

FACTORS RELATED TO DEPRESSIVE SYMPTOMS IN OLDER ADULTS WITH DIABETES MELLITUS

Erica Maria Belmiro dos Santos¹ 
Cláudia Jeane Lopes Pimenta¹ 
Gerlania Rodrigues Salviano Ferreira¹ 
Maria Cristina Lins Oliveira Frazão¹ 
Tatiana Ferreira da Costa² 
Gerson da Silva Ribeiro³ 
Kátia Neyla de Freitas Macedo Costa¹ 

ABSTRACT

Objective: to identify the factors related to depressive symptoms in older adults with Diabetes *Mellitus*. **Method:** a cross-sectional study with a quantitative approach conducted with 144 older adults registered in 72 Family Health units from the municipality of João Pessoa, Paraíba, Brazil. The data were collected from September to December 2019, using an instrument to obtain information referring to the sociodemographic and clinical profile and the Geriatric Depression Scale by means of descriptive and inferential statistics. **Results:** it was observed that 75.7% of the diabetic older adults did not present depressive symptoms. There was a significant association between depressive symptoms and the following variables: personal income ($p=0.044$), type of income ($p=0.020$), dyslipidemia ($p=0.038$), diabetes complications ($p=0.045$) and retinopathy ($p=0.033$). **Conclusion:** the social and health factors, as well as those related to diabetes, can exert negative influences on older adults' psychological state and favor the onset of depressive symptoms.

DESCRIPTORS: Depressive Symptoms; Diabetes *Mellitus*; Older Adults; Primary Health Care, Patient-Centered Care.

HOW TO REFERENCE THIS ARTICLE:

Santos EMB dos, Pimenta CJL, Ferreira GRS, Frazão MCLO, Costa TF da, Ribeiro G da S, et al. Factors related to depressive symptoms in older adults with diabetes mellitus. *Cogitare Enferm.* [Internet]. 2022. [accessed "insert day, month and year"]; 27. Available from: <http://dx.doi.org/10.5380/ce.v27i0.88119>.

¹Universidade Federal da Paraíba, Programa de Pós-Graduação em Enfermagem, João Pessoa, PB, Brasil.

²Universidade Federal de Pernambuco, Vitória de Santo Antão, PE, Brasil.

³Universidade Federal da Paraíba, João Pessoa, PB, Brasil.

INTRODUCTION

The 21st century brought along with it great technological advances for the population, especially in the health area, which provided for an increase in life expectancy at the global level. In developing countries such as Brazil, the aged population is growing quite rapidly, which represents an important achievement, as well as a challenge¹⁻². The repercussions of the high numbers of older adults are accompanied by high rates of chronic non-communicable diseases in the country, with *Diabetes Mellitus* as one of the most prevalent in this population group³.

The global prevalence estimate of *Diabetes Mellitus* for 2019 was 463 million individuals aged between 20 and 79 years old and it is predicted that approximately 700 million people will have been diagnosed with the disease by 2045⁴. *Diabetes Mellitus* represents a public health problem, mainly due to the disability degree caused by its complications, of which, in the Brazilian population, the most prevalent are diabetic retinopathy and neuropathy⁵.

It is a disease that significantly alters older adults' everyday life; with diagnostic confirmation, it becomes indispensable to carry out special care measures, which include adherence to healthy habits, medication use and regular monitoring by the health team, with the implementation of these measures emerging as a challenge, as there is a moment of adaptation of the normal healthy body to the changes in the current body with emotional repercussions⁶.

In view of this context, older adults often experience mental illness processes with presence of depressive symptoms, which, in addition to being associated with frailty, should be an alert for the emergence of depression⁷⁻⁸. Depression refers to a disabling mental disorder that alters a person's everyday life and has its effects potentiated by the presence of another underlying disease, diabetes in this case⁷⁻⁸.

It can cause significant distress, affecting the person's quality of life and independence, especially among older adults, due to a frequent unsatisfactory health perception and to the high risk of falls and frailty, which increases the hospitalizations and death risks⁷⁻⁹.

