

The role of interpersonal support in the management of type 2 diabetes mellitus through self-care

O papel do apoio interpessoal no manejo do diabetes mellitus tipo 2 através do autocuidado
El rol del apoyo interpersonal en el manejo de la diabetes mellitus tipo 2 mediante el autocuidado

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Abstract

Objective: To assess whether people with type 2 diabetes mellitus who participated in an educational intervention related to supported self-care can increase their knowledge and change their behaviors for the control of glycemic levels. **Methods:** A quasi-experimental study, typified as before-and-after, with a quantitative approach. The intentional sample consisted of 30 patients with type 2 diabetes mellitus. An educational intervention based on the "5 As" was applied over two months. Knowledge about diabetes (DKN-A Scale), capillary glycemia levels, and glycated hemoglobin levels were assessed before and after the intervention. **Results:** There was a significant improvement in knowledge about diabetes ($p < 0.05$) and a reduction in the mean capillary glycemia ($p = 0.027$). The reduction in glycated hemoglobin was not statistically significant ($p = 0.069$). **Conclusion:** The intervention with self-care support was effective in improving disease knowledge and its treatment, as well as promoting glycemic control.

Descriptors: Chronic disease; Health education; Self-care; Nursing.

Whats is already known on this?

Health professionals play a crucial role in supporting self-care through individualized education, effective communication, and patient empowerment.

What this study adds?

This study shows the effectiveness of self-care support in primary care, improving knowledge about diabetes and glycemic levels in a population.



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Resumo

Objetivo: Avaliar se as pessoas com diabetes mellitus tipo 2 que participaram de intervenção educativa relativa ao autocuidado apoiado conseguem aumentar o conhecimento e mudar o comportamento para controle dos níveis glicêmicos. **Métodos:** Estudo quase experimental, do tipo antes e depois, com abordagem quantitativa. A amostra intencional foi composta por 30 pacientes com diabetes mellitus tipo 2. Foi aplicada uma intervenção educativa baseada nos “5 As” durante dois meses. Avaliaram-se o conhecimento sobre diabetes (Escala DKN-A) e os níveis de glicemia capilar e hemoglobina glicada antes e após a intervenção. **Resultados:** Houve melhora significativa no conhecimento sobre diabetes ($p<0,05$) e redução na média da glicemia capilar ($p=0,027$). A redução na hemoglobina glicada não foi estatisticamente significativa ($p=0,069$). **Conclusão:** A intervenção com apoio ao autocuidado foi eficaz para melhorar o conhecimento da doença e do seu tratamento, além de favorecer o controle glicêmico.

Descritores: Doença crônica; Educação em saúde; Autocuidado. Enfermagem.

Resumen

Objetivo: Evaluar si las personas con diabetes mellitus tipo 2 que participaron en una intervención educativa relativa al autocuidado apoyado logran aumentar el conocimiento y cambiar el comportamiento para el control de los niveles glicémicos. **Metodos:** Estudio cuasi-experimental, del tipo antes y después, con enfoque cuantitativo. La muestra intencional estuvo compuesta por 30 pacientes con diabetes mellitus tipo 2. Se aplicó una intervención educativa basada en los “5 As” durante dos meses. Se evaluaron el conocimiento sobre diabetes (Escala DKN-A) y los niveles de glicemia capilar y hemoglobina glicosilada antes y después de la intervención. **Resultados:** Hubo una mejora significativa en el conocimiento sobre diabetes ($p<0,05$) y una reducción en el promedio de la glucosa capilar ($p=0,027$). La reducción en la hemoglobina glucosilada no fue estadísticamente significativa ($p=0,069$). **Conclusión:** La intervención con apoyo al autocuidado fue eficaz para mejorar el conocimiento de la enfermedad y su tratamiento, además de favorecer el control glucémico.

Descriptores: Enfermedad crónica; Educación para la salud; Autocuidado. Enfermería.

