JNK

JURNAL NERS DAN KEBIDANAN

http://ojs.phb.ac.id/index.php/jnk

Knowledge, Attitude, and Practice Among Nurses Regarding Nutrition Management of Diabetes Mellitus Patients

Imam Tri Sutrisno[1], [CA]Rafika Rosyda[1], Nandar Wirawan[2], Sandi Alfa Wiga Arsa[3]

[1]Universitas Pendidikan Indonesia

[2]Universitas Bale Bandung, Indonesia

[3]STIKes Patria Husada Blitar, Indonesia

[CA]Corresponding Author

Article Information

History Article:
Received, 19/10/2024
Accepted, 24/12/2024
Published, 24/12/2024

Keyword:
Knowledge, Attitude, Practice, Nurses, Nutritional Management, Diabetes Mellitus

Abstract

Diabetes mellitus is a chronic metabolic disorder that contributes significantly to the global health burden, with a rising prevalence globally. It is important to understand nurses' knowledge, attitudes, and practices (KAP) because knowledge provides essential insights into how diet affects blood glucose levels, a positive attitude encourages support for patient adherence, and efficient practices ensure the consistent application of dietary management strategies. This study aimed to assess the KAP among nurses about the nutritional management of diabetes. This descriptive study involved 100 nurses working in medical and surgical wards of a hospital, with 99 respondents included in the analysis following the dropping out of one respondent. The data was collected by using a structured questionnaire designed to evaluate the KAP of nurses concerning diabetes nutritional management. The study found disparities in the levels of knowledge among nurses: 14.1% demonstrated high knowledge, 49.5% demonstrated intermediate knowledge, and 36.4% demonstrated poor knowledge. Despite these variations, none demonstrated a bad attitude, with 11.1% demonstrating an intermediate attitude and the majority of nurses (88.9%) exhibiting high attitudes towards diabetes nutritional management. Additionally, 0% engaged in bad practices, 4% demonstrated intermediate practices, and nearly all respondents (96%) reported engaging in good practices. These results underscore the need for targeted educational interventions to bridge knowledge gaps. Enhancing nurses' knowledge in diabetes nutritional management is essential to improve the quality of care and health outcomes for patients with diabetes.

✉Correspondence Address:
STIKes Patria Husada Blitar – East Java, Indonesia
Email: rafika.rosyda@upi.edu

P-ISSN : 2355-052X
E-ISSN : 2548-3811
DOI: https://doi.org/10.26699/jnk.v11i3.ART.p276-284

INTRODUCTION

Knowledge, attitudes, and practices of nurses about diabetes nutrition management are important to improve the quality of patient care. In treating and managing diabetes, nurses are essential front-line healthcare professionals. Nurses are frequently involved in patient education, medication delivery, monitoring, and offering support to patients and their families (Alshammari et al., 2021). To evaluate patients' knowledge, attitudes, and practices related to diabetes mellitus nutrition management, nurses are in a good position due to their frequent interactions with patients.

For several reasons, it is essential to understand nurses' knowledge, attitudes, and practices regarding diabetic nutrition management. First, to pinpoint any knowledge gaps regarding diabetic nutrition treatment, which in turn enables focused educational intervention to raise the level of competency in this domain. Furthermore, the attitudes that nurses have toward nutrition management have the potential to greatly impact patients' compliance with dietary guidelines. This emphasizes the need for cultivating good attitudes and employing efficient communication techniques. Lastly, assessing nurses' practice provides insight into the extent to which evidence-based guidelines for diabetes nutrition management are implemented in the clinical setting, thereby informing quality improvement initiatives (Farzaei et al., 2023).

Diabetes mellitus itself is a chronic metabolic disorder marked by high blood glucose levels resulting from either inadequate or inefficient insulin synthesis or use by the body. This condition is a global public health concern, and its prevalence is rising globally (Galicia-Garcia et al., 2020). The World Health Organization (WHO) estimates that 422 million people worldwide had diabetes in 2014; if these trends continue, the number is projected to continue increasing to 642 million by 2040. According to data from 2021, 19.4 million (10%) Indonesians suffer from diabetes. Several factors contribute to this trend, such as aging, bad eating habits, sedentary lifestyle, and obesity (Sun et al., 2022).

