good communication skills, and have been diagnosed with diabetes for a minimum 6 months, calculated from the time diagnosis.

In this study, personal and environmental factors were considered as independent variables. Personal factors include the level of knowledge, self-efficacy, and outcome expectations. Environmental factors include family functions and officers or cadres in diabetes mellitus control program activities. Data is obtained through validated questionnaires. Family functioning questionnaire used APGAR questionnaire developed by researchers. The dependent variable of the study was self-care diabetes behavior. Data was collected through the SDSCA questionnaire or Summary Diabetes Self-Care Activity.

This study used the Chi-Square test and the Spearman-rho Correlation test for data analyzing. The ethics committee of Faculty of Dentistry in Airlangga University has determined that this research passed the ethical test with certificate number 71/HRECC.FODM/IX/2022.

3. Results

3.1. Characteristic of Respondents

Table 1 presents the characteristics of the respondents analyzed in this study. The majority of respondents were female (62.3%), with the highest proportion falling within in the age range of 57 – 65 years old (62.3%). Regarding educational background, a significant portion of the respondents had a middle level of education (56.6%). In terms of income level, a majority of the respondents fell into the low-income level, earning below Rp1.500.000,00 (68.1%). Additionally, a substantial proportion of respondents had been diagnosed with diabetes for more than 5 years (40.6%).

Table 1 Characteristic of Respondents

Variable	Frequency	Percentage
Age		
39 – 47 years old	8	11.6%
48 – 56 years old	18	26.1%
57 – 65 years old	43	62.3%
Level of Education		
Elementary	25	36.2%
Middle	39	56.6%
High	5	7.2%
Gender		
Female	43	62.3%
Male	26	37.7%
Income Level		
Low	47	68.1%
Middle	9	13.0%
High	3	4.3%
Very High	10	14.5%
Having diabetes for		
<1 years	14	20.3%
1 – 5 years	27	39.1%
>5 years	38	40.6%

Source: Primary Data

3.2. Univariate Analysis of Personal Factors

Table 2 Univariate Analysis of Respondent's Personal Factors

Variable	Frequency	Percentage
Level of Knowledge		
Low	7	10.1%
Sufficient	48	69.6%
High	14	20.3%
Self-Efficacy		
Low	10	14.5%
Sufficient	36	52.2%
High	23	33.3%
Outcome Expectation		
Low	2	2.9%
Sufficient	55	79.7%
High	12	17.4%

Source: Primary Data

A majority of the respondents (69.6%) demonstrated a relatively good level of knowledge regarding diabetes self-care. Regarding self-efficacy, a significant proportion of the respondents (52.2%) fell into the moderate category. This category indicates the confidence level of individuals with diabetes mellitus in their ability to engage in self-care practice and prevent complications. Respondents in this study on average have outcome expectations in the moderate category (79.7%). The outcome expectation category reflects the respondents' perception of future related to the implementation of self-care behaviors for individuals with Type 2 Diabetes Mellitus.

3.3. Univariate Analysis of Environmental Factors

Table 3 Univariate Analysis of Environmental Factors

Variable	Frequency	Percentage
Function of Family		
Not functional	5	7.2%
Functional	7	10.2%
Very Functional	57	82.6%
The Role of Cadres and Health Workers		
Low	8	11.6%
Sufficient	44	63.8%
High	17	24.6%

Source: Primary Data

Table 3 presents the results of the univariate analysis conducted on the environmental factors. The findings indicate that a majority of the respondents; families (82.6%) exhibited a high level of functioning. This suggests that families play a crucial role in assisting patients with diabetes to managing self-care, adapting to changes, and resolving problem. Cadres and health workers were found to have a significant role (63.8%) in supporting self-care for individuals with Type 2 Diabetes Mellitus. They served as valuable sources of information, references, advice and support, and also as motivators for diabetes self-care..

3.4. Univariate Analysis of Respondent's Diabetes Self-Care

Table 4 Table title should be of font size 10pt, Cambria, justify

Diabetes Self-Care	Frequency	Percentage
Bad	9	13.0%
Quite Good	48	69.6%
Good	12	17.4%

Source: Primary Data

According to the findings presented in table 4, the self-care diabetes behavior of the majority of respondents in this study was assessed as quite good (69.6%). This indicates that the respondents demonstrated a satisfactory level of competence in carrying out independent self-care activities for individuals with diabetes mellitus. The activities include engaging in regular exercise, effectively managing blood glucose levels, adhering to prescribed medications, and practicing proper foot care.