INTRODUCTION

Diabetes mellitus (DM) is a complex condition with multiple causes, involving both genetics and the environment. It is characterized by problems in the production or action of insulin by the body, which can lead to complications in small and large blood vessels, affecting organs such as the heart, blood vessels, eyes, kidneys, and brain.⁽¹⁾

In 2017, the International Diabetes Federation (IDF) estimated that 8.8% of the global population aged 20 to 79 (424.9 million people) lived with DM, and projections indicate that this number will exceed 628.6 million by 2045. Notably, 79% of these cases are concentrated in developing countries, where the highest increase is expected in the next two decades.⁽²⁾

In developing nations, such as Brazil, DM represents a significant public health problem, accounting for about 30% to 40% of morbidity cases in adults, mainly due to complications in small and large blood vessels.⁽³⁾

The treatment related to DM involves various precautions, such as adequate diet, physical activity, regular monitoring of glycemia, correct use of insulin and its supplies, as well as other practices. A study revealed that the management of modifiable risk factors, such as a balanced diet, exercise, not smoking, and maintaining a healthy weight, led to a 91% reduction in the onset of DM and an 88% decrease in cases among individuals with a family history of the disease.⁽⁴⁻⁵⁾

Adherence to treatment is influenced by various factors, including the compatibility between medical guidelines and the patient's lifestyle. Non-compliance with treatment can be caused by difficulties in accessing medications, signs and symptoms of the disease, socioeconomic conditions, the relationship between the health professional and the patient, age, education level, and beliefs about the disease.⁽⁶⁾ The adoption of effective self-care in diabetes increases the chances of successful treatment, resulting in better metabolic control, quality of life, reduction of symptoms of anxiety and depression, and lower risk of cardiovascular problems. Therefore, self-care is essential for people with chronic diseases like DM, and it is necessary to empower patients so that they become capable and responsible for their own care.⁽⁷⁾

Self-care is the individual's ability to perform actions to preserve his/her health, development, and well-being. In the context of type 2 diabetes mellitus (T2DM), self-care involves lifestyle changes that are essential to prevent complications that can lead to disability or death. Healthy eating, regular exercise, continuous use of medications, frequent glycemic monitoring, and foot care are examples of crucial activities for adherence to treatment and the maintenance of self-care in people with T2DM.⁽⁸⁾

In addition, educational initiatives aimed at empowering individuals with T2DM for self-care are suggested to encourage active participation in health decisions. Supported self-care (SSC), defined as the

application of specific measures to promote health self-management, is particularly relevant for people with DM and can be structured using the “5 As” method: Ask, Assess, Advise, Assist, and Arrange.⁽⁹⁾

Accordingly, it is understood that the follow-up of self-care practices of people with T2DM can help in the control and observation of blood sugar levels, as well as encourage these patients to adhere to treatment efficiently, promoting benefits and a better life.

This study aims to assess whether people with T2DM who participated in educational interventions related to supported self-care can increase their knowledge and change their behaviors to control glycemic levels.

METHODS

This quasi-experimental study, typified as before-and-after, with an educational intervention to support self-care and a quantitative approach, was conducted at the Primary Health Care Unit named Saulo Leal Ernesto de Melo, located in the city of Queimadas-PB.

The intentional sample included 30 participants who met the inclusion criteria (age ≥ 18 years, registered at the PHCU, and diagnosis of T2DM) and exclusion criteria (cognitive/communicative disability and recent diagnosis of T2DM < 6 months). Data collection, conducted from June to October 2023, used a structured questionnaire for sociodemographic and clinical data, adapted from Gouveia (2020),⁽¹⁰⁾ and the Brazilian Version of the Diabetes Knowledge Questionnaire (DKN-A), in order to assess knowledge about the disease before and after the intervention.⁽¹¹⁾

The DKN-A, in its translated and validated version into Portuguese, is a questionnaire that has 15 objective multiple-choice questions involving knowledge from five categories, which include basic physiology (questions 1, 3, 6, 7, and 8), insulin action (question 2), hypoglycemia (questions 10 and 12), food groups (questions 1, 4, and 5) and substitutions (questions 14 and 15), management of DM in case of complications, and general principles of DM (question 10). In addition, this scale is measured on a score from 0 to 15 points, where each correct response earns a score of 1 and incorrect responses score 0. Questions 1 to 12 have only one correct alternative, and questions 13 to 15 are multiple choice. If the participant scores eight or higher, this indicates that he/she has satisfactory knowledge about DM, while a score below eight indicates unsatisfactory knowledge, as displayed in Chart 1.⁽¹¹⁾

Chart 1. Distribution of questions and responses for an accuracy index by participants according to the DKN-A questionnaire. Queimadas-PB, Brazil, 2023.