Depressive symptoms are frequent among older adults, especially in women, and may be mistaken by health professionals, as the patients can present somatic symptoms that tend to mask this disorder, such as lack of appetite, sleep and indisposition¹⁰. In this case, nurses must resort to a multidimensional assessment during the Nursing consultation with older adults, given that it serves to guide the care to be provided to aged people, value the patients' emotional aspects and seek to identify and prevent changes, in addition to offering support to face the adversities arising from their clinical condition¹¹.

In this way, there is a need to investigate the factors associated with depressive symptoms in the aged population with diabetes, in order to provide scientific subsidies that contribute to safe, resolute and good quality care on the part of nurses with a focus on integrality of the subjects.

Thus, the objective of the current study was to identify the factors related to depressive symptoms in older adults with Type 2 *Diabetes Mellitus*.

METHOD

This is a cross-sectional study with a quantitative approach, which was guided by the STROBE tool and carried out between June and October 2019 in 72 Family Health Units (FHUs) from João Pessoa, Paraíba, Brazil. Sampling stratified by the city's Health

Districts was chosen for the sample planning stage.

The municipality is territorially delimited in the form of Health Districts, in an attempt to organize the system's progressive care network and guarantee the population access to basic as well as specialized services, including hospital care, having Permanent Education in Health as its main policy currently adopted. The Health Districts are under supervision of the Municipal Health Department with the responsibility of executing full management of the Unified Health System (*Sistema Único de Saúde*, SUS) at the municipal level and of formulating and implementing policies, programs and projects aimed at promoting good quality health for SUS users¹².

The population consisted in all the aged users with *Diabetes Mellitus* treated in the FHUs, corresponding to 10,647 individuals distributed across all five Health Districts, as follows: I – 2,641; II – 1,919; III – 3,072; IV – 1,554; and V – 1,461. Sample selection was carried out according to the allocation method proportional to the number of aged people with *Diabetes Mellitus* treated by each District compared to the total number of older adults assisted (Table 1).

Table 1 - Distribution of the older adults treated, by Health District and according to presence of diabetes. João Pessoa, PB, Brazil, 2019.

Health District	Appointments		
	No. of older adults	No. of diabetic older adults	Percentage of diabetic older adults in relation to the total
I	12,571	2,641	$P_1 = 5.4$
II	9,366	1,919	$P_2 = 3.9$
III	13,122	3,072	$P_3 = 6.3$
IV	7,391	1,554	$P_4 = 3.2$
V	6,184	1,461	$P_5 = 3.0$
Total	48,634	10,647	-

Source: The authors (2019).

Sample size was obtained by the stratification procedure, considering a simple random sampling plan in each district, corresponding to 144 participants, as follows: District I = 38; District II = 28; District III = 38; District IV = 22; and District V = 18. In order to operationalize data collection, a maximum number of two patients per unit was established, with the need to reach an even number for proportional division. Given the above, an interview was included in Health Districts I (n=38) and II (n=28), which resulted in a sample comprised by 144 participants.

The inclusion criteria defined were the following: being aged at least 60 years old and presenting a medical diagnosis of Type 2 *Diabetes Mellitus*. The older adults excluded were those that were not capable of verbal communication and who had cognitive conditions that precluded them from answering the questions as per the Mini-Mental State Examination¹³.

In order to obtain data referring to the sociodemographic and clinical profile, a semi-structured questionnaire was prepared, which was submitted to a previous assessment by evaluators, MScs and PhDs in the area. The Geriatric Depression Scale (GDS-15) - Short

version was used to assess the presence of depressive symptoms, being the most used instrument to investigate depressive symptoms in the aged population. This scale was translated and validated in Brazil and consists of 16 items with dichotomous answers. Its score varies between zero and 15 points, obtaining the following results: less than or equal to five points means a normal individual or without depressive symptoms and more than five points represents an individual with depressive symptoms¹⁴.

Data collection was conducted from September to December 2019 by means of individual interviews in the waiting rooms of the FHUs, before or after the appointments. To preserve privacy and offer tranquility during collection, the older adults were invited to stay in place farther away from the other people.

