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# Functional Capacity and Self-care in Older Adults with Diabetes *Mellitus*

**Theme:** Promotion and prevention.

**Contribution to the subject:** The findings of this study reinforce the need for nurses to investigate the presence of functional limitations and their impacts on self-care practices with diabetes in the older adult population. In this sense, during the nursing consultation, the professional must perform a multidimensional assessment of the older adults and identify the self-care activities that present greater and lesser adherence, in order to guide and encourage the importance of these actions to treat the disease and prevent complications.

## ABSTRACT

**Objective:** To correlate functional capacity and self-care in older adults with diabetes. **Method:** A cross-sectional and quantitative study, carried out with 189 older adults with diabetes *mellitus* treated at an endocrinology outpatient clinic. The structured instrument to obtain sociodemographic and clinical data, the Barthel Index, and the Diabetes Self-Care Activities Questionnaire were used. Data was analyzed with descriptive and inferential statistics. **Results:** Most of the older adults were independent and had high mean values of adherence to self-care. There was a positive correlation with statistical significance between functional capacity and the domains of self-care activities related to physical activity and care with the feet. **Conclusions:** Functional capacity showed a positive relationship with items related to physical activity and care with the feet. Functional independence in the older adult can influence adherence to self-care practices facing diabetes *mellitus*.

**KEYWORDS** (SOURCE: DECS)

Activities of daily living; self care; diabetes *mellitus*; aged; nursing.

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# Capacidad funcional y autocuidado en ancianos con diabetes *Mellitus*

## RESUMEN

**Objetivo:** correlacionar la capacidad funcional y el autocuidado en adultos mayores con diabetes. **Método:** estudio transversal y cuantitativo, llevado a cabo con 189 ancianos con diabetes *Mellitus* atendidos en un ambulatorio de endocrinología. Se utilizó del instrumento estructurado para obtener los datos sociodemográficos y clínicos, el Índice de Barthel y el Cuestionario de Actividades de Autocuidado con la diabetes. Se analizaron los datos por medio de estadística descriptiva e inferencial. **Resultados:** la gran parte de los ancianos era independiente y presentaba promedios elevados de adherencia al autocuidado. Se observó correlación positiva con significancia estadística entre la capacidad funcional y los dominios de las actividades de autocuidado relacionados a la actividad física y el cuidado con los pies. **Conclusiones:** la capacidad funcional presentó una relación positiva con los ítems referentes a la práctica de actividad física y el cuidado con los pies. La independencia funcional en el adulto mayor puede influenciar en la adherencia a las prácticas de autocuidado hacia la diabetes *Mellitus*.

PALABRAS CLAVE (FUENTE: DECS)

Actividades cotidianas; autocuidado; diabetes *mellitus*; anciano; enfermería

# Capacidade funcional e autocuidado em idosos com diabetes mellitus

## RESUMO

**Objetivo:** correlacionar a capacidade funcional e o autocuidado em pessoas idosas com diabetes. **Método:** estudo transversal e quantitativo, realizado com 189 idosos com diabetes *mellitus* atendidos em um ambulatório de endocrinologia. Utilizou-se do instrumento estruturado para a obtenção dos dados sociodemográficos e clínicos, do Índice de Barthel e do Questionário de Atividades de Autocuidado com o diabetes. Os dados foram analisados por estatística descritiva e inferencial. **Resultados:** a maioria dos idosos era independente e apresentava médias elevadas de aderência ao autocuidado. Observou-se correlação positiva com significância estatística entre a capacidade funcional e os domínios das atividades de autocuidado relacionados à atividade física e ao cuidado com os pés. **Conclusões:** a capacidade funcional apresentou uma relação positiva com os itens referentes à prática de atividade física e ao cuidado com os pés. A independência funcional na pessoa idosa pode influenciar na adesão às práticas de autocuidado ante o diabetes *mellitus*.

PALAVRAS-CHAVE (FONTE: DECS)

Atividades cotidianas; autocuidado; diabetes *mellitus*; idoso; enfermagem

## Introduction

The older adult population has increased worldwide, mainly due to the decrease in fertility and the increase in life expectancy. However, the way in which this group is aging is worrying, with a transition in the epidemiological profile, in which there is a predominance of chronic diseases, with emphasis on diabetes *mellitus* (1).

The prevalence of diabetes is high in all countries, currently affecting more than 425 million people and causing nearly four million deaths that result directly from the disease or its complications. In the older adults, this scenario also represents a serious public health problem, given that in 2017, approximately 122.8 million people aged between 65 and 99 years old had diabetes, with projections of 253.4 million for 2045 (2).