QUESTIONS	RESPONSES
1. In UNCONTROLLED diabetes, the blood sugar is:	High
2. Which of these statements is TRUE?	Poorly controlled diabetes can result in a higher chance of complications later on
3. The NORMAL range of blood glucose variation is:	70-110 mg/dL
4. Butter is mainly consisted of:	Fat
5. Rice is mainly consisted of:	Carbohydrates
6. The presence of ketones in urine is:	Bad sign
7. Which of the following complications are NOT usually associated with diabetes?	Changes in the lungs
8. If a person taking insulin has high blood sugar or urine sugar levels, as well as ketones, he/she must:	Maintain the same insulin dosage and diet, and have blood and urine tests later
9. If a person with diabetes is taking insulin and becomes ill or is unable to eat the prescribed diet,	He/she must continue taking insulin
10. If you feel hypoglycemia coming on, you must:	Eat or drink something sweet immediately
11. You can eat as much as you want of the following FOODS:	Lettuce and watercress
12. Hypoglycemia is caused by:	Excess insulin
13. One KILO is:	A unit of weight equal to 1,000 grams
14. Two of the following substitutions are correct:	One French bread roll is equal to four crackers One egg is equal to one serving of ground meat
15. If I do not feel like eating the French bread roll allowed in my diet for breakfast, I can:	Eat four crackers Replace with two medium cheese breads

Source: Survey data, 2023.

The intervention, based on the “5 As” methodology (Ask, Assess, Advise, Assist, and Arrange), aimed to promote self-management and adherence to pharmacological and non-pharmacological

treatments, with guidance on medication use, healthy eating, and physical activity. At the end of the intervention, capillary glycemia and glycated hemoglobin data were collected, and the DKN-A questionnaire was reapplied to assess the impact of the intervention on knowledge and glycemic levels.

The data were anonymized and statistically analyzed in SPSS, version 22.0, using descriptive statistics (mean, standard deviation, absolute and relative frequencies) and inferential statistics (paired Student's t-test for comparison of means before and after the intervention, with a significance level of $p < 0.05$), after checking the normality of the data using the Shapiro-Wilk test.

The study began after a favorable opinion was issued by the Research Ethics Committee (REC) of the Federal University of Campina Grande, which authorized its implementation under CAAE nº 68794023.3.0000.0154 and Opinion nº 6.122.899.

RESULTS

This study has a population of 30 participants diagnosed with diabetes mellitus who met the inclusion criteria to contribute to the survey, where they responded to the form of sociodemographic and clinical characteristics, as well as the DKN-A, in order to meet the proposed aims, conducted through an in-person interview for data collection.

The sociodemographic and clinical characteristics are displayed in Table 1.

Table 1. Sociodemographic data of people with DM2 (n = 30). Queimadas-PB, Brazil, 2023.

Variable	n	%
Gender		
Female	23	76.7
Male	07	23.3
Race		
White	11	36.7
Non-white	19	63.3
Marital status		
Married	20	66.7
Single	05	16.7
Widowed	05	16.7
Occupation		
Inactive	22	73.3
Active	02	6.7
Unemployed	06	20.0
Origin		
Queimadas	30	100
Family income		
1 MW	18	60.0
2 MW	09	30.0
>3 MW	03	10.0
Religion		
Catholic	23	76.7
Evangelical	05	16.7
Other	02	6.7

Source: Survey data, 2023.

Regarding gender, there was a prevalence of women, with 23 (76.7%) participants. Concerning race, 19 (63.3%) participants self-declared their skin color as non-white. In relation to marital status, most are married or in a stable union.

As regards the financial situation of participants, it was possible to observe that most live on a minimum wage (MW). As for the age range, it is observed a variation between 34 and 87 years, with most being over 60 years old.

The clinical data is displayed in Table 2.

Table 2. Clinical data of people with DM2 participating in the study (n = 30). Queimadas-PB, Brazil, 2023.

Variable	n	%
Harmful habits		
Tobacco	04	13.3
Alcohol	02	6.7
None	24	80.0
Presence of SAH (Systemic Arterial Hypertension)		
Yes	22	73.3
No	08	26.7
Physical activity		
Yes	04	13.3
No	26	86.7
Nutritional follow-up		
Yes	08	26.7
No	22	73.3
Medication in use		
ADO	22	73.3
ADI	02	6.7
ADO+ADI	04	13.3
None	02	6.7
Other medications		
Antihypertensive	22	73.3
None	07	23.3
Other	01	3.3
Total	30	100

Source: Survey data, 2023.