The data collected were entered into a database in Microsoft Excel and were subsequently imported and processed in the *Statistical Package for Social Science*, version 22.0, where descriptive and inferential statistical analyses were performed. The significance level used for the statistical analyses was 5% ($p < 0.05$). The Mann-Whitney and Kruskal-Wallis tests were used to associate the variables.

The project corresponding to this study was approved by the Research Ethics Committee of the Health Sciences Center at the Federal University of Paraíba, under opinion No. 3,411,237.

RESULTS

Of the 144 aged individuals, 96 (66.7%) were female, 49 (34%) were aged between 65 and 69 years old, 79 (54.9%) were married or in a stable relationship, 48 (33.3%) had from nine to 12 years of study, 127 (88.9%) had a personal income between one and three minimum wages, and 108 (75%) were retired.

Regarding their health conditions, it was evidenced that: 80 (55.6%) aged individuals did not practice physical activity; 129 (89.6%) did not consume alcoholic beverages; 121 (84%) had some comorbidity associated with *Diabetes Mellitus*, of which 110 (76.4%) had Systemic Arterial Hypertension; and 129 (89.6%) used oral hypoglycemic agents daily. Regarding the characteristics of *Diabetes Mellitus*, 42 (29.2%) and 44 (30.6%) participants had, respectively, a diagnosis and treatment time from six to 10 years, 81 (56.3%) had a family history of the disease and 80 (55.6%) reported presence of complications, with neuropathy in 54 (37.5%). It was identified that 109 (75.7%) older adults did not present depressive symptoms, while 35 (24.3%) did have such symptoms.

Regarding the association between the depressive symptoms and the sociodemographic variables, Table 2 shows that there was statistical significance between depressive symptoms and the personal income ($p = 0.044$) and source of income ($p = 0.020$) variables.

Table 2 - Association between depressive symptoms and sociodemographic variables of the older adults with *Diabetes Mellitus*. João Pessoa, PB, Brazil, 2019.

Variables	Depressive Symptoms		
	Mean	Standard Deviation	p-value
Gender			

Female	3.61	2.77	0.859
Male	3.50	2.80	
Age group			
60 - 64 years old	4.15	2.94	0.723
65 - 69 years old	3.10	2.85	
70 - 74 years old	3.76	2.52	
75 - 79 years old	3.22	2.46	
80+ years old	4	3.12	
Marital status			
Divorced	4.11	2.74	0.680
Single	3.92	2.87	
Widowed	3.51	2.75	
Married or stable union	3.43	2.80	
Schooling			
Illiterate	4.06	2.70	0.138
1 – 4 years of study	3.37	2.56	
5 – 8 years of study	3.44	2.73	
9 – 12 years of study	3.77	3.08	
13+ years of study	2.25	2	
Personal income			
< 1 minimum wage	4.83	1.32	0.020
1 - 3 minimum wages	3.45	2.75	
4 - 5 minimum wages	1.50	1.07	
6+ minimum wages	2	-	
No income	6.08	2.77	
Occupation			
No	3.60	2.68	0.207
Yes	3.46	2.99	
Type of income			
None	6.17	4.11	0.044
Benefits	5.50	2.12	
Own work	4.08	3.66	
Pension	3.57	2.63	
Rent	3.50	1.70	
Retirement	3.44	2.60	
Employee	2.80	1.48	

Source: The authors (2019).

In relation to the association between depressive symptoms and the health conditions of the sample, it was possible to observe statistical significance between depressive symptoms and the dyslipidemia variable ($p=0.038$) (Table 3).

Table 3 - Association between depressive symptoms and health conditions of aged people with *Diabetes Mellitus*. João Pessoa, PB, Brazil, 2019.

