D'Nursing and Health Journal **(DNHJ)**
E-ISSN: 2774-3810, P-ISSN: 2774-3802
Vol: 5 No: 2, September 2024
Page: 142-156

Relationship between Health Locus of Control and Eating Behavior in Diabetics in the Work Area of Health Center Sumbersari

Muhammad Iqro' Ayatullah[1*], Cahya Tri Bagus[2], Sri Wahyuni Adriani[3]
[1,2,3)] *Faculty of Health Sciences, University of Muhammadiyah Jember, Jember, Indonesia*
**Corresponding author: muhammadiqroayatullah@gmail.com*

ABSTRACT

Background: Diabetes mellitus is a complex metabolic disorder characterized by hyperglycemia, a physiological abnormal condition characterized by a continuous increase in blood glucose levels. Health locus of control (HLOC) is a human belief about the location of health control and has a central role in health services. Eating behavior is a broad term that includes food choices and motivations, eating habits, eating patterns, and food-related problems such as obesity, eating disorders, and eating disorders.

Method: This study uses a correlational research design with a cross sectional approach, aiming to correlate between health locus of control and eating behavior. The population in this study were diabetics in the working area of the Sumbersari health center with a sample size of 267 respondents. The sampling technique used Simple Random Sampling. The data collection process used multidimensional health locus of control questionnaire and ducth eating behavior questionnaire.

Result: The results of research on health locus of control show that the majority of diabetics have sufficient health locus of control. The results of eating behavior research show that the majority of diabetics have moderate eating behavior. The results of the study using the Spearman rho Rank test ($\alpha = 0.05$) showed a relationship between health locus of control and eating behavior in diabetics in the Sumbersari working area, with a p value = 0.000.

Conclusion: The conclusion of this study is that there is a relationship between health locus of control and eating behavior in diabetics. The recommendation of this study is that it can be used as a reference for nurses in conducting education and interventions for diabetics to pay more attention to health locus of control with eating behavior in diabetics.

Keywords: *Health locus of control; Eating behavior; Diabetics*

Introduction

Diabetes Mellitus (DM) is a disease that continues to increase until now, this disease is very rarely known and is still considered a common problem. DM is a group of metabolic disorders characterized by hyperglycemia (American Diabetes Association, 2014; World Health Organization, 2019). DM is a medical condition characterized by elevated blood sugar levels above normal. DM is currently a global health threat (Menteri Kesehatan Republik Indonesia, 2020).

Data from the International Diabetes Federation (IDF) Indonesia is ranked 5th with the most diabetics in the world, with around 19 million people suffering from diabetes in 2021, and this number is expected to increase to 23 million in 2023 and 28.6 million in 2045 (International Diabetes Federation, 2021).

The estimated number of DM sufferers in East Java is 863 thousand of the population aged 15 years and over. Health services for DM patients at the First Level Health Facilities (FKTP) in 38 districts / cities throughout East Java have reached 842,004 cases (97.5% of the estimated DM patients) (Dinkes Jawa Timur, 2022). The percentage of DM patients who receive health services according to standards in Jember Regency in 2022 is 35 thousand people, out of the total number of DM patients of 38 thousand people, thus the service coverage of DM patients in 2022 is 93.2% (Dinkes Kabupaten Jember, 2023). Based on the results of preliminary studies that have been carried out, there are 1,359 diabetics of all ages. Furthermore, 802 diabetics were obtained from adults in the Sumbersari Health Center working area.

According to WHO (2014), there is evidence to support that a healthy lifestyle, such as maintaining an ideal body weight, staying physically active, and following healthy eating behaviors and avoiding smoking, will more effectively prevent diabetes and delay complications. Effective diabetes management is necessary, including implementing self-care behaviors such as eating behavior control, blood sugar control, foot care, and exercise (Perkeni, 2021).

Eating behavior is complex to study, with people making many decisions about food every day that are influenced by a variety of personal, social, cultural, environmental and economic factors. What individuals eat and how much they eat has a major influence on their health. (Gellman, 2020).