With the application of the DKN-A questionnaire on knowledge about diabetes before and after the provision of self-care support through in-person meetings and phone calls every fifteen days over a period of two months, it was possible to observe a considerable improvement in the scores of most items in the questionnaire and a moderate improvement in capillary glycemia and glycated hemoglobin levels, as displayed in Table 3.

Table 3. Capillary glycemia values, glycated hemoglobin values, and the DKN-A questionnaire on knowledge about diabetes at two times of the study. Queimadas-PB, Brazil, 2023.

Variables	Start time		End time		p-value*
	Mean	Standard deviation	Mean	Standard deviation	
Hemoglucotest	218.4	101.8	202.7	99.7	0.027
Glycated/hemoglobin	8.8	0.9	8.5	1.0	0.069
Q1	0.7	0.4	0.8	0.4	0.718
Q2	0.4	0.5	0.8	0.4	0.009
Q3	0.5	0.5	0.8	0.3	0.020
Q4	0.5	0.5	0.9	0.2	<0.004
Q5	0.5	0.5	0.9	0.2	0.029
Q6	0.1	0.2	0.0	0.0	0.333
Q7	0.2	0.4	0.9	0.2	<0.001
Q8	0.4	0.5	0.8	0.4	0.014
Q9	0.4	0.5	0.9	0.3	0.014
Q10	0.4	0.5	1.0	0.0	<0.001
Q11	0.6	0.5	0.9	0.2	0.029
Q12	0.2	0.3	0.4	0.5	0.104
Q13	0.1	0.3	0.7	0.4	<0.001
Q14	0.4	0.5	1.0	0.0	<0.004
Q15	0.5	0.5	0.9	0.2	<0.004
Total score	6.0	3.4	12.0	1.8	<0.001

Caption: Start time (St) e End time (Et) with inferential analysis; (*paired Student's t-test).

Source: Survey data, 2023.

DISCUSSION

The sample of this study revealed a prevalence of women (76.7%) with T2DM, a finding that converges with studies that associate this greater occurrence in the post-menopausal phase with the aging process, marked by abdominal weight gain, increasing the risk of developing the disease.⁽¹²⁾ The increased vulnerability to chronic diseases, such as diabetes, at advanced ages, due to the reduction of estrogen, suggests that greater awareness of symptoms, the role of family caregivers, and higher frequency of diagnostic tests may contribute to early diagnosis in women.^(13,14)

As for ethnicity, most participants (63.3%) identified themselves as non-white, reflecting the miscegenation of the Brazilian population, a result similar to those already mentioned in the literature.⁽¹⁵⁾ It is known that there is a higher likelihood of developing T2DM in African Americans compared to individuals of European descent, underscoring the importance of considering race as a risk factor.⁽¹⁶⁾ The prevalence of married participants or those in a stable union suggests potential social support for disease management, highlighting the fundamental role of partners in coping with it, providing essential encouragement and care for adherence to treatment.⁽¹⁷⁾

The inactivity revealed by most participants (73.3%), often linked to health and retirement issues, can negatively impact the perception of health and quality of life.⁽¹⁸⁾ The financial situation, with most living on a minimum wage, also proved to be a barrier to adopting healthy eating habits, due to the cost of certain foods, echoing relevant concerns about how low family income can undermine adherence to adequate dietary choices.⁽¹⁹⁾ The predominance of the Catholic religion among participants reinforces that spirituality strengthens feelings of strength and security to deal with adverse situations, indicating the potential of faith as a resource for positive coping.⁽²⁰⁾

The predominant age group over 60 years reflects the aging population and the consequent increase in the prevalence of non-communicable chronic diseases, as is the case with T2DM.⁽²¹⁻²²⁾ Aging is a known risk factor for the development of diabetes. It is noteworthy that the low educational level observed in most participants may hinder the understanding of the necessary information for the control of this disease and the prevention of complications, contributing to higher rates of glycemic dysregulation.⁽²³⁻²⁴⁾

The time since the diagnosis of DM between 2 and 10 years suggests that, over time, there may be a tendency to relax treatment, thus increasing the risk of complications. The prevalence of overweight participants highlights the need for interventions focused on weight loss to improve glycemic control and prevent cardiovascular diseases.⁽²⁵⁻²⁶⁾