There are multiple aspects involved in managing diabetes, including education, lifestyle changes, medication intervention, and regular blood glucose monitoring. Among these interventions, dietary management is essential for reaching and maintaining adequate glycemic control as well as preventing complications. Dietary management aims to regulate blood glucose levels through the consumption of a balanced diet that controls carbohydrate intake, promotes weight management, and improves overall metabolic health (Evert et al., 2019). However, gaps may exist in nurses' knowledge, attitudes, and practices regarding nutritional management for diabetic patients, which could impact the quality of patient care and their adherence to dietary recommendations. Identifying and addressing these gaps is essential for improving nursing competency in diabetes care.

METHODS

One hundred nurses from a hospital participated in this descriptive research. The nurses who complied with the criteria: being on permanent duty for at least one month and were chosen by a sample quota from the medical and surgical inpatient wards. None of the nurses involved in this study had a diabetes educator certificate. Data collection was carried out using a paper-based questionnaire. Demographic information on sex, age, length of experience, and education level was gathered in the first section of the questionnaire. The Nutritional Management of Diabetes Knowledge Test (NMDKT), which has been adapted and adjusted to comply with PERKENI's diabetes management recommendations, was used to assess knowledge. There were twenty questions in this survey. One point was given for correct responses and zero for incorrect ones.

A questionnaire created by researchers was based on dietary guidelines from the American Diabetes Association (ADA) and the WHO, as well as a study of pertinent literature, was utilized for attitude assessment. It consists of ten questions on a five-point Likert scale; answers range from strongly disagree (1) to strongly agree (5). The overall score may vary from 10 to 50. Following that, the score is transformed from 0 to 100 and divided into three

groups: high attitude (66.6–100), intermediate (33.3–66.6), and bad attitude (0–33.3). A questionnaire that the researchers also created was used for the practice assessment. With responses ranging from never (1) to always (4) on a four-point Likert scale, it has fifteen questions. The range of the overall practice score is 15 to 60. Following conversion to a score between 0 and 100, the practice of diabetes nutrition management is divided into three groups: good practice (66.6–100), intermediate practice (33.3–66.6), and bad practice (0–33.3). Validity testing was conducted by the researchers, with the results of all questions being valid; the r of each question was greater than 0.196. The reliability test of the questionnaire was conducted and obtained a reliability coefficient value of 0.65 for the NMDKT, 0.83 for the attitude questionnaire, and 0.9 for the practice questionnaire.

The KEPK of Universitas Jendral Achmad Yani granted ethical approval for this study (No: 016 / KEPK / FITKes-Unjani / VI / 2024). Before taking part in the study, all potential responders were briefed about it and what was expected of them. They also all provided their consent. The hospital's director gave approval for research to be conducted. Participants in this anonymous survey were guaranteed that neither the hospital nor any individual participant could be identified from the data. To identify and characterize every variable that was found, statistical programs were used in univariate analysis.

RESULTS

Table 1. Respondent Characteristics

Variables	Frequency	Percentage
Sex		
Male	26	26,3%
Female	73	73,7%
Level of Education		
Diploma	68	68,7 %
Bachelor	31	31,3 %
Working Experience		
<2 years	22	22,2%
3 – 5 years	19	19,2%
5 – 10 years	16	16,2%
>10 years	42	42,4%
Age Group (years)		
<26	15	15,2%
26 – 30	23	23,2%
31 – 40	33	33,3%
>40	28	28,3%
Total	**99**	**100%**

Source: *Primary Data*

One respondent withdrew from the survey, resulting in data analysis from 99 out of the 100 respondents who signed informed consent. Most of the respondents were female (73.7%), and regarding education levels, most of the respondents had a diploma (68.7%), while 31.3% had a bachelor's degree. Variation is also seen in the length of work experience. 22.2% of respondents had only worked for two years or less, 19.2% for two to five years, 16.2% for five to ten years, and 42.4% had more than ten years of work experience. Regarding age, 15.2% of respondents were younger than 26 years old, 23.2% were between 26 and 30 years old, 33.3% were between 30 and 40 years old, and 28.3% were older than 40 (Table 1).