Eating behavior is an important aspect of life as it can affect long-term health outcomes as unhealthy eating habits such as consuming nutrient-deficient foods, skipping meals, and lack of timely eating patterns can lead to various health problems and nutritional deficiencies (Kabir et al., 2018).

Controlling healthy behavior is often defined as health locus of control. In its development, the concept of health locus of control was developed by Rotter in 1966. According to Wallston and Wallston (1982), health locus of control is the degree to which individuals believe their health can be controlled by factors of themselves (internal), from other people and the environment (powerful others) or because of luck or fate (chance). According to Dielman (1987) health locus of control can serve as a health intervention. Indeed, this theory concerns whether or not the control exercised affects a person's emotional, cognitive, behavioral and physical state (Nurjanah & Rahmatika, 2017).

Based on the results of the study, it is explained that the high prevalence of diabetes mellitus cannot be separated from dietary non-compliance of patients with type 2 DM. The prevalence of compliance in carrying out a diet in patients with type 2 diabetes mellitus obtained the results of a total of 40 respondents, 22 of whom were not compliant (Toruan et al., 2018). The results of the study there is a significant relationship between health locus of control with dietary compliance with a moderate level of correlation strength and has a positive relationship direction which means that the higher the health locus of control, the better the dietary compliance in patients with diabetes mellitus (Arsad et al., 2023).

Method

This study uses a correlational research design with a cross sectional approach, by connecting between health locus of control and eating behavior.

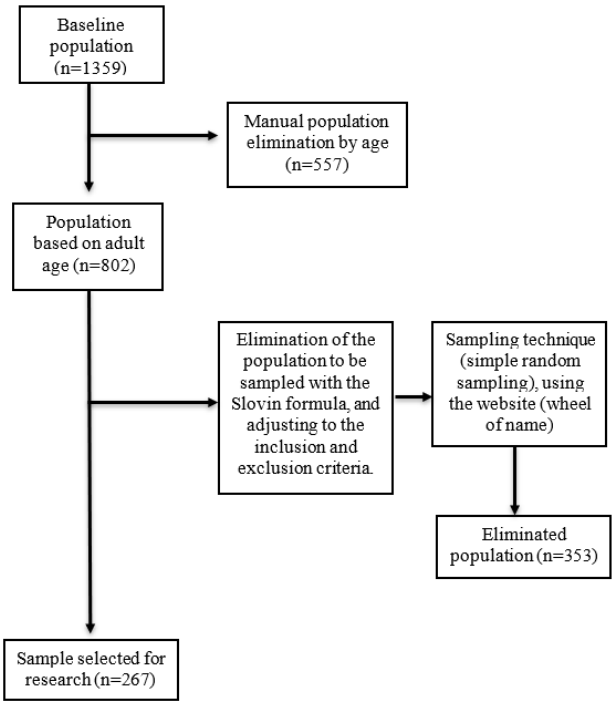

Chart 1. The process of selecting a sample from the population

The place used in this study was the Sumbersari Health Center Working Area, the research was conducted from May 16 to June 16.

The instrument in this study used a questionnaire, namely the first multidimensional health locus of control (MHLC) scales as many as 18 statements to measure the health locus of control of respondents, and the second is the dutch eating behavior questionnaire (DEBQ) as many as 33 questions to measure the eating behavior of respondents. The instrument has been tested for validity and reliability on 40 diabetics in the working area of the Wuluhan health center, with the results of r count of all questionnaire contents greater than r table (0.312) which means that all questionnaire contents are declared valid. Furthermore, the reliability test was also carried out, with the results of the Cronbanch's alpa value on the HLOC variable 0.881 and the eating behavior variable 0.965 which is greater than 0.600. So it can be concluded that the items in each questionnaire question are reliable and can be used. This research has passed the ethical test at Muhammadiyah University of Jember with number (0051/KEPK/FIKES/XII/2024).