3.5. Correlation between Variables

Table 5 displays the relationship between the variables analyzed in this study. The results of the variables analysis revealed a significant relationship between family function ($p = 0.02$; $r = 0.265$) and the role of cadres and health workers ($p = 0.00$; $r = 0.512$) in the self-care behavior of patients with Type 2 diabetes mellitus. This study also found that the level of knowledge ($p = 0.19$), self-efficacy ($p = 0.052$), and outcome expectation ($p = 0.72$) had no effect on the self-care behavior of Type 2 DM patients at the Mojo Health Center.

Table 5 Correlation between Variables

Variable	Self-care Behavior						Total		P-Value
	Bad		Quite Good		Good				
	N	%	N	%	N	%	N	%	
Personal Factors									
Level of Knowledge									
Low	1	14.3%	5	71,4%	1	14,3%	7	100%	p=0.19
Sufficient	8	16.7%	31	64,6%	9	18,8%	48	100%	
High	0	0.0%	12	85,7%	2	14,3%	14	100%	
Self-Efficacy									
Low	1	10.0%	9	90,0%	0	0,0%	10	100%	P=0.052
Sufficient	3	8.3%	29	80,6%	4	11,1%	36	100%	
High	5	21.7%	10	43,5%	8	34,8%	23	100%	
Outcome Expectation									
Low	0	0.0%	2	100,0%	0	0,0%	2	100%	P=0.72
Sufficient	6	10.9%	39	70,9%	10	18,2%	55	100%	
High	3	25.0%	7	58,3%	2	16,7%	12	100%	
Environmental Factors									
Function of Family									
Not Functional	0	0.0%	5	100,0%	0	0,0%	5	100%	P=0.02
Functional	4	57.1%	2	28,6%	1	14,3%	7	100%	R=0.265
Very Functional	5	8.8%	41	71,9%	11	19,3%	57	100%	
The Roles of C1adres and Health Worker									
Low	1	12.5%	7	87,5%	0	0,0%	8	100%	P=0.00
Sufficient	8	18.2%	32	72,7%	4	2,9%	44	100%	R=0.512
High	0	0.0%	9	52,9%	8	18,8%	17	100%	

Source: Primary Data

4. Discussion

The result of the spearman correlation test revealed a significance value of p = 0.19 (p > 0.05) indicating that there is no significant correlation between knowledge and self-care diabetes behavior among Type 2 Diabetes Mellitus patients at the Mojo Public Health Center, Surabaya. Regardless of whether respondents had low, sufficient, and high levels of knowledge, they exhibited fairly good diabetes self-care behavior. It is worth noting that these findings differ from a study conducted by Clara (2018), which reported a correlation between knowledge and self-care among diabetes mellitus patients at Bekasi Regional Hospital. Clara's study emphasized that higher patient knowledge was associated with better self-management in diabetes mellitus treatment (10).

However, this study is in line with Widyastuti's research which also found no correlation between level of knowledge and the well-being of diabetes mellitus patients. It has been observed that the self-care behavior of patients with diabetes is a reflection of their overall quality of life (11). Although diabetes mellitus patients are already aware of the importance of engaging in regular self-care activities such as adhering to a specific diet, engaging in physical activity, taking prescribed medications, and monitoring blood sugar levels, they may struggle to implement these practice

effectively (12). Therefore, the level of knowledge alone does not necessarily translate into improved self-care behavior among diabetic patients.

Merely increasing knowledge among diabetic patients is insufficient to foster diabetes self-care behaviors. This is in line with the theory of Social Cognitive Theory which explains the importance of the role of environmental factors in changing people's behavior. In terms of diabetes self-care behavior, environmental factors can include support from families, cadres and health workers, as well as facilities that support the behavior.

This research indicates that the majority of respondents who had a low, sufficient, or high level of self-efficacy exhibited fairly good self-care diabetes behavior. However, the results of the correlation test showed no significant correlation between self-efficacy and self-care diabetes behavior among Type 2 Diabetes Mellitus patients at the Mojo Public Health Center in Surabaya p = 0.052 (p > 0.05). These results differ from the findings of a study conducted by Windani, which demonstrated that self-efficacy plays a significant role in determining the self-management behavior of diabetes mellitus patients in Bandung City (8). In that study, the level of self-efficacy was found to have an important influence on patients' self-management behavior.

Furthermore, the findings of this research are consistent with Pakaya's research in 2020, conducted on patients with diabetes mellitus in Gorontalo. Pakaya found no significant correlation between self-efficacy and physical activity in the both the intervention and control groups of the study (13). Additionally, the present study also align with Kiajamali's research in 2017, which revealed a negative correlation between self-efficacy and self-care behavior among hemodialysis patients in Karaj city (14).