Table 2. Nurses' Knowledge, Attitudes, and Practices on Nutritional Management of DM Patients

Variables	Frequency	Percentage
Knowledge		
High	14	14,1%
Intermediate	49	49,5%
Poor	36	36,4%
Attitude		
High	88	88,9%
Intermediate	11	11,1%
Bad	0	0%
Practice		
Good	95	96%
Intermediate	4	4%
Bad	0	0%
Total	**99**	**100%**

Source: *Primary Data*

Twenty questions were used to evaluate the knowledge. The findings revealed differences in nurses' knowledge. Overall, over half (49.5%) of the respondents showed intermediate knowledge, 14.1% had high knowledge, and 36.4% had poor knowledge. Almost all respondents (88.9%) had a high attitude, while 11.1% were intermediate, and there were no respondents with a bad attitude. In terms of practice, almost all respondents (96%) implemented good practices, and only 4% were intermediate, and there were no respondents with bad practices (Table 2).

Table 3. Nurses' Knowledge on Nutritional Management of Diabetic Patients

Question Items	Right Answer (%)
1. Diabetic patients should not have any food restrictions in their diet.	80,8
2. The diabetic diet is calculated based on the amount of carbohydrates, protein, and fat.	88,9
3. Trans fats increase HDL (high-density lipoprotein) cholesterol levels.	25,3
4. Determine the amount of carbohydrates per serving by looking at the total carbohydrates on the food label.	78,8
5. The total amount of carbohydrates is more important than the type of carbohydrates.	57,6
6. Diabetes is indicated by FBG (fasting blood glucose) of 200 mg/dl or lower.	22,2
7. Symptomatic hypoglycemia can be treated using 12-16 mg (3-4 tsp) of sugar.	65,7
8. Non-fat or low-fat milk contains less fat and is lower in calories than whole milk.	66,7
9. 45–65% of a diabetic's daily calorie intake should come from carbohydrates.	55,6
10. People with diabetes should consume fruit juice rather than unprocessed fruit.	58,6
11. Only carbohydrates should be restricted for diabetic patients.	64,6
12. Animal fats do not have to be restricted for diabetes patients.	38,4
13. Exercise plays an important role in the prevention and management of diabetes.	87,9
14. Obese patients with diabetes are more susceptible to diabetes complications than diabetic patients with normal body weight.	87.9
15. The initial symptoms of diabetes patients are easily thirst and hunger.	92,9

16.	Diabetes is associated with hypertension	66,7
17.	People with diabetes must eat a balanced diet	86,9
18.	10–15% of a diabetic's daily calorie intake should come from protein.	78,8
19.	Cholesterol should be limited to 300 mg daily for diabetic patients.	6,1
20.	Recommended sodium intake for diabetes patients is the same as for healthy people.	33,3

Source: *Primary Data*

Nurses' knowledge was high on questions related to early symptoms, prevention, restricted food, food components, and obesity that increase complications, with more than 80% correct answers. However, there was a lack of understanding, especially regarding cholesterol intake limits, which were only answered correctly by 6.1% of respondents. Other questions, such as those related to normal fasting blood glucose (FBG), fat consumption limits, and sodium consumption limits, also received less than 50% correct answers (Table 3).

Table 4. Nurses' Attitude on Nutritional Management of Diabetic Patients

Question Items	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. I recommend all diabetes patients to regulate their diet to control their blood glucose.	5,1	1	1	34,3	58,6
2. Initial nutritional assessment is not necessary for all hospitalized diabetic patients.	18,2	7	2	36,4	36,4
3. Initial nutritional assessment in diabetic patients is one of the nurse's responsibilities.	6,1	15	11	34,3	33,3
4. BMI of diabetic patients should be calculated and interpreted upon admission to the ward.	5,1	3	16	53,5	22,2
5. Nutritional management of diabetic patients treated in hospital is entirely the responsibility of the hospital nutritionist.	14,1	51	12	16,2	71
6. Nurses must pay attention to nutritional management and support systems for diabetes patients.	2	2	6	56,6	33,3
7. Nurses play an important role in increasing patient understanding of diabetes diets.	0	1	13	54,5	31,3
8. Nurses do not need to inform nutritionists about the diabetic diet required by the patient.	1	3	5	36,4	54,5
9. Providing health education to patients and families about the importance of a diabetic diet is one of the nurses' responsibilities.	3	7	11	52,5	26,3
10. Nurses must evaluate the effectiveness of nutritional interventions in diabetic patients.	4	7	9	50,5	29,3

Source: *Primary Data*

About 34.3% of nurses agree and 33.3% strongly agree that one of the roles of nurses is to do an initial nutritional evaluation, and the majority of nurses (34.3% agree and 58.6% strongly agree) stated that nutrition management is crucial to controlling blood glucose levels in diabetic patients. Despite this, 16.2% and 71% of nurses believed that dietitians should be in charge of nutritional

management in hospitals, highlighting the different responsibilities that nurses and dietitians play in patient care. As part of their support for the patient's care system, nurses also showed a high level of understanding of the significance of determining the patient's Body Mass Index (BMI) and paying attention to nutritional management. Additionally, 52.5% of nurses agree and 26.3% strongly agree that they have to inform patients and families about the significance of a diabetic diet. This indicates that nurses have a significant role in this regard. Up to 79.8% of nurses concurred that it is their responsibility to assess the success of dietary therapies used on patients (Table 4).