Results

General Data

Table 1. Gender distribution of diabetics

Gender	Frequency	Percentage
Male	82	30,7%
Female	185	69,3%
Total	267	100%

The gender distribution of diabetics in the work area of the Sumbersari health center, obtained male respondents with a total of 82 people or 30.7%, while female respondents amounted to 185 people or 69.3%.

Table 2. Distribution of diabetics education

Education	Frequency	Percentage
Elementary School	79	29,6%
Junior High School	89	33,3%
Senior High School	71	26,6%
Associate's degree	14	5,2%
Bacelor degree	14	5,2%
Total	267	100%

The distribution of education obtained data on respondents with no school / elementary school amounted to 79 people or 29.6%, junior high school amounted to 89 people or 33.3%, high school amounted to 71 people or 26.6%, D3 amounted to 14 people or 5.2%, and S1 amounted to 14 people or 5.2%.

Table 3. Occupational distribution of diabetics

Occupational	Frequency	Percentage
Self-employed	139	52,0%
Farmers	41	15,4%
Employed	29	10,9%
Others	58	21,7%
Total	267	100%

The distribution of occupations obtained by diabetics who work as self-employed respondents amounted to 139 people or 52%, farmers amounted to 41 people or 15.6%, employees amounted to 29 people or 10.9%, while the others amounted to 58 people or 21.7% as housewives.

Table 4. Distribution of diagnosis with diabetes

Duration of Diagnosis	Frequency	Percentage
> 1 year	187	70%
< 1 year	80	30%
Total	267	100%

The distribution of length of diagnosis obtained by respondents with a length of diagnosis > 1 year amounted to 187 people or 70%, and those diagnosed < 1 year amounted to 80 people or 30%.

Table 5. Distribution of diabetics' complications

Complications	Frequency	Percentage
Hypertension	132	49,5%
Cataract	0	0
Stroke	0	0
Gangrene	10	3,7%
Others	125	46,8%
Total	267	100%

The distribution of diabetic complications obtained by respondents with hypertension complications amounted to 132 people or 49.5%, gangrene wounds amounted to 10 people or 3.7%, and others amounted to 125 people or 46.8%.

Table 6. Frequency distribution of health locus of control diabetics

Variable	Category	N	Percentage
HLOC	Bad	7	2,6%
	Fair	171	64,0%
	Good	89	33,4%
Total		267	100%

The frequency distribution of health locus of control in the table above obtained diabetics in the working area of the Sumbersari health center who had a poor health locus of control of 7 people or 2.6%, sufficient health locus of control amounted to 171 people or 64.0%, and good health locus of control amounted to 89 people or 33.4%.

Table 7. Frequency distribution of eating behavior of diabetics

Variable	Category	N	Percentage
Eating Behavior	Bad	6	2,2%
	Fair	177	66,3%
	Good	84	31,5%
Total		267	100%

The frequency distribution of eating behavior in the table above obtained diabetics in the work area of the Sumbersari health center who had poor eating behavior of 6 people or 2.2%, sufficient eating behavior amounted to 177 people or 66.3%, and good eating behavior amounted to 84 people or 31.5%.

Table 8. Cross tabulation of health locus of control with eating behavior of diabetics

		Eating Behavior			Total	*p*	r
		Bad	Fair	Good			
HLOC	Bad	6	1	0	7	0,000	0,291
	Fair	0	128	43	171		
	Good	0	48	41	89		
Total		6	177	84	267		

The results of cross tabulation obtained that there are 6 individuals with poor health locus of control, 171 individuals with sufficient health locus of control, and 89 individuals with good health locus of control. In terms of eating behavior, there are 6 individuals with poor eating behavior, 177 individuals with adequate eating behavior, and 84 individuals with good eating behavior. Individuals with poor health locus of control had poor or moderate eating behavior (no one had good eating behavior). Individuals with moderate health locus of control had moderate eating behavior (128 out of 171 individuals), but there were also those with good eating behavior (43 individuals). Individuals with good health locus of control are more likely to be evenly distributed between moderate eating behavior (48 individuals) and good eating behavior (41 individuals). The results of the analysis using Rank Spearman rho between HLOC and eating behavior of diabetics obtained in table 13 value ($p = 0.000$) so that the p value ≤ 0.05 which means that H0 is rejected and H1 is accepted, namely there is a significant relationship between health locus of control and eating behavior of diabetics.

