



## Depression and anxiety in subjects with chronic non-communicable diseases

Jéssica Maria Vieira Evangelista<sup>1</sup>; Viviane Soares<sup>2</sup>, Ludymilla Pollyana Magalhães Mendanha<sup>2</sup>, Iransé Oliveira-Silva<sup>2</sup>; William Alves Lima<sup>2</sup>; Henrique Lima Ribeiro<sup>2</sup>; Jairo Teixeira Junior<sup>2</sup>; Grassyara Pinho Tolentino<sup>2</sup>; Patrícia Espíndola Mota Venâncio<sup>2</sup>.

### ABSTRACT

**Background:** Modern society is undergoing socio-cultural and economic transformations. Such changes lead to situations in which the human being has to choose between his health or practicality, directly affecting his quality of life. Pathologies with a high degree of morbidity such as depression, anxiety and chronic diseases immerse themselves in this equation, and are taking alarming proportions in society nowadays. **Objectives:** To identify the levels of depression and anxiety in individuals with chronic non-communicable diseases. **Method:** This is a cross-sectional and quantitative study, consisting of 23 young adults with 20-40 years old, hypertensive or with type 2 diabetes mellitus. The symptoms of depression and anxiety were evaluated using the Beck Depression Inventory and Beck Anxiety Inventory. **Results:** In hypertensive patients, the mean scores for the Depression Inventory were 15.0 and for diabetics 15.6. For the Anxiety Inventory the mean scores obtained for hypertensive patients were 11.6 and 8.1 for diabetics. For the most part, both groups were classified as without depression (43.48%) and mild depression (43.48%); And without anxiety (47.9%) and mild anxiety (34.8%). Significant differences ( $p = 0.050$ ) were found only in the mean scores for the Beck Anxiety Inventory between groups. No significant differences were found between the sexes. **Conclusion:** We conclude that the studied sample, both hypertensive and diabetic patients, mostly present with depression and mild anxiety. And when compared between the sexes the women showed to be more vulnerable than the men.

**Keywords:** Depression; Anxiety; Chronic Disease; Hypertension; Diabetes.

### INTRODUCTION

Human society is undergoing transformations of a social, cultural and political-economic nature, which can change its perspective on the choices of its way of life, causing negative changes on the pattern of illness. Pathologies linked to the lifestyle caused by such changes have become epidemic in the world, and this is independent of the economic profile of the population. Of these diseases, chronic non-communicable diseases (NCDs) represent a major threat to society due to their chronic nature and slowness in the ideal approach and treatment<sup>(1)</sup>.

The absence of a regular practice of exercises, unbalanced diet and tobacco consumption are risk factors of the main chronic diseases, in which cardiovascular diseases and diabetes are the most prevalent<sup>(2)</sup>. These NCDs can be characterized as long-term pathologies, which have great chances of prevention, but denote time for treatment, if established<sup>(1)</sup>.

Chronic diseases are major source of deaths in developing countries. One of the reasons is the discovery of the disease only in the late stage. This situation arises, because in the

majority the diseases remain asymptomatic until their discovery, generating the probability of a fatal outcome<sup>(3)</sup>. In Brazil, about 70% of the deaths are caused by NCDs, which constitutes a major health problem. Programs to prevent these diseases are being instituted by the Ministry of Health for the prevention and reduction of mortality rates in the country<sup>(4)</sup>.

Among NCDs, hypertension is a chronic disease of great prevalence that has been increasing the mortality rates of the world population<sup>(5)</sup>. Its diagnosis is obtained through a mapping of blood pressure levels, measuring blood pressure (BP) regularly, in which if the elevation of these levels is observed repeatedly in the casual measurements the individual will be diagnosed as hypertensive<sup>(6)</sup>. The follow-up of this disease is necessary in order to prevent the development of serious cardiovascular diseases, such as acute myocardial infarction and congestive heart failure<sup>(7)</sup>.

Multiple risk factors are linked with the development of this pathology, such as aging, unhealthy diet, alcohol and tobacco abuse, absence of regular exercise and obesity. In addition,

**Corresponding Author:** Patrícia Espíndola Mota Venâncio. Rua Leopoldo de Bulhões n.1014, Centro, CEP 75040-500- Anápolis- GO, Telephone: 00 55 62 992639330. E-mail: venanciopatrícia@hotmail.com

<sup>2</sup> Professor at University Center of Anápolis (UNIEVANGELICA), Anápolis (GO), Brazil.

Full list of author information is available at the end of the article.

**Financial support:** The authors declare that there was no financial support.

**Submission date 04 August 2017; Acceptance date 05 October 2017; Publication date 27 October 2017**





countries with low and medium purchasing power are more affected by hypertension, due to the higher population rate of these places and the poor health system that is offered to society. Compared to the first world countries, the population receive less treatment and control of hypertension, as well as previous diagnosis<sup>(8)</sup>.

Diabetes is an NCDs that causes great mortality in the world population. Approximately 36 million people died in 2008 from chronic diseases<sup>(9)</sup>. Of these, diabetes accounted for 3.6% of all deaths.