Table 5. Nurses' Practice on Nutritional Management of Diabetic Patients

Question Items	Never (%)	Sometimes (%)	Often (%)	Always (%)
1. I did not assess the nutritional needs of diabetic patients using the initial assessment sheet.	3	19,2	14,1	63,6
2. I calculate and interpret the body mass index (BMI) of diabetic patients.	21,2	40,4	24,2	14,1
3. During the initial patient assessment, I ask family members about the patient's recent weight loss or gain.	0	7,1	20,2	71,7
4. I formulate a nursing diagnosis related to the nutrition of diabetic patients and record it in the nurse's report sheet for follow-up.	2	6,1	27,3	63,6
5. I prepare and adjust nursing care plans for each diabetic patient based on primary and secondary information.	0	6,1	31,3	61,6
6. In the ward, I monitor the types and amounts of food needed by diabetic patients, according to the diet determined by the nutrition consultant, and if the patient wants to change the type or amount of food, I coordinate with the nutritionist.	1	13,1	35,4	49,5
7. Based on the results of the initial patient assessment, I will inform the doctor in charge that the patient is suffering from diabetes so that he can ask for nutritional advice that the patient needs.	0	12,1	22,2	64,6
8. I did not follow up on information to the nutritionist about the patient's nutritional status and conduct nutritional counseling.	5,1	7,1	14,1	72,7
9. During nursing rounds/doctor visits, I discuss the nutritional status of my diabetic patients.	2	29,3	30,3	37,4
10. To strengthen the understanding of diabetes patients and their families, I do not teach them about the diabetes diet.	6,1	13,1	7,1	72,7
11. I evaluate the effectiveness of nutrition education provided to diabetes patients in various ways, including repetition methods, oral tests, and so on.	0	28,3	29,3	42,4
12. After injecting insulin/oral antidiabetic drugs, I visit the patient to ensure that the patient has consumed food.	1	13,1	38,4	47,5
13. When the patient goes home, I give verbal instructions to the patient/family regarding diabetes nutrition and diet.	1	7,1	36,4	55,6
14. When the patient goes home, I provide written information to the patient/family regarding diabetes nutrition and diet.	0	19,2	34,3	46,5
15. I did not document the discharge planning provided for the diabetic diet on the patient education form.	8,1	11,1	4	75,8

Source: *Primary Data*

The results of the study related to nurses' practices in diabetes nutritional management showed that the majority of nurses were actively involved in various aspects of nutritional management. Approximately 63.6% of nurses consistently determined the patient's dietary needs using the initial assessment sheet, and 71.7% of nurses consistently inquired about changes in the patient's weight during the examination with the patient's family. The majority of nurses (61.6%) created and modified nursing care plans using data from both primary and secondary sources. Although 64.6% of nurses always let the doctor know about the patient's nutritional state so that a nutritionist might provide further advice. 37.4% of nurses always discuss nutritional status with patients during nursing rounds, and 72.7% also always teach patients and their families about the importance of a diabetic diet. Furthermore, 42.4% of nurses consistently assessed the efficacy of the nutrition instruction they gave through several kinds of approaches. After the patient is discharged, 55.6% of nurses always provide verbal instructions to the patient and their family about the diabetes diet. (Table 5).

DISCUSSION

Nurses are the first-line health workers who provide direct care to patients. Therefore, for nurses to comprehend the clinical condition and make ideal decisions, they must be knowledgeable. The study's conclusions show differences in knowledge levels. It should be emphasized that fewer than 50% of respondents properly answered the questions about nurses' awareness of fat consumption (questions number 3, 12, and 19). Because trans fats are mistaken for unsaturated fats, they are frequently misinterpreted as healthy while they raise LDL cholesterol and decrease HDL cholesterol.