Diabetes is defined as a condition of glycemic instability, which has the effect of altering the metabolism of lipids, proteins and carbohydrates, and which causes dysfunctions in insulin secretion. The increase in prevalence associated with the growing number of obese people and the aging population characterizes diabetes as an epidemic disease today (2, 3).

Individuals with diabetes undergo several changes in their daily lives, not only due to the effects of the disease, but also due to the changes required in their living standard, which causes losses to their functionality. Functional disability is characterized as a dynamic and progressive process that is associated with physical and mental limitations which may compromise autonomy and independence to perform routine activities (4).

A study carried out with older adults hospitalized due to diabetes complications in João Pessoa, Brazil, found that more than 85 % of the patients had some degree of dependence in carrying out activities of daily living, which could be a result of the disease's own characteristics, the higher risk of involving other morbidities and damage caused by complications (5).

In the older adults, the changes resulting from diabetes are aggravated due to the limitations inherent to the aging process and the frequent presence of functional disabilities, which may negatively impact the practice of self-care (6). This, in turn, is characterized as the activities performed by the individuals for their own benefit, with the aim of avoiding, treating, and promoting

living with chronic diseases (7). In addition, this practice favors the improvement of quality of life, maintenance of health and well-being, as well as the performance of daily activities (8).

Glycemic control is one of the most complex challenges in the routine of the older adult with diabetes, given that it requires daily efforts to adhere to a healthy lifestyle and to adopt self-care practices, since it is necessary for the individual to present a satisfactory level of functional capacity in order to perform these activities (7, 9).

In this sense, the nurse must use tools to track the health conditions of the older adult. The multidimensional evaluation stands out for its early identification of a functional deficit in activities of daily living and self-care practices, in addition to preventing the problems resulting from diabetes, such as dermatological, musculoskeletal, vascular and neurological changes (10). Associated with this, the care of this professional must be based on a theory that can explain, justify and support the implementation of the stages of the nursing process (11).

Among the theoretical references used in the care of people with diabetes *mellitus*, Orem's Self-Care Theory is one of the most frequent (11), given that it values the individual's responsibility for their health when recognizing the role of nurses in preventing complications in health education. A study carried out in Basic Health Units with people with type 2 diabetes in Paraná, Brazil, showed that the use of self-care assumptions supported by nurses represented an effective strategy in identifying the main barriers to glycemic control (12).

Although diabetes is a problem that has been extensively investigated in the scientific literature, studies that assess functional capacity and adherence to self-care practices in the older adult are still scarce. In this sense, the question that guided this study was the following: Is there a correlation between functional capacity and self-care in older adults with diabetes? In view of the harms caused by the disease to the various aspects of life and health, the need to investigate whether there is this correlation — which has become the objective of this study — emerges, since this may contribute to the implementation of interventions related to the most compromised competences and to identify the attitudes of these individuals in certain circumstances, which will allow more specific strategies to treat diabetes (9, 13).

## Method

This is a cross-sectional study with a quantitative approach, carried out in an outpatient endocrinology service of a teaching hospital, located in João Pessoa, Paraíba, Brazil, from May to August 2018, using the STROBE instrument to substantiate the methodology (14).

This outpatient clinic was chosen because it is one of the reference services for specialized endocrinology care in the state of Paraíba for receiving patients referred from Basic Health Units for the purpose of ambulatory monitoring of endocrine diseases, with a mean of 90 monthly visits by older adults with diabetes *mellitus*.

The study population consisted of older adults diagnosed with diabetes treated at the outpatient endocrinology service. The sample was calculated considering the treatment of 371 older adults with diabetes *mellitus*, from July to December 2017, a period that preceded the collection of the data, which were provided by the regulation service of that institution.

The sample size was defined using the calculation for finite populations with known proportion and 95 % confidence interval, an estimated prevalence of 50 %, and a margin of error of 5 %, which led to a total of 189 older adults. There were no losses or refusals in the sample. For the selection of the study participants, the coordination of the service was asked to list patients with diabetes *mellitus* scheduled for treatment on each day of data collection, with a subsequent random draw of three participants per day.

The inclusion criteria established in this research were the following: being 60 years old or older, being followed up at the endocrinology outpatient clinic during the collection period and presenting a medical diagnosis of diabetes *mellitus*, confirmed by the list provided by the service. The exclusion criteria were the following: older adults who presented cognitive impairment according to the Mini Mental State Examination, which is composed of questions related to orientation, immediate and evocation memory, calculation, language, concentration and spatial domain (15).

Data was collected by previously trained researchers, in a process that involved the presentation, explanation and application of the scale among the interviewers to standardize data collection. The ones who met the inclusion criteria were invited to participate in the study and the interview was conducted before the follow-up consultation, in an outpatient room provided by the service.