Self-efficacy refers to an individual's ability to maintain self-care, provide adequate care, and effectively manage their health, thereby influencing their quality of life, beliefs, and spiritual strength (15). Self-efficacy is closely associated with motivation, as it helps us understand and delve deeper into an individual's motivation to manage and mitigate risk factors (16,17). Research conducted by Huda (2020) found that diabetic patients with high level of self-efficacy exhibited greater motivation in practicing foot care. As a result, their foot care behaviors were more effective and comprehensive (18).

When the patient have confidence in their ability to control their health issues, their health behavior can significantly improve. Motivation plays a vital role in enhancing an individual's confidence in their own capabilities. Consequently, a patient's level of motivation can have a direct impact on the management plan they choose to implement. In the case of Diabetes mellitus patients, high levels motivation are often associated with increased self-efficacy, enabling them to engage in effective self-care practices (19). Therefore, future studies could further analyze the motivation of Diabetes Mellitus patients as an important factor influencing the formation of self-efficacy and self-care diabetes behavior.

This study found that there was no significant association between outcome expectation and diabetes self-care behavior among patients at the Mojo Public Health Center p = 0.72 (p > 0.05). Regardless of whether diabetes mellitus patients had low, sufficient, or high levels of outcome expectation, their diabetes self-care behavior remained relatively good. This finding aligns with the research conducted by Mallows, who also found no correlation between outcome expectation and the management of Achilles tendinopathy (20). Patients seeking treatment often have high expectations for positive outcomes, often overlooking the potential negative consequences if they fail to modify problematic behavior (21). This can be seen in table 4, where only 12 respondents (17.4%) demonstrated a high level of self-care diabetes behavior, despite the majority of respondents having a relatively good level of outcome expectation.

Individuals with high expectations often overlook the fact that achieving those expectations requires making various behavioral changes. As a result, they may inadvertently reduce or even abandon the necessary behavior. Thus, monitoring of diabetes self-care behavior carried out by patients is needed so that the results obtained can be maximized.

The majority of respondents in the study reported having highly functioning families. The results of the correlation test prove that family function has a correlation with diabetes self-care behavior of Type 2 Diabetes Mellitus patients at the Mojo Public Health Center p = 0.02 (p < 0.05). The findings indicate that as the functioning of the family of a diabetic patient improves, there is a corresponding increase in the level of diabetes self-care among the patients.

The findings of this research are in line with research on Diabetes Mellitus patients at Banguntapan 2 Public Health Center in Bantul which found an influence between family functioning and blood glucose control in patients with type 2 diabetes mellitus p = 0.008 (p < 0.05). A functional family allows diabetic patients to have more controlled glucose levels (22). Family support has an important role to optimize treatment by increasing patient confidence to continue to

do diabetes self-care because DM patients need long-term care (13,22). Families can be actively involved through discussion and consensus especially in terms of monitoring adherence to taking medication regularly and monitoring blood sugar (22).

Functional families play an indispensable role in providing solutions to health problems and improving the quality of life for sick family, particularly those with diabetes mellitus. Families can support their self-care behavior in various way, such as adjusting their diet according to the recommendations of health workers, reminding them to take medication, encouraging physical activities like gymnastics, conducting routine blood sugar checks at the Public Health Center or at home, and ensuring the cleanliness of the patient's feet. To maximize the role of the family in assisting the care of DM patients at the Mojo Health Center, efforts are needed from the Government and related Public Health Center to improve family functions and provide necessary support.

This study explores the association between the involvement of health workers and cadres in diabetes control programs and the diabetes self-care behavior of individuals with type 2 diabetes mellitus at the Mojo Public Health Center, Surabaya p = 0.000 (p < 0.05). The results indicate a positive correlation, suggesting that as the role of health workers and cadres in various diabetes control programs increase, patients exhibit higher levels of self-care behavior for managing their diabetes.

In line with Adimuntja's research (2020), there is significant correlation p = 0.000 (p < 0.05) between the involvement of health workers and self-care diabetes behavior. Health workers are an important factor in providing education on self-care for individuals with Type 2 Diabetes Mellitus (23). It is important for health workers to collaborate with community cadres, as cadres also contribute significantly to diabetes education, support, and advocacy (24). To optimize the role of cadres, it is recommended to provide them with specialized training to enhance their understanding of diabetes self-care, enabling them to provide accurate information to individuals with Type 2 Diabetes Mellitus.