Variables	Depressive Symptoms		
	Mean	Standard Deviation	p-value
Physical activity			
No	3.64	2.78	0.679
Yes	3.50	2.77	
Consumption of alcoholic beverages			
Yes	4	3.27	0.707
No	3.53	2.72	
Presence of comorbidities			
No	3.91	2.71	0.052
Yes	3.51	2.79	
Systemic arterial hypertension			
No	4.26	2.92	0.092
Yes	3.36	2.70	
Musculoskeletal			
No	3.61	2.91	0.879
Yes	3.49	2.43	
Dyslipidemia			
Yes	3.84	2.88	0.038
No	2.57	2.04	
Glaucoma			
No	3.59	2.79	0.892
Yes	3.33	2.58	
Heart disease			
Yes	4.62	2.08	0.224
No	3.47	2.31	

Source: Authors, (2019).

Table 4 shows statistical significance between depressive symptoms and complications of *Diabetes Mellitus* ($p=0.045$) and also retinopathy ($p=0.033$).

Table 4 - Association between depressive symptoms and characteristics of Diabetes Mellitus. João Pessoa, PB, Brazil, 2019.

Variables	Depressive Symptoms		
	Mean	Standard Deviation	p-value
Diagnosis time			
1 – 2 years	3.52	3.21	0.632
3 – 5 years	3.21	2.95	
6 – 10 years	3.36	2.20	
11 – 20 years	4.06	2.83	
21+ years	4.07	3.10	
Treatment time			
1 – 2 years	3.69	3.32	0.583
3 – 5 years	3.06	2.75	
6 – 10 years	3.39	2.19	
11 – 20 years	4.20	2.90	
21+ years	3.77	3.21	
Family history of diabetes			
Yes	3.79	2.77	0.241
No	3.30	2.77	
Diabetes complications			
Yes	4	2.89	0.045
No	3.05	2.54	
Neuropathy			
Yes	3.85	2.81	0.302
No	3.41	2.75	
Retinopathy			
Yes	4.58	2.78	0.033
No	3.36	2.73	
Stroke			
Yes	4.56	3.24	0.281
No	3.51	2.74	
Nephropathy			
Yes	4	3.10	0.736
No	3.55	2.76	
Infarction			
No	3.64	2.78	0.192
Yes	2.17	2.31	
Diabetic foot			
Yes	5.33	5.03	0.498

No	3.54	2.72
----	------	------

Source: The authors (2019).

DISCUSSION

The results of this study indicate presence of depressive symptoms in a small percentage of the participants, which can be related to the excessive emotional burden of chronic diabetes, as it requires the patient to implement changes in lifestyle and adhere to a strict treatment regime for self-control of the pathology, with these symptoms being common in patients who are subjected to more expensive treatments, as in relation to those who use insulin therapy, when compared to those who only use oral hypoglycemic agents¹⁵.

Depression in people with *Diabetes Mellitus* has a synergistic effect, as presence of both diseases contributes to a decrease in self-care, increases the risk of complications of a micro- and macro-vascular nature, and imposes higher chances of mortality¹⁶. Therefore, it is necessary that health professionals pay attention regarding the existence of these pathologies in older adults.

In a study carried out with users with diabetes in the Primary Care services of Encarnación in Paraguay, presence of mild depression was identified in 32.9% of the participants, revealing the importance of care with psychosocial interventions to be developed by the team, pointing out that this depression level can be treated at the HU, whereas more severe levels should be referred to specialists¹⁷. Nurses play a key role in the identification of depressive symptoms in aged people with *Diabetes Mellitus*, and Nursing consultations are a propitious moment for these findings.

The association between depressive symptoms and the sociodemographic variables presented statistical significance, in which older adults with low personal incomes or who do not earn any income had a higher mean of depressive symptoms. It is known that restriction of financial resources tends to leave older adults in a condition of social vulnerability, thus generating moments of stress that can affect the physical and cognitive domains and favor discouragement, social isolation and sadness¹⁸.

The vulnerability experienced by a large part of the older adults is not an exclusive Brazilian reality, as it is also observed with significant frequency in underdeveloped or developing countries, which can cause serious harms to health and quality of life due to lack of financial, family and governmental support, contributing to the emergence of depressive symptoms¹⁹.

In the case of older adults with *Diabetes Mellitus*, the need for differentiated care, especially in relation to their diet, can trigger depressive symptoms, either due to family conflicts generated by high expenses for maintaining a healthy diet or to the impossibility of purchasing food due to low monthly incomes²⁰⁻²¹.