The structured instrument was used to obtain data regarding the participants' sociodemographic and clinical profile: gender, age, marital status, schooling, social security situation, family income and family arrangement, type of diabetes, self-reported health situation, physical activity practice, smoking, alcoholism, presence of associated comorbidities and number of medications used per day.

To assess functional capacity, the Barthel Index was used, validated for the Brazilian context. This instrument comprises ten items that assess personal hygiene, independence in the bathroom, diet, moving from a chair, walking, ability to dress, bathe and climb stairs, and control of bladder and intestinal sphincters. Each item has a specific score which, when added, can reach a total value of 0 to 100 points, which correspond to total dependence or total independence, respectively (16). From the score, the following classification was used: independence (100 points), mild dependence (91 to 99 points), moderate dependence (61 to 90 points), severe dependence (21 to 60 points), and total dependence (0 to 20 points) (4).

In order to assess self-care with diabetes, the Diabetes Self-Management Activities Questionnaire was used, translated into Brazilian Portuguese with 18 items, distributed in seven thematic axes: general diet, specific diet, physical activity, blood glucose monitoring, care with the feet, medication use, and smoking. For the analysis of adherence, the items of the questionnaire were characterized in seven days of the week prior to the collection, assigning the score of each item from 0 to 7, where 0 is the least desirable situation and 7, the most favorable, except for the specific diet dimension that addresses the consumption of high fat foods and sweets, whose values have been inverted (17).

The collected data were compiled and stored in *Microsoft Office Excel* and later imported into the *Statistical Package for the Social Sciences* (SPSS), version 22.0, being analyzed by means of descriptive and inferential statistics. Self-care was considered as a dependent variable, and functional capacity as an independent variable. To check the normality of the numerical data, the Kolmogorov-Smirnov test was used. As they have a non-normal distribution, the correlation between the dependent and independent variables was performed using Spearman's correlation coefficient. The significance level used for the statistical analyses was 5 % ( $p \leq 0.05$ ).

The study was developed in accordance with the recommendations set forth in Resolution 466/2012 of the National Health Council of Brazil, with the approval of the Ethics Committee in research involving human beings from the place where it was carried out, under CAAE (*Certificado de Apresentação para Apreciação Ética*) 90238718.3.0000.5183 and approval No. 2,714,334. The participants signed the Free and Informed Consent Form after having been duly clarified about the research justification, its purpose, risks and benefits, in addition to the procedures to be performed and the guarantee of secrecy and confidentiality of the information provided.

## Results

Of the 189 participating older adults, 130 (68.8 %) were female; 114 (60.3 %) were aged between 60 and 69 years old; 103 (54.5 %) married or with a partner; 150 (79.4 %) had low schooling; 134 (70.9 %) were retired; 161 (85.2 %) had a family income between one and two minimum wages, and 96 (50.8 %) lived with one or two people. With regard to health conditions, 185 (97.9 %) had type 2 diabetes; 102 (54.0 %) rated their health status as neither good nor bad; 148 (78.3 %) did not practice physical activity; 179 (94.7 %) did not smoke; 181 (95.8 %) did not consume alcoholic beverages; 148 (78.3 %) had arterial hypertension, and 103 (56.6 %) reported using five or more medications daily.

Regarding the analysis of the functional capacity of the older adults, it was observed that 129 (68.3 %) were independent to carry out daily activities (Table 1).

**Table 1.** Functional capacity of older adults with diabetes mellitus

Functional capacity	n	%
Independence	129	68.3
Mild dependence	17	9.0
Moderate dependence	38	20.1
Severe dependence	4	2.1
Total dependence	1	0.5
Total	189	100

Source: Research data, 2018.

The diabetes self-care activities that had the highest mean values per day of the week, during the seven days, were the following: taking diabetes medications (6.97); taking the indicated

number of diabetes pills (6.97), and taking insulin injections (6.90). The activities that obtained the lowest adherence rates by the older adults were the following: assessing blood glucose (1.83); performing physical activity for less than 30 minutes (1.07), and performing specific exercise, such as walking, swimming, etc. (1.06). Although the activities of eating high fat foods (0.71) and eating sweets (0.62) have low values, this indicates that the older adults had a high adherence to self-care, since they consumed these foods a few times during the week (Table 2).

Diabetes self-care activities related to smoking showed that 178 (94.2 %) older adults had not smoked in the last seven days. When asked about the date of the last cigarette smoked, 111 (58.7 %) older adults reported that they had never smoked and 62 (32.8 %) mentioned that this had occurred more than two years ago.