5. Conclusion

The conclusion of this study is that the level of knowledge, self-efficacy, and outcome expectation have no correlation with self-care diabetes behavior of type 2 diabetes mellitus patients in the Mojo Public Health Center work area. However, the study found a significant relationship between the functioning of family, the role of health workers and cadres in the diabetes mellitus control program and self-care diabetes behavior in the Mojo Public Health Care Center work area.

The success of a health program is the responsibility of many parties. This suggest that the success self-care efforts requires active involvement from various elements of society, including health works, cadres, families, and the surrounding environment. Further research and collaboration are needed to enhance the effectiveness of diabetes management programs.

Compliance with ethical standards

Disclosure of Conflict of interest

There isn't any potential conflict in this study.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] World Health Organization (WHO). Diabetes [Internet]. 2018. Available from: https://www.who.int/News%02Room/Fact-Sheets/Detail/Diabetes

[2]   The International Diabetes Federation. Diabetes Atlas 10th Edition [Internet]. 2021. Available from: https://diabetesatlas.org/idfawp/resource-files/2021/07/IDF_Atlas_10th_Edition_2021.pdf

[3]   Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2019 [Internet]. 2020. Available from: https://vizhub.healthdata.org/gbd-results/

[4]   Kemenkes RI. Infodatin Tetap Produktif, Cegah, Dan Atasi Diabetes Melitus 2020 [Internet]. Pusat Data dan Informasi Kementrian Kesehatan; 2020. Available from: https://pusdatin.kemkes.go.id/resources/download/pusdatin/infodatin/infodatin-diabetes.pdf

[5]   Elka Fitri D, Krianto T, Mayang Sari S. Perbandingan Diabetes Self Management Education Metode Ceramah Menggunakan Booklet Dengan Metode Group Whatsapp Terhadap Self Care BehaviorPasien Diabetes Mellitus: Perbandingan Diabetes Self Management Education Metode Ceramah Menggunakan Booklet Dengan . J Kesehat Komunitas [Internet]. 2018 Feb 2 [cited 2023 Apr 2];4(3):126–31. Available from: https://jurnal.htp.ac.id/index.php/keskom/article/view/294

[6]   Harmiardillah S. PENGARUH LATIHAN MINDFULNESS-BASED ON EATING DENGAN PENDEKATAN SOCIAL COGNITIVE THEORY (SCT) TERHADAP SELFEFFICACY, KEPATUHAN DIET DAN KADAR GLUKOSA DARAH PADA DIABETES MELITUS TIPE 2 [Internet]. Airlangga University; 2018. Available from: http://repository.unair.ac.id/id/eprint/77153

[7]   Kristinawati B, Rosyid N, Rizkiawan A, Shofiya L, Keperawatan P. Pelatihan Manajemen Perawatan Diri Untuk Meningkatkan Pengetahuan Keluarga Dan Pasien Gagal Jantung. Poltekita J Pengabdi Masy [Internet]. 2023 Jan 30 [cited 2023 Apr 6];4(1):86–93. Available from: https://www.poltekkespalu.ac.id/jurnal/index.php/PJPM/article/view/1380

[8]   Windani C, Sari M, Yamin A, Santoso MB. HUBUNGAN SELF-MANAGEMENT DAN SELF-EFFICACY PADA PASIEN DIABETES MELITUS DI KOTA BANDUNG. J Keperawatan BSI [Internet]. 2018 Jul 9 [cited 2023 Mar 26];6(1). Available from: https://ejournal.bsi.ac.id/ejurnal/index.php/jk/article/view/3694

[9]   Widiastutik GK, Makhfudli M, Wahyuni SD. Hubungan Dukungan Keluarga, Kader Dan Petugas Kesehatan Dengan Kepatuhan Berobat Penderita TB Paru. Indones J Community Heal Nurs [Internet]. 2020 Jul 10;5(1):41. Available from: https://e-journal.unair.ac.id/IJCHN/article/view/18654

[10]   Clara H. Hubungan Pendidikan Dan Pengetahuan Dengan Perilaku Manajemen Diri Diabetes Melitus Tipe 2. Bul Kesehat Publ Ilm Bid Kesehat [Internet]. 2018 Dec 28 [cited 2023 Mar 24];2(2):49–58. Available from: https://akper-pasarrebo.e-journal.id/nurs/article/view/44

[11]   Widyastuti I, Wijayanti AC. Hubungan Pengetahuan Dan Sikap Dengan Kualitas Hidup Penderita Diabetes Melitus Tipe 2 Di Surakarta. J Kesehat Masy Indones [Internet]. 2021 Sep 30;16(3):136. Available from: https://jurnal.unimus.ac.id/index.php/jkmi/article/view/7720