The presence of dyslipidemia was associated with higher means of depressive symptoms, corroborating the data of a study carried out in Recife - PE, which identified that changes in the lipid profile with increased levels of LDL-C, HDL-C and systolic blood pressure were related to a higher number of depressive symptoms in aged diabetics²².

Dyslipidemia is common in diabetic patients, especially in those with central obesity, which contributes to insulin resistance. This problem is characterized by high levels of triglycerides and the presence of small, low-density lipoproteins, which are highly atherogenic, increasing the risk of cardiovascular disease²³. The relationship between dyslipidemia and depressive symptoms could be due to the presence of comorbidities, especially arterial hypertension, as it causes greater harms to the individual's health,

increases the risk of complications and negatively interferes with their daily routine²⁴.

The association between the complications of diabetes and retinopathy variables presented statistical significance with depressive symptoms, showing that older adults with complications of the disease, mainly retinopathy, had higher means of depressive symptoms. Complications related to diabetes compromise older adults' quality of life and potentiate the vulnerabilities related to the disease and to aging, which favors the emergence of psychological problems²².

A telephone survey carried out in Maringá - PR²⁵ identified that age over 80 years old, time since diagnosis of the disease, insulin use and altered Body Mass Index are risk factors for microvascular complications such as nephropathy, peripheral neuropathy and retinopathy. Of these factors, only the Body Mass Index can be modified by the individual, which requires a change in the aged person's lifestyle and adaptation of their routine, contributing to the emergence of fear, anguish, uncertainty, anxiety, hopelessness and sadness²⁵.

Diabetic retinopathy is a complex pathology, being one of the main causes of blindness in people with diabetes. A research study carried out in the Republic of Croatia evidenced the prevalence of this complication in 44.5% of the participants²⁶, whereas in China, 40% of the diabetics have some type of retinopathy associated with aging and with presence of comorbidities such as arterial hypertension and metabolic syndrome²⁷.

In this context, it becomes indispensable to monitor the blood parameters and pay attention to eye diseases in older adults with *Diabetes Mellitus*. Self-care represents an important tool for the prevention of complications, especially retinopathy, which should be encouraged and supported by health professionals, as the impacts of this complication are intense in older adults, generating dependence and frailty, which can favor the emergence of depressive symptoms²⁸.

It is relevant that Nursing professionals working in Primary Health Care focus on health promotion and disease prevention actions with a stimulus for healthy and active aging, in addition to the development of activities that explore education, culture, leisure and self-care. Such actions can strengthen ties with the users and their family members, contribute to quality care and promote better quality of life²⁹.

The multidimensional assessment of an aged person represents a key instrument for acting in Primary Health Care, as it points out the main older adults' demands as well as their frailty, identifies the need for referral to other specialized services, individualizes the care plan and organizes the health care network, promoting dignified, safe and good quality care that respects the health policy for older adults³⁰.

The study does have limitations, considering that the sample comprises the FHUs of a single Brazilian municipality. Finally, it is suggested that further research studies be carried out in other municipalities with different scenarios and varying health system complexity levels for the purpose of comparing results.

CONCLUSION

The focus of this study was to identify the factors related to depressive symptoms in older adults with *Diabetes Mellitus*; therefore, it was noticed that social factors and those related to the disease can exert a negative influence on older adults' psychological state and favor the emergence of depressive symptoms.

Aged people with *Diabetes Mellitus* who present depressive symptoms are more susceptible to complications related to the disease, which favors an increase in frailty and

deterioration of quality of life. In this way, this study can help Nursing undergraduates and professionals to know the older adults' reality and the risks to which they are exposed and, based on that, promote actions at the waiting rooms in the Family Health units and in Nursing consultations to encourage adoption of healthy living habits and self-care, in order to preserve older adults' autonomy and biopsychosocial well-being in the Primary Health Care context.