While the value of the correlation coefficient obtained a correlation coefficient of 0.291 which means that the level of correlation strength / relationship is a fairly strong relationship. The correlation coefficient number is positive, which means that if the health locus of control of diabetics is good, the eating behavior of diabetics is also good.

Discussion

1. Health Locus of Control in Diabetics

The results showed that the majority of diabetics in the working area of the Sumbersari health center had sufficient health locus of control, meaning that most diabetics have a health locus of control that is not bad and not good either, this shows the balance of diabetics regarding the view of control over their health. In line with research conducted Arsad *et al.*, (2023) showed that the majority of respondents, 39 people (59%), had moderate health locus of control, these respondents tended to consult health workers whenever their condition worsened, and believed that deterioration in health was a matter of fate and luck.

Most of the dominant respondents answered the statement "whenever I feel unwell, I should consult a health worker". In line with research conducted by Abo-Eata *et al.*, (2022) showed that 76% of older adults believed that influential people, such as health workers, had a major influence on their health outcomes. Theory according to Kilic & Arslan (2021) stated that the multidimensional health locus of control scale shows that patients tend to trust the locus of control of influential people more, which indicates dependence on external forces in managing their illness. This means that diabetics believe that health workers have control over their health, they believe that if there are problems in their health, health workers can solve these problems.

The results showed that some respondents also believed that they were in control of their health. In line with research conducted by Asri *et al.*, (2020) suggests that individuals believe their health outcomes are primarily determined by their own actions and behaviors, in the context of diabetes mellitus management, having strong internal health locus of control beliefs is associated with better self-care behaviors.

Health locus of control refers to individuals' beliefs about the extent to which they can control their health outcomes. In the context of diabetes mellitus, individuals with a strong internal health locus of control believe that they have control to manage their diabetes through behaviors such as eating behaviors, exercise, and medication adherence. On the other hand, individuals with external

health locus of control may attribute their health outcomes to external factors such as chance or the influence of others.

2. Eating Behavior in Diabetics

The results showed that the majority of diabetics in the Sumbersari health center working area had adequate eating behavior, meaning that diabetics had eating behavior that was not bad and not good either, diabetics already had an understanding and application of eating behavior that was almost good, but there were still several things that needed to be improved to achieve more optimal diabetes management. In line with research conducted LaCaille *et al.,* (2020) suggests eating behaviors play an important role in the development and management of health conditions such as diabetes mellitus.

The results showed that the majority of respondents with female gender, this is related to eating behavior that tends to restrain themselves (restarting eating). In line with research conducted by Gal *et al.,* (2024) showed that women scored significantly higher than men in terms of emotions and eating restraint in this study. This indicates a gender difference in eating behavior among individuals with type 2 diabetes mellitus.

Diabetics with type 1 diabetes mellitus have a higher prevalence of eating disorders, such as overeating and meal skipping, compared to those without diabetes. Meal skipping and deliberate insulin omission are associated with eating disorders and elevated HbA1c levels in individuals with type 1 diabetes mellitus. In addition, the results of a cohort study conduc higher prevalence of disordered eati to the total population (Wagner & Karwautz, 2020).

The results showed that the majority of respondents had been diagnosed with diabetes for > 1 year with adequate and good eating behavior. This is in line with research conducted Rosyida *et al.,* (2019) The study showed that most of the respondents, who have been living with diabetes mellitus for an average of almost 6 years, manage their daily diet. Of these, 72.5% of respondents manage their diet by limiting consumption of sugary foods or drinks (32.39%), reducing carbohydrate

intake (25.35%), and reducing meal portions (16.90%). This shows that the longer the diabetics are diagnosed with diabetes mellitus, the better their eating behavior.