[12]   Putri MR. HUBUNGAN RELIGIUSITAS DENGAN DIABETES DISTRESS PADA KLIEN DIABETES MELITUS TIPE 2 DI WILAYAH KERJA PUSKESMAS PATRANG KABUPATEN JEMBER. 2017 Oct 27 [cited 2023 Mar 26]; Available from: https://repository.unej.ac.id/xmlui/handle/123456789/82722

[13]   Pakaya N. Model Perilaku Pencegahan Luka Kaki Diabetes Di Kota Gorontalo. 2020 [cited 2023 Mar 26]; Available from: https://repository.unair.ac.id/101124

[14]   Kiajamali M, Hosseini M, Estebsari F, Nasiri M, Ashktorab T, Abdi A, et al. Correlation between Social Support, Self-Efficacy and Health-Promoting Behavior in Hemodialysis Patients Hospitalized in Karaj in 2015. Electron Physician. 2017 Jul 25;9(7):4820–7.

[15]   Eller LS, Lev EL, Yuan C, Watkins AV. Describing Self-Care Self-Efficacy: Definition, Measurement, Outcomes, and Implications. Int J Nurs Knowl [Internet]. 2018 Jan 1 [cited 2023 Mar 27];29(1):38–48. Available from: https://pubmed.ncbi.nlm.nih.gov/27245100/

[16]   Mustarim SW, Nur BM, Azzam R, Muhammadiyah Jakarta U. Faktor-Faktor Yang Berhubungan Dengan Self Management Pada Pasien DM Tipe II. J Telenursing [Internet]. 2019 Dec 22 [cited 2023 Mar 27];1(2):364–75. Available from: https://journal.ipm2kpe.or.id/index.php/JOTING/article/view/838

[17]   Schunk DH, DiBenedetto MK. Self-Efficacy and Human Motivation. Adv Motiv Sci. 2021 Jan 1;8:153–79.

[18]   Huda N, Sukartini T, Pratiwi NW. The Impact of Self Efficacy on the Foot Care Behavior of Type 2 Diabetes Mellitus Patients in Indonesia. J Ners [Internet]. 2020 Jan 16;14(2):181–6. Available from: http://localhost/demo3309/index.php/JNERS/article/view/16741

[19]   Anwar Mufidah. Pengembangan Edukasi Berbasis Self Efficacy Dan Self Care Pada Pasien Diabetes Mellitus Tipe 2 Menggunakan Aplikasi Android [Internet]. [Surabaya]: UNIVERSITAS AIRLANGGA).; 2020 [cited 2023 Mar 27]. Available from: https://repository.unair.ac.id/107055/

[20]   Mallows A, Jackson J, Littlewood C, Debenham J. The Association of Working Alliance, Outcome Expectation, Adherence and Self-Efficacy with Clinical Outcomes for Achilles Tendinopathy: A Feasibility Cohort Study (the MAP Study). Musculoskeletal Care [Internet]. 2020 Jun 1 [cited 2023 Mar 27];18(2):169–76. Available from: https://onlinelibrary.wiley.com/doi/full/10.1002/msc.1451

[21]   Reesor L, Vaughan EM, Hernandez DC, Johnston CA. Addressing Outcomes Expectancies in Behavior Change. https://doi.org/101177/1559827617722504 [Internet]. 2017 Aug 11 [cited 2023 Mar 27];11(6):430–2. Available from: https://journals.sagepub.com/doi/10.1177/1559827617722504

[22]   Fathonah Y, Fauziyati A, Malik M, Hanif M. Effects of Family Function on Blood Sugar Control in Patients with Type 2 Diabetes Mellitus. Rev Prim Care Pract Educ (Kajian Prakt dan Pendidik Layanan Prim [Internet]. 2021 Dec 8 [cited 2023 Mar 27];4(3):63–7. Available from: https://jurnal.ugm.ac.id/rpcpe/article/view/69859

[23]   Adimuntja NP. DETERMINAN AKTIVITAS SELF-CARE PADA PASIEN DM TIPE 2 DI RSUD LABUANG BAJI. J Heal Sci Gorontalo J Heal Sci Community [Internet]. 2020 Mar 25 [cited 2023 Mar 27];4(1):8–17. Available from: https://ejurnal.ung.ac.id/index.php/gojhes/article/view/4483

[24]   Egbujie BA, Delobelle PA, Levitt N, Puoane T, Sanders D, van Wyk B. Role of Community Health Workers in Type 2 Diabetes Mellitus Self-Management: A Scoping Review. Nkomazana O, editor. PLoS One [Internet]. 2018 Jun 1;13(6):e0198424. Available from: https://dx.plos.org/10.1371/journal.pone.0198424