The results of this study are relevant for Nursing and other health areas, as they identify the profile of aged diabetics and the characteristics that favor the emergence of depressive symptoms, which allows for new reflections and discussions about public policies that can alleviate the problems related to this theme as well as preventive and care measures for this population group. Therefore, we recommend that further studies be carried out to better understand this phenomenon.

REFERENCES

1. Sousa F de JD de, Gonçalves LHT, Gamba MA. Capacidade funcional de idosos atendidos pelo programa saúde da família em Benevides, Brasil. *Rev Cuidarte*. [Internet]. 2018. [acesso em 24 set 2020]; 9(2). Disponível em: <http://dx.doi.org/10.15649/cuidarte.v9i2.508>.
2. Veras RP, Oliveira M. Envelhecer no Brasil: a construção de um modelo de cuidado. *Ciênc Saúde Colet*. [Internet]. 2018. [acesso em 24 nov 2019]; 23(6). Disponível em: <https://doi.org/10.1590/1413-81232018236.04722018>.
3. Christofolletti M, Duca GFD, Gerage AM, Malta DC. Simultaneidade de doenças crônicas não transmissíveis em 2013 nas capitais brasileiras: prevalência e perfil sociodemográfico. *Epidemiol. Serv. Saúde*. [Internet]. 2020. [acesso em 27 jul 2022]; 29(1). Disponível em: <https://doi.org/10.5123/S1679-49742020000100006>.
4. IDF. International Diabetes Federation. *IDF Diabetes Atlas Ninth edition*. [Internet]. 2019. [acesso em 11 nov 2019]. Disponível em: <https://www.diabetesatlas.org/en/#>.
5. Muzy J, Campos MR, Emmerick I, Silva RS da, Schramm JMA. Prevalência de diabetes mellitus e suas complicações e caracterização das lacunas na atenção à saúde a partir da triangulação de pesquisas. *Cad Saúde Pública*. [Internet]. 2021. [acesso em 27 jul 2022]; 37(5). Disponível em: <https://doi.org/10.1590/0102-311X00076120>.
6. Junges JR, Camargo WV de. A percepção do corpo e o autocuidado em sujeitos com diabetes mellitus 2: uma abordagem fenomenológica. *Physis: Revista de Saúde Coletiva*. [Internet]. 2020 [acesso 27 jul 2022]; 30(3). Disponível em: <https://doi.org/10.1590/S0103-73312020300318>.
7. Nascimento PPP do, Batistoni SST. Depressão e fragilidade na velhice: uma revisão narrativa das publicações de 2008-2018. *Interface - Comunic., Saude, Educ*. [Internet]. 2019. [acesso em 28 jul 2022]; 23. Disponível em: <https://doi.org/10.1590/Interface.180609>.
8. Valenzuela MJ, Munzenmayer B, Osório T, Arancibia M, Madrid E. Sintomatologia depressiva y control metabólico en pacientes ambulatorios portadores de diabetes mellitus tipo 2. *Rev Méd Chile*. [Internet]. 2018. [acesso em 24 nov 2019]; 146(12). Disponível em: <http://dx.doi.org/10.4067/s0034-98872018001201415>.
9. Ferreira FG, Gomes LO de, Grangeiro AFB, Cintra TR, Mello JLM de, Magalhães PRM de, Cunha CS da. Prevalência de depressão e fatores associados em idosos atendidos na Atenção Primária à Saúde em uma região metropolitana do Distrito Federal. *Ciência Médica*. [Internet]. 2021. [acesso em 28 jul 2022]; 31(1). Disponível em: <https://doi.org/10.15448/1980-6108.2021.1.38237>.
10. Gonçalves AMC, Teixeira MTB, Gama JR de A, Lopes CS, Silva GA e, Gamarra CJ, et al. Prevalência de depressão e fatores associados em mulheres atendidas pela Estratégia de Saúde da Família. *J Bras Psiquiatr*. [Internet]. 2018. [acesso em 28 jul 2022]; 67(2). Disponível em: <https://doi.org/10.1590/0047-2085000000192>.