**Table 2.** Self-care activities with diabetes in older adults

Self-care	Mean adherence (standard deviation)
<b>General diet</b>	
Following a healthy diet	5.63 (± 2.078)
Following food guidance	5.20 (± 2.486)
<b>Specific diet</b>	
Eating five or more servings of fruits or vegetables	5.71 (± 1.874)
Eating high fat foods	0.71 (± 1.585)
Eating sweets	0.62 (± 1.408)
<b>Physical activity</b>	
Performing physical activity for at least 30 minutes	1.07 (± 2.203)
Performing specific exercise (walking, swimming, etc.)	1.06 (± 2.198)
<b>Blood glucose monitoring</b>	
Assessing blood glucose	1.83 (± 2.621)
Assessing blood glucose the recommended number of times	1.85 (± 2.689)
<b>Care with the feet</b>	
Examining the feet	5.87 (± 1.853)
Examining inside shoes before putting them on	5.84 (± 1.882)
Drying the spaces among the toes after washing them	5.88 (± 1.868)

Medication	
Taking diabetes medications	6.97 ( $\pm$ 0.242)
Taking insulin injections	6.90 ( $\pm$ 0.693)
Taking the indicated number of diabetes pills	6.97 ( $\pm$ 0.251)

Source: Research data, 2018.

When correlating functional capacity with self-care activities, a positive correlation was observed, with statistical significance ( $p \leq 0.050$ ), between the “physical activity” ( $p = 0.007$ ) and “care with the feet” ( $p = 0.021$ ) domains. This finding shows that the increase in the functional capacity of the older adults is correlated with the practice of these activities (Table 3).

**Table 3.** Correlation between the self-care activities with diabetes and functional capacity

Domains of the self-care activities	Functional capacity	
	r	p*
General diet	0.135	0.063
Specific diet	0.130	0.076
Physical activity	0.195	0.007
Blood glucose monitoring	-0.004	0.956
Foot care	0.168	0.021
Medication use	-0.094	0.569

\*Spearman’s correlation test.

Source: Research data, 2018.

## Discussion

In the assessment of functional capacity, there was a higher frequency of independent older adults, which could be related to the fact that they were being followed at a secondary level of care and with the absence of complications from diabetes that could cause losses for the performance of the activities of daily living. The preservation of functionality can have an influence on the quality of life of the older adults, since it allows for greater autonomy and independence, favors the development of daily tasks, and facilitates diabetes care (18).

Functional capacity represents an important indicator of the health condition of the individual with diabetes *mellitus*, especially

in the older adult, given that the disease may cause physical tiredness, fatigue, muscle weakness and decreased plantar sensitivity, which, associated with natural changes in the aging, causes limitations in the range of movements and in the ability to perform various actions (5, 19).

The nursing consultation for the older adult with diabetes should not be restricted to the investigation of aspects inherent to the disease; therefore, it is necessary to perform a multidimensional assessment that addresses among other aspects, functional capacity as one of the pillars for the promotion of health and self-care of these individuals (12, 18, 20). Although the treatment of diabetes involves changes in routine, with emphasis on the adoption of healthy eating habits, the regular practice of physical activity, the use of medications, and care with the feet, the presence of limitations in functionality can directly interfere in its adherence (8).

Therefore, it is clear that self-care in diabetes can be influenced by intrinsic and extrinsic factors to the older adult (11), with the establishment of a trust relationship between nurse and patient, in order to assist the latter in managing their health condition, which would allow for the identification of elements that harm and favor the realization of self-care practices.

With regard to self-care in the management of diabetes, the national and international scientific production shows that adherence to activities carried out by the individual to preserve their life, health and well-being enhances therapeutic success (6, 8, 10, 12). In the present study, the items of diabetes self-care related to drug therapy showed higher mean values, which can be justified because it is easier to access medications than to change lifestyle behaviors, as this implies cultural and socioeconomic aspects (13, 21).

The older adults who adhere to the use of diabetes medications and consider it effective for glycemic control are 18 times more likely to control the disease when compared to those who do not adhere to it (22). However, with regard to the regular practice of insulin therapy, there is a need for nurses to intervene in teaching self-care in the management of this therapeutic method, due to its specificities and risks, alluding to errors in insulin self-administration such as not washing hands, the aspiration of air in the syringe, the deficit in the application casters and the improper disposal of sharps (23, 24).



According to Orem (11), self-care actions are a direct result of the individual's personal decision. Thus, the ability to commit to self-care is subjected to some conditioning elements such as age, life experiences, values, culture, and schooling level of the older adult, given that they are inherent particularities to each individual and can positively or negatively influence the quality and adherence to self-care (21).