Emotional eating, stress eating, or using food as a coping mechanism can affect blood sugar levels and overall health in people with diabetes (Fan et al., 2024). This shows that eating behavior can affect blood sugar levels in diabetics.

3. The relationship between health locus of control and eating behavior in diabetics

The results showed that the majority of diabetics in the Sumbersari health center working area had sufficient health locus of control and eating behavior as well, which means that if the health locus of control increases, eating behavior will also increase. This study identified a fairly strong relationship between health locus of control and eating behavior in diabetics. In line with research conducted by Are *et al.*, (2020) which shows that health locus of control can influence eating behavior.

The results showed that some diabetics have good health locus of control and good eating behavior, meaning that there are diabetics who also have the confidence to control their health properly through good eating behavior. In line with research conducted by Arsad *et al.*, (2023) it was found that there was a relationship between health locus of control and adherence to eating recommendations which showed that respondents with higher levels of health locus of control showed better adherence to the prescribed diet. Health locus of control is very influential on eating behavior in diabetics.

Health locus of control is a psychological concept related to an individual's perception of control over their health. Individuals with an internal health locus of control tend to exhibit health-related behaviors and enjoy a better quality of health, while those with an external health locus of control tend not to exhibit health-related behaviors (Ramadani et al., 2023). Individuals with good internal health locus of control believe that their health is primarily determined by their own actions and behaviors. Research has indicated that good scores on the internal health locus of control subscale are associated with better medication adherence (Duplaga & Grysztar, 2021).

The results showed that individuals with diabetes tend to have an external health locus of control and are advised to increase their internal health locus of

control to improve independence, especially through nurse-led interventions (Kiliç & Arslan, 2018). Health locus of control plays an important role in the management of diabetes mellitus, as it influences behavior, self-management, and metabolic control in people with type 1 diabetes (Franceschi et al., 2022).

A healthy diet plays an important role in managing type 2 diabetes mellitus as it can significantly improve glycemic control and even reverse the disease. Diabetics have highlighted that following a healthier diet is one of the most complex aspects of self-management. Turning points for healthier eating behaviors are triggered by experiences that change participants' perspectives on life and health, such as dealing with illness, parenthood, psychosocial therapy, and marriage. These turning points make individuals reflect on the long-term implications of their current eating habits on their health and life goals (Polhuis et al., 2020).

The results showed that some diabetics also had poor health locus of control and poor eating behavior, meaning that diabetics did not believe that they could recover as evidenced by poor eating behavior. However, there are also those who have poor health locus of control and have adequate eating behavior, which means that diabetics do not believe that they can recover, but their eating behavior is slightly maintained. This is in line with the theory according to Kesavayuth *et al.*, (2020) mentioned that poor health locus of control can also stem from a lack of belief in the relationship between one's behavior and health outcomes, leading to a sense of helplessness in maintaining health. In the Health Belief Model (HBM) theory according to Pakpahan *et al.*, (2021) which explains the scope and application of the Health Belief Model (HBM) covering a wide range of health behaviors, including disease prevention measures, behaviors related to disease diagnosis, and behaviors that can affect disease severity. This shows that the theory explains how diabetics who have various beliefs in the prevention of their disease including in eating control.

Conclusion

Based on the results of research on the relationship between health locus of control and eating behavior in diabetics in the work area of the Sumbersari health center. The researcher's conclusions are as follows:

1. The majority of diabetics show sufficient health locus of control, meaning that they are not completely dependent on external factors nor rely entirely on themselves. They tend to consult health workers when their condition worsens and believe that control over their health is influenced by fate and luck.
2. Diabetics in the Sumbersari Health Center working area have adequate eating behavior. They already have an understanding of the importance of healthy eating behavior in managing diabetes, but there is still room for improvement. This finding is consistent with previous studies showing that eating behavior plays an important role in the development and management of health conditions such as diabetes mellitus. Factors such as gender, length of diagnosis, and emotions influence the eating behavior of respondents.
3. There is a strong relationship between health locus of control and eating behavior in diabetics. The better health locus of control diabetics have, the better their eating behavior. Diabetics with good health locus of control showed better adherence to dietary recommendations, while those with poor health locus of control tended to have poor eating behaviors. Previous research supports these findings, showing that good health locus of control positively influences dietary adherence and self-care behaviors, while poor health locus of control positively influences dietary adherence and self-care behaviors.