Physiologically, diabetes consists of deficiency in Beta cell production or hormonal failure. Diabetes mellitus type 1 (DM1) is caused by the self-destruction of  $\beta$ -cells in the body, which leads to non-production of insulin. Diabetes mellitus type 2 (DM2) is caused by the failure of insulin secretion generated by a resistance to this hormone by the body. The treatment measure of this pathology is mainly based on glycemic index control<sup>(10)</sup>.

However, NCDs can present an injury when linked to psychological illness. Depression is considered one of the most impacting disorders in a person's life, causing physical, emotional and social losses<sup>(11)</sup>. Associated with NCDs, depression becomes a possible aggravator of the disease, since data indicate a higher incidence of depression in chronic patients compared to those who are absent from this pathology, as well as evidences showed that when associated with the diseases have worse outcomes<sup>(12)</sup>. In another psychosomatic pole, we have anxious disorders.

Intimidating situations for the human being generate a natural feeling of fear, in which the organism reacts by enabling it to perform a reaction of retreat or struggle against the threat. However, in anxiety, this reaction becomes a state of vigilance against intangible threats, making one cautious and elusive in an unhealthy and persistent way, affecting his mental and physical health<sup>(13)</sup>.

Physiologically, links between Stress, Anxiety and Depression have a high level of comorbidity<sup>(14)</sup>.

In view of the above statements, such study finds the problematic: What are the indicators of depression and anxiety in individuals with NCDs?

The need for such a study is justified by the lack of studies with this perspective, even with the relation of the subjects addressed and consequences in patients with NCDs. These results will have importance for the scientific and for the society in the future.

The study aims to: Identify the indicators of depression and anxiety in individuals with NCDs.

## METHODOLOGY

This is a quantitative, cross-sectional and descriptive study carried out with 13 hypertensive individuals and 10 diabetic patients with  $28.29 \pm 8.25$  years old, of both sexes, living in Anápolis-GO.

First, a cover letter was sent along with a co-participant institution term to the director of the Family Health Strategy

of Anápolis-Go for the study in the Family Health Units. The present study was submitted to the approval of the Research Ethics Committee of the Centro Universitário de Anápolis (UNIEVANGELICA) with number 2.147.331/2017. For inclusion in the research, participants signed the Informed Consent Term, which explained the study objectives, risks and benefits.

The confidentiality of the information provided by the respondent was guaranteed by hiding and replacing his name with numbers. This material has been archived in a way to grant restricted access to the researchers involved, and will have custody for five years, when they will be incinerated. The individual's privacy was protected, since the research was conducted in a private room with only the researcher and the evaluator.

Subjects answered two questionnaires: the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI).

BDI is a self-report questionnaire developed by Beck *et al.*<sup>(15)</sup> composed of 21 categories aimed at the symptomatology of depression in the social, cognitive and somatic domains. The Brazilian version was validated by Cunha<sup>(16)</sup> and each category has four alternatives ranging from 0 to 3, in which zero equals the absence of symptoms and three the presence of higher intensity of symptoms. The maximum score to be achieved is 0 to 63, and the intensity of depression is correlated with the highest score obtained in the test. The interpretation of the scores is performed according to the standardization, in which: score from 0 to 11, minimal or no depression; 12 to 19, mild depression; 20 to 35, moderate depression; 36 to 53, severe depression.

BAI is a questionnaire that measures the intensity of symptoms of anxiety through 21 items that carry the main symptoms of this pathology. The instrument was created by Beck *et al.*<sup>(17)</sup> and validated for Brazilians by Cunha<sup>(16)</sup>. The answers are obtained through a four-point likert scale, ranging from 0 to 3 in which: 0) Absolutely not; 1) Lightly: did not bother me too much; 2) Moderately: it was very unpleasant but I could bear it; 3) Severely: hard to bear. The final score ranges from 0 to 63 points in which a higher score indicates more severe symptoms. Also according to this adaptation, the interpretation of the scores is performed as follows: for results between 0 to 10, the individual will be within the minimum limit; 11-19, mild anxiety; 20 to 30, moderate anxiety; 31 to 63, severe anxiety.

Were used a descriptive analysis in percentage and a t-test of student and a Mann-Whitney to compare the groups and sexes, through the program SPSS20.0 adopting a level of significance of  $p=0.005$ .

## RESULTS

The results of Table 1 refer to the mean scores obtained through BDI and BAI in hypertensive and diabetic individuals. For hypertensive patients, the mean BDI score was 15.0, and



**Table 1.** Beck Depression Inventory and Beck Anxiety Inventory in hypertensive and diabetic patients of both sexes.

Classification	Hypertensive		Diabetic	
	BDI	BAI	BDI	BAI
Mean	15.0	11.6	15.61	8.1*
Standard Deviation	±11.26	±3.59	±11.98	±3.69
Minimum	0.0	6.0	1.0	3.0
Maximum	38.0	19.0	41.0	13.0

Note: BDI- Beck Depression Inventory; BAI- Beck Anxiety Inventory; BAI\* p= 0.050

for diabetics 8.1. Only the mean BAI scores between the groups presented a significant difference ( $p=0.050$ ), in which for hypertensive individuals it was 11.6 and 8.1 for diabetics.

Table 2 shows the results regarding depression obtained through BDI, which reports