The habit of smoking and the consumption of alcoholic beverages, although less prevalent, represent important modifiable risk factors. On the other hand, the act of quitting smoking in people with diabetes reduces the risk of cardiovascular diseases and improves other metabolic parameters.⁽²⁸⁾ The high prevalence of Systemic Arterial Hypertension (SAH), coexisting with T2DM, significantly increases the risk of cardiovascular complications and undermines therapeutic management, as discussed by Abreu *et al.* (2016).⁽²⁷⁻²⁹⁾

Most participants reported sedentary behavior, an unfavorable factor for glycemic control. Studies emphasize the essential role of physical activity in the treatment of diabetes, regulating glucose, reducing cardiovascular risk, and preventing obesity.⁽³⁰⁾

The lack of nutritional follow-up found in most participants can lead to inadequate food choices and hinder glycemic control. The predominant pharmacological therapy with oral antidiabetics, due to its lower complexity compared to insulin, as well as the common use of antihypertensives, reflect the clinical management of the studied population and the high prevalence of comorbidities.⁽³¹⁻³²⁾

The results of the DKN-A questionnaire showed a considerable improvement in scores after the self-care support intervention, both in terms of in-person meetings and in contacts via phones, indicating an increase in knowledge about the disease. This finding reinforces the importance of health education, recognized as an effective way to control diabetes and improve quality of life. The improvement in specific items of the DKN-A (Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q13, Q14, and Q15), with a significant p-value (<0.001), underscores the positive impact of the intervention on the knowledge of participants about various aspects of DM, although the question about uncontrolled blood sugar (Q1) did not show significant improvement.

The improvement observed in the knowledge on the part of participants after the self-care support intervention highlights the importance of primary health care in promoting self-care.⁽⁸⁾ The change in glycemic levels, especially the moderate reduction in glycated hemoglobin values, although it did not reach

reference levels in all participants, suggests a positive effect of the follow-up and self-care support strategy on the adoption of a healthier lifestyle, as they recognize HbA1c as an important indicator of the effectiveness of the treatment plan.⁽¹¹⁻¹²⁾

The first assessment revealed an unsatisfactory level of knowledge about the disease, reflected in high glycemic and HbA1c values, as well as an inadequate lifestyle. This lack of knowledge, particularly among individuals with low education levels, can lead to neglect of preventive measures and failure to recognize the severity of the disease, making it difficult to adhere to treatment. The inadequate perception of the role of medications as the only factor in glycemic control also contributes to low adherence, reinforcing the need for interventions that promote acceptance and behavioral change.^(24,7)

Although showing the potential of educational interventions in the self-care of T2DM, this study is limited by its small non-randomized sample and short follow-up period, thus restricting generalization and the assessment of long-term effects. The use of self-report and one-off measures may not reflect continuous adherence and glycemic control. However, this study is beneficial as it evidences the effectiveness of interventions in primary care, using adapted methodology and highlighting the importance of personalized strategies and follow-up to improve knowledge, adherence to treatment, and potentially the quality of life of individuals with T2DM.

CONCLUSION

The operationalization of the study showed positive behavioral changes and better self-management of health among participants, reflecting in glycemic control and knowledge about the disease, impacting their daily activities, medication adherence, and potentially physical activity practices. The act of supporting the empowerment of individuals with chronic diseases promotes lifestyle changes, contributing to self-care and improved clinical and psychological outcomes, with greater autonomy. Although the Internet provides access to information about diabetes, the population with low education levels and the elderly citizens still need accessible verbal and written communication.

Self-care support must be integrated into in-person follow-up in health services, especially in primary care, using continued in-person and virtual health education for interaction and autonomy, aiming for health improvements.

It is recommended to continue this methodology and develop new educational strategies. The limitations of the study included difficulty in obtaining a larger sample, the availability of participants, and the short period of intervention, which may have limited the significance of the results in terms of glycated hemoglobin. For future studies, it is suggested to provide continuous self-care support, involving family members and using more dynamic and engaging strategies to motivate adherence to healthy practices in health management.

CONTRIBUTIONS

Contributed to the conception or design of the study/research: Vieira SM, Gouveia BLA. Contributed to data collection: Vieira SM. Contributed to the analysis and/or interpretation of data: Vieira SM. Contributed to article writing or critical review: Albuquerque AM, Andrade LL, Gouveia BLA, Rodrigues WVL. Final approval of the version to be published: Albuquerque AM, Andrade LL, Gouveia BLA, Rodrigues WVL.

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