Similarly, cultural dietary standards, the preponderance of carbohydrate control in diabetes care, or a misreading of fat intake guidelines might all contribute to the idea that animal fats don't need to be restricted. Some nurses might not understand the significance of controlling cholesterol because of ambiguous or changing guidelines and a focus on other dietary components. This result aligns with a previous study that showed that although nurses are typically aware of the fundamentals of managing diabetes, their comprehension of nutritional recommendations for specific food components, such as cholesterol and fat consumption, is still deficient (Farzaei et al., 2023). This knowledge gap may have a significant influence on patient care, considering improper fat and cholesterol consumption are risk factors for cardiovascular problems in individuals with diabetes (Dizdarevic-Bostandzic et al., 2018; Khil et al., 2023). PERKENI recommends that diabetic patients need to include 20-25% fat in their diet, restrict their intake of saturated and trans fats, and consume no more than 200 mg of cholesterol per day (Perkumulan Endokrinologi Indonesia, 2021).

Being knowledgeable about FBG levels is crucial for managing diabetes, considering they are used as an indicator for glycaemic control (Bin Rakhis et al., 2022). The diagnostic standard for diabetes is FBG ≥126 mg/dL (Perkumulan Endokrinologi Indonesia, 2021), while the recommended range for FBG in non-pregnant women with diabetes is 80–130 mg/dL (American Diabetes Association, 2004). However, the results of this study may show that nurses are unable to correctly recognize the FBG range. While question no. 6 ‘Diabetes is indicated by FBG (fasting blood glucose) of 200 mg/dl or lower—could have some confusing language, but if the nurses had prior knowledge of the standard diagnostic criteria, this shouldn't have influenced their answers. This indicates a gap that needs to be considered. Understanding blood glucose levels is essential because keeping blood glucose levels within the recommended range helps to minimize complications, both acute complications and chronic complications. Nurses may give inaccurate information while educating patients about blood glucose monitoring and dietary control if they have poor knowledge about this issue.

Questions about sodium consumption also got less than 50% correct answers. It's possible that nurses misunderstood the dietary guidelines for certain comorbidities or assumed that diabetes alone

changed salt requirements or their assumption that diabetic patients always develop hypertension, which led them to provide an inaccurate response. Since diabetics are more likely to develop hypertension and cardiovascular disease, sodium consumption is another crucial factor in diabetes management (Petrie et al., 2018). PERKENI advises diabetics to consume fewer than 1,500 mg of sodium daily, the same amount as healthy individuals, with the exception of those with hypertension who require special adjustments (Perkumulan Endokrinologi Indonesia, 2021). The findings of this study suggest that certain nurses may be unable to offer patients thorough nutritional instruction due to their lack of understanding of sodium consumption restrictions.

Nursing professionals' attitudes toward diabetes are particularly crucial since they are the healthcare professionals who spend the most time interacting with patients. This study found that nurses had positive attitudes and good practices, despite the knowledge gap. This result is consistent with other research on nurses' use of evidence-based practice, which found knowledge gaps but also good attitudes among the nurses (Al-Busaidi et al., 2019). The way nurses interact with patients is strongly impacted by their attitudes. Good attitudes may foster an atmosphere that encourages patients to follow dietary guidelines, which is crucial for the management of chronic conditions like diabetes.

Nearly all respondents (96%) exhibited good practice. This reveals that nurses may effectively provide nursing care while adhering to regulations and protocols. This is a positive finding since it shows that nurses are still capable of using proper procedures, despite ongoing knowledge gaps. These solid practices, however, don't necessarily demonstrate an adequate understanding of the motivations underlying the decisions made. Critical thinking abilities are the foundation of good attitudes and practice, meaning that they are more than simply habits. Furthermore, critical thinking-based methods might enhance overall patient outcomes (Van Nguyen & Liu, 2021).

CONCLUSION

These findings indicate that while nurses' attitudes and practices towards diabetes nutritional management are positive, there is a need to enhance nurses' knowledge in this area.

SUGGESTION

Ongoing training programs, developing educational modules that focus on important aspects of diabetes nutrition management, and conducting periodic evaluations to ensure that nurses' knowledge remains up-to-date.

ACKNOWLEDGEMENT

We extend our gratitude to the leader of Universitas Pendidikan Indonesia for providing support towards making this research succeed.

FUNDING

This Research was funded by LPPM Universitas Pendidikan Indonesia.