References

Abo-Eata, S. G. A., El-shafie, E. F., AL-Zeftawy, A. M. A., & El-Gamal, S. M. A. (2022). Relation between Health Locus of Control and Foot Self-Care for Elderly with Type II Diabetes Mellitus. *Tanta Scientific Nursing Journal*, *24*(1), 78–117.

American Diabetes Association. (2014). *American Diabetes Association: Complete Guide to Diabetes* (G. Guthrie (ed.); 5th ed.). Library of Congress Cataloging. https://doi.org/10.2337/9781580403306

Are, M., Santos, E., Oliveira, B. M. P. M., Correia, F., & Poínhos, R. (2020). Eating behaviour, health locus of control and stages of change towards healthy eating among Portuguese undergraduate students. *Proceedings of the Nutrition Society*, *79*(OCE2), 2020. https://doi.org/10.1017/s0029665120005637

Arsad, S. F. M., Dungga, E. F., & Kidamu, S. C. (2023). Hubungan Health Locus of Control Dengan Kepatuhan Menjalani Diet Pada Pasien Diabetes Mellitus. *Jambura Nurshing Jurnal*, *5*(1), 1–19.

Asri, S. A. D., Widayati, N., & Aini, L. (2020). Health Locus of Control and Self Care Behavior in Patients with Type 2 Diabetes Mellitus. *Asian Community Health Nursing Research*, *2*(2), 22–38. https://doi.org/10.29253/achnr.2020.22249

Dinkes Jawa Timur. (2022). *Profil Kesehatan Provinsi Jawa Timur Tahun 2022*.

Dinkes Kabupaten Jember. (2023). *Profil Kesehatan Tahun 2022*.

Duplaga, M., & Grysztar, M. (2021). Nutritional behaviors, health literacy, and health locus of control of secondary schoolers in southern poland: A cross-sectional study. *Nutrients*, *13*(12), 1–19. https://doi.org/10.3390/nu13124323

Fan, J., Nagata, J. M., Cuccolo, K., & Ganson, K. T. (2024). Associations between dieting practices and eating disorder attitudes and behaviors: Results from the Canadian study of adolescent health behaviors. *Eating Behaviors*, *54*(101886). https://doi.org/10.1016/j.eatbeh.2024.101886

Franceschi, R., Canale, M., Piras, E. M., Galvagni, L., Vivori, C., Cauvin, V., Soffiati, M., & Maines, E. (2022). Influence of Parental Health Locus of Control on Behavior, Self-Management and Metabolic Control, in Pediatric Patients with Type 1 Diabetes. *Journal of Personalized Medicine*, *12*(10). https://doi.org/10.3390/jpm12101590

Gal, A. M., Iatcu, C. O., Popa, A. D., Arhire, L. I., Mihalache, L., Gherasim, A., Nita, O., Soimaru, R. M., Gheorghita, R., Graur, M., & Covasa, M. (2024). Understanding the Interplay of Dietary Intake and Eating Behavior in Type 2 Diabetes. *Nutrients*, *16*(6), 1–15. https://doi.org/10.3390/nu16060771

Gellman, M. D. (2020). Encyclopedia of Behavioral Medicine. In M. D. Gellman (Ed.), *Springer Nature Switzerland AG 2020* (2nd ed.). Springer Cham. https://doi.org/10.1007/978-3-030-39903-0_668

International Diabetes Federation. (2021). IDF Diabetes Atlas. In 10 (Ed.), *Diabetes Research and Clinical Practice* (Vol. 102, Issue 2).