The study participants demonstrated that they do not regularly monitor blood glucose, with low adherence to items related to this practice. Such finding can be justified by economic difficulties for the acquisition of materials, failure in the offer by the public health service, fear of the technique, little instruction in handling the procedure, impairment in functional capacity or by reduced knowledge about the importance of this activity for self-care (20, 25).

Blood glucose monitoring is indicated for all individuals undergoing insulin therapy or drug treatment, since the observation of blood glucose levels enables intervention in the face of adversities, such as hypo or hyperglycemia (21). However, although this activity has great relevance, the low level of schooling presented by the participants of this study may have been a factor that negatively influenced their adherence, as it made it difficult to search or assimilate information related to diabetes and care to prevent their complications.

Regarding physical activity, it was observed that the majority of the older adults do not routinely practice exercise, which was also verified by other studies (21, 26). Low adherence to physical activity makes people with diabetes more vulnerable to developing complications, as this practice is effective in reducing the need for pharmacological treatment, improving metabolic control by increasing sensitivity to the action of insulin and glucose uptake, and decreasing weight and risk of cardiovascular disease (2, 22).

The practice of physical exercise, especially in the older adult population, provides benefits for the quality of life and for the autonomy of these individuals, since it improves the functional capacity and promotes a more active aging with the preservation of physical and mental health (27). However, there are difficulties that limit this practice, with emphasis on aspects related to senescence and senility, lack of family support and lack or deficiency of public services and professionals qualified to promote the practice of physical exercise to this population (22).

Effective family participation is one of the conditioning factors for self-care (11), representing a major factor for diabetes control (6). In this sense, the nurse must guide the older adults and their relatives about the importance of the self-care practice for an effective treatment, so that these individuals understand the main aspects related to the disease from the adoption of a healthy lifestyle with an emphasis on a balanced diet and regular physical activity (12).

Most of the older adults reported not smoking, which is a positive finding for the treatment of diabetes, given that cigarette consumption is associated with a worsening of glycemic control and with an increase in cardiovascular risk and mortality rate (28). In this sense, quitting smoking is an important measure of self-care in diabetes, especially among the older adults; however, support from family members and health professionals is important for effective smoking cessation (29).

When correlating functional capacity with domains related to self-care, it was found that independence may have promoted greater adherence to the practice of physical activity. In a study that evaluated the functionality of older adults by means of a walk test, it was observed that those who practiced physical exercise had a satisfactory functional capacity, since this activity provides an increase in muscle strength and energy expenditure, improves balance, promotes the reduction of body fat, and helps to improve the cardio-respiratory rhythm, which serves as a basis for functional independence (30).

A significant correlation was identified between the functionality of the older adults and the self-care activities with the feet. This care represents the main preventive form of the diabetic foot, which is one of the prevalent complications that result from the disease, in addition to being a constant reason for hospitalizations and amputations, which may interfere in the functional capacity of the older adults and make them dependent on third parties (6, 31).

Thus, it is essential that the assessment of functional capacity becomes a routine practice in health care for the older adult, in order to identify the needs and priorities for care, promote greater autonomy and independence for these individuals and act in encouragement for greater adherence to self-care practices with diabetes (3, 7). Associated with this, nurses can use nursing theories that support their clinical practice and the systematization of



care for the older adult with diabetes, which favors the quality, safety and integrality of the care provided (32).

## Conclusions

It was found that the majority of the older adults was independent for their daily activities and adhered to the practices of self-care with diabetes, although they still need to be guided in what concerns the performance of physical activity and the monitoring of capillary blood glucose, which are essential elements for the control and management of diabetes.

In the correlation between the variables, it was noticed that functional capacity had a significant positive relationship with the items related to the practice of physical activity and care with the feet. Thus, it is observed that functional independence in the older adult can influence adherence to the self-care practices for diabetes, which reinforces the need to plan intervention programs

focusing on maintaining and rehabilitating the functional capacity of the older adults affected by this morbidity.

The results of this study demonstrated the importance of the functionality of the older adult for adherence to the self-care practices with diabetes. In this sense, the functional capacity of these individuals, in addition to acting as an important predictor of independence and quality of life, represents a relevant tool for adherence to self-care, especially in the presence of diabetes, in which the changes imposed by the disease require more autonomy of the individual to carry out adaptations in daily activities routine.

As a limitation of the study, the research design stands out, as the cross-sectional method does not bring cause and effect results. Thus, it is suggested to conduct longitudinal studies that clarify the impact of functional capacity in the practice of self-care.

**Conflicts of interest:** None declared.

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