CONFLICTS OF INTEREST

There is no conflict of interest that could cause research bias.

AUTHOR CONTRIBUTIONS

All researchers were involved in the entire research process, including research planning activities, data collection, and data analysis.

REFERENCES

Al-Busaidi, I. S., Al Suleimani, S. Z., Dupo, J. U., Al Sulaimi, N. K., & Nair, V. G. (2019). Nurses' knowledge, attitudes, and implementation of evidence-based practice in oman: A multi-institutional, cross-sectional study. *Oman Medical Journal*, *34*(6), 521–527. https://doi.org/10.5001/omj.2019.95

Alshammari, M., Windle, R., Bowskill, D., & Adams, G. (2021). The Role of Nurses in Diabetes Care: A Qualitative Study. *Open Journal of Nursing*, *11*(08), 682–695. https://doi.org/10.4236/ojn.2021.118058

Bin Rakhis, S. A., AlDuwayhis, N. M., Aleid, N., AlBarrak, A. N., & Aloraini, A. A. (2022).

Glycemic Control for Type 2 Diabetes Mellitus Patients: A Systematic Review. *Cureus*, *14*(6), 6–13. https://doi.org/10.7759/cureus.26180

Dizdarevic-Bostandzic, A., Begovic, E., Burekovic, A., Velija-Asimi, Z., Godinjak, A., & Karlovic, V. (2018). Cardiovascular Risk Factors in Patients with Poorly Controlled Diabetes Mellitus. *Medical Archives (Sarajevo, Bosnia and Herzegovina)*, *72*(1), 13–16. https://doi.org/10.5455/medarh.2018.72.13-16

Evert, A. B., Dennison, M., Gardner, C. D., Timothy Garvey, W., Karen Lau, K. H., MacLeod, J., Mitri, J., Pereira, R. F., Rawlings, K., Robinson, S., Saslow, L., Uelmen, S., Urbanski, P. B., & Yancy, W. S. (2019). Nutrition therapy for adults with diabetes or prediabetes: A consensus report. *Diabetes Care*, *42*(5), 731–754. https://doi.org/10.2337/dci19-0014

Farzaei, M., Shahbazi, S., Gilani, N., Ostadrahimi, A., & Gholizadeh, L. (2023). Nurses' knowledge, attitudes, and practice with regards to nutritional management of diabetes mellitus. *BMC Medical Education*, *23*(1), 1–10. https://doi.org/10.1186/s12909-023-04178-4

Galicia-Garcia, U., Benito-Vicente, A., Jebari, S., Larrea-Sebal, A., Siddiqi, H., Uribe, K. B., Ostolaza, H., & Martín, C. (2020). Pathophysiology of Type 2 Diabetes Mellitus. *International Journal of Molecular Sciences*, *21*(17), 6275. https://doi.org/10.3390/ijms21176275

Khil, J., Kim, S. M., Chang, J., Choi, S., Lee, G., Son, J. S., Park, S. M., & Keum, N. N. (2023). Changes in total cholesterol level and cardiovascular disease risk among type 2 diabetes patients. *Scientific Reports*, *13*(1), 1–11. https://doi.org/10.1038/s41598-023-33743-6

Perkumulan Endokrinologi Indonesia. (2021). *Pedoman Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 Dewasa di Indonesia 2021*. PB PERKENI.

Petrie, J. R., Guzik, T. J., & Touyz, R. M. (2018). Diabetes, Hypertension, and Cardiovascular Disease: Clinical Insights and Vascular Mechanisms. *Canadian Journal of Cardiology*, *34*(5), 575–584. https://doi.org/10.1016/j.cjca.2017.12.005

Sun, H., Saeedi, P., Karuranga, S., Pinkepank, M., Ogurtsova, K., Duncan, B. B., Stein, C., Basit, A., Chan, J. C. N., Mbanya, J. C., Pavkov, M. E., Ramachandaran, A., Wild, S. H., James, S., Herman, W. H., Zhang, P., Bommer, C., Kuo, S., Boyko, E. J., & Magliano, D. J. (2022). IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. *Diabetes Research and Clinical Practice*, *183*, 109119. https://doi.org/10.1016/j.diabres.2021.109119

Van Nguyen, T., & Liu, H. E. (2021). Factors associated with the critical thinking ability of professional nurses: A cross-sectional study. *Nursing Open*, *8*(4), 1970–1980. https://doi.org/10.1002/nop2.875