Kabir, A., Miah, S., & Islam, A. (2018). Factors influencing eating behavior and dietary intake among resident students in a public university in Bangladesh: A qualitative study. *PLoS ONE*, *13*(6), 1–17. https://doi.org/10.1371/journal.pone.0198801

Kesavayuth, D., Poyago-Theotoky, J., Tran, D. B., & Zikos, V. (2020). Locus of control, health and healthcare utilization. *Economic Modelling*, *86*, 227–238. https://doi.org/10.1016/j.econmod.2019.06.014

Kilic, M., & Arslan, S. (2021). Self-efficacy and its association with locus of control in diabetes in Turkey. *Clinical and Experimental Health Sciences*, *11*(3), 399–404. https://doi.org/10.33808/clinexphealthsci.699958

KILIÇ, M., & ARSLAN, S. (2018). Evaluation of Health Locus of Control of Individuals with Type 2 Diabetes. *Turkish Journal of Family Medicine and Primary Care*, *12*(2), 126–135. https://doi.org/10.21763/tjfmpc.432547

LaCaille, R. A., Hooker, S. A., & LaCaille, L. J. (2020). Using self-determination theory to understand eating behaviors and weight change in emerging adults. *Eating Behaviors*, *39*, 101433. https://doi.org/10.1016/j.eatbeh.2020.101433

Menteri Kesehatan Republik Indonesia. (2020). *Keputusan Menteri Kesehatan Republik Indonesia Nomor Hk.01.07/Menkes/603/2020 Tentang Pedoman Nasional Pelayanan Kedokteran Tata Laksana Diabetes Melitus Tipe 2 Dewasa*.

Nurjanah, N., & Rahmatika, R. (2017). Hubungan antara health locus of control dan self – efficacy pada mahasiswa keperawatan. *SCHEMA (Journal of Psychological Research)*, *3*(2), 116 – 127.

Pakpahan, M., Siregar, D., Susilawaty, A., Mustar, T., Ramdany, R., Sianturi, E. I. M. E., Sitanggang, M. R. G. T. Y. F., & M, M. (2021). Promosi Kesehatan & Prilaku Kesehatan. In R. Watrianthos (Ed.), *Yayasan Kita Menulis*.

Perkeni. (2021). *Pedoman Pengelolaan Dan Pencegahan Diabetes Melitus Tipe 2 Dewasa Di Indonesia*. PB. Perkeni.

Polhuis, C. M. M., Vaandrager, L., Soedamah-Muthu, S. S., & Koelen, M. A. (2020). Salutogenic model of health to identify turning points and coping styles for eating practices in type 2 diabetes mellitus. *International Journal for Equity in Health*, *19*(1), 1–20. https://doi.org/10.1186/s12939-020-01194-4

Ramadani, P. S., Rifani, R., & Firdaus, F. (2023). Pengaruh Health Locus of Control terhadap Perilaku Makan pada Remaja Putri di Kota Makassar. *Arus Jurnal Psikologi Dan Pendidikan (AJPP)*, *2*(2), 204–211.

Rosyida, R. W., Purnamayanti, N. kadek D., & Rining, M. K. L. (2019). The Eating Habbits of Type 2 Diabetes Mellitus in Primary Healthcare Center. *Indonesian Journal of Nutrition and Dietetics*, *7*(3), 87.

Toruan, D. P. ., Karim, D., & Woferst, R. (2018). Hubungan motivasi diri dengan kepatuhan diet pada penderita diabetes melitus tipe 2. *Universal Journal of Educational Research*, *5*(3–2), 137–145.

Wagner, G., & Karwautz, A. (2020). Eating disorders in adolescents with type 1 diabetes mellitus. *Current Opinion in Psychiatry*, *33*(6), 602–610. https://doi.org/10.1097/YCO.0000000000000650

World Health Organization. (2019). Classification of diabetes mellitus. In *Clinics in Laboratory Medicine* (Vol. 21, Issue 1). https://doi.org/10.5005/jp/books/12855_84