11. Marques GCS, Rodrigues JS, Rodrigues SG, Souza MR de, Barros P de S, Borges CJ. Profissional enfermeiro: competências e habilidades para a avaliação multidimensional da pessoa idosa. Rev. Kairós. [Internet]. 2018. [acesso em 28 jul 2022]; 21(2). Disponível em: <https://revistas.pucsp.br/kairos/article/view/40938>.
12. SMS. Secretaria Municipal de Saúde. João Pessoa [Internet]. 2020. acesso em 30 nov 2019]. Disponível em: <https://www.joaopessoa.pb.gov.br/secretaria/sms/>.
13. Folstein MF, Folstein SE, Mchugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. [Internet]. 1975. [acesso em 24 nov 2019]; 12(3). Disponível em: <https://www.sciencedirect.com/science/article/abs/pii/0022395675900266?via%3Dihub>.
14. Almeida OP, Almeida SA. Confiabilidade da versão brasileira da Escala de Depressão em Geriatria (GDS) versão reduzida. Arq Neuro-Psiquiatr. [Internet]. 1999. [acesso em 30 out 2019]; 57(2B): 421-426. Disponível em: <https://doi.org/10.1590/S0004-282X1999000300013>.
15. Moulton CD, Pickup JC, Ismail K. The link between depression and diabetes: the search for shared mechanisms. Lancet Diabetes Endocrinol. [Internet]. 2015. [acesso em 19 nov 2019]; 3(6). Disponível em: [https://doi.org/10.1016/S2213-8587\(15\)00134-5](https://doi.org/10.1016/S2213-8587(15)00134-5).
16. Bădescu SV, Tătaru C, Kobylinska L, Georgescu EL, Zahiu DM, Zăgrean AM, Zăgrean L. The association between Diabetes mellitus and Depression. J Med Life. [Internet]. 2016. [Access in: 18 Jul 2020]; 9(2). Disponível em: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4863499/>.
17. Sosa AR, Brizuela M, Díaz AR-R. Nivel de depresión según la cronicidad de la Diabetes Mellitus tipo 2 y sus comorbilidades en pacientes de las Unidades de Salud, Encarnación, Paraguay 2018. Rev Salud Pública Parag. [Internet]. 2019. [acesso em 18 Jun 2020]; 9(2): 9-15. Disponível em: <https://docs.bvsalud.org/biblioref/2019/12/1047044/2307-3349-rspp-9-02-9.pdf>.
18. Oliveira DV de, Pivetta NRS, Oliveira GV do N, Silva DA da, Nascimento Júnior JRA do, Cavaglieri CR. Fatores intervenientes nos indicativos de depressão em idosos usuários das unidades básicas de saúde de Maringá, Paraná, 2017. Epidemiol Serv Saúde. [Internet]. 2019. [acesso em 18 jun 2020]; 28(3). Disponível em: <https://doi.org/10.5123/S1679-49742019000300010>.
19. Ramírez-Girón N, Osorio-Mejía AM; Gallegos-Cabriales, E. Determinantes individuales y contexto socioeconómico en el reporte de diabetes mellitus tipo 2. J Health NPEPS. [Internet]. 2019. [acesso em 20 ago 2020]; 4(2). Disponível em: <http://dx.doi.org/10.30681/252610103600>.
20. Dias EG, Nunes M do SL, Barbosa VS, Jorge SA, Campos LM. Comportamentos de pacientes com diabetes tipo 2 sob a perspectiva do autocuidado. J Health Sci. [Internet]. 2017. [acesso em 26 out 2020]; 19(2). Disponível em: <https://revista.pgskroton.com/index.php/JHealthSci/article/view/3230>.
21. Lindemann IL, Oliveira RR, Mendoza-Sassi RA. Dificuldades para alimentação saudável entre usuários da atenção básica em saúde e fatores associados. Ciênc Saúde Colet. [Internet]. 2016 [acesso em 26 out 2020]; 21(2). Disponível em: <https://doi.org/10.1590/1413-81232015212.04262015>.
22. Fittipaldi EO da S, Andrade AD de, Santos ACO, Campos S, Fernandes J, Catanho MTJ de A. Sintomas depressivos estão associados a níveis séricos elevados de colesterol de lipoproteína de baixa densidade em idosos com diabetes mellitus tipo 2. Arq Bras Cardiol. [Internet]. 2020. [acesso em 26 out 2020]; 115(3). Disponível em: <https://www.scielo.br/j/abc/a/XTTY8n7f8VVsYSv4q6MxbnC/?lang=pt&format=pdf>.
23. Cuevas A, Alonso R. Dislipidemia diabética. Rev Méd Clín Las Condes. [Internet]. 2016. [acesso em 26 out 2020]; 27(2). Disponível em: <https://doi.org/10.1016/j.rmclc.2016.04.004>.
24. Terassi M, Rossetti ES, Luchesi BM, Gramani-Say K, Hortense P, Pavarini SCI. Fatores associados aos sintomas depressivos em idosos cuidadores com dor crônica. Rev Bras Enferm. [Internet]. 2020. [acesso em 28 out 2020]; 73(1). Disponível em: <https://doi.org/10.1590/0034-7167-2017-0782>.
25. Santos A de L, Cecílio HPM, Teston EL, Arruda GO de, Peternella FMN, Marcon SS. Complicações

- microvasculares em diabéticos tipo 2 e fatores associados: inquérito telefônico de morbidade autorreferida. *Ciênc Saúde Colet*. [Internet]. 2015. [acesso em 28 out 2020]; 20:761-770. Disponível em: <https://doi.org/10.1590/1413-81232015203.12182014>.
26. Antunica AG, Bucan K, Kastelan S, Kastelan H, Ivankovic M, Šikic M. Prevalence of diabetic retinopathy in the Dubrovnik-Neretva County. *Cent Eur J Public Health*. [Internet]. 2019. [acesso em 30 nov 2019]; 27(2). Disponível em: <https://doi.org/10.21101/cejph.a5213>.
27. Yin L, Zhang D, Ren Q, Su X, Sun Z. Prevalence and risk factors of diabetic retinopathy in diabetic patients: A community based cross-sectional study. *Medicine (Baltimore)*. [Internet]. 2020. [acesso em 30 nov 2019]; 99(9). Disponível em: <https://doi.org/10.1097/MD.00000000000019236>.
28. Vicente MC, Silva CRR da, Pimenta CJL, Frazão MCLO, Costa TF da, Costa KN de FM. Resilience and self-care of elderly people with diabetes mellitus. *Rev Rene*. [Internet]. 2019. [acesso em 24 set 2020]; 20:e33947. Disponível em: <https://doi.org/10.15253/2175-6783.20192033947>.
29. Silva EP, Nogueira IS, Labegoline CMG, Carreira L, Baldissera VDA. Percepções de cuidado entre casais idosos. *Rev Bras Geriatr Gerontol*. [Internet]. 2019. [acesso em 30 nov 2019]; 22(1). Disponível em: <http://dx.doi.org/10.1590/1981-22562019022.180136>.
30. Luz GO de A, Alves DD de A, Costa HK da S, Silva Filho JC da, Stratmann PF, Souza MA de O, et al. Associação entre o letramento funcional em saúde e o autocuidado com o diabetes mellitus. *Cogitare Enferm*. [Internet]. 2019. [acesso em 24 set 2020]; 24:e66452. Disponível em: <http://dx.doi.org/10.5380/ce.v24i0.66452>.

Received: 15/07/2021
Approved: 19/07/2022

Associate editor: Dra. Luciana Nogueira

Corresponding author:

Cláudia Jeane Lopes Pimenta
Universidade Federal da Paraíba
Campus I, Loteamento Cidade Universitária, João Pessoa, PB. CEP 58051-900
E-mail: claudiajlpimenta@hotmail.com

Role of Authors:

Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - Santos EMB dos, Ferreira GRS, Frazão MCLO, Costa KN de FM. Drafting the work or revising it critically for important intellectual content - Pimenta CJL, Costa TF da, Ribeiro G da S, Costa KN de FM. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - Santos EMB dos, Costa KN de FM. All authors approved the final version of the text.

ISSN 2176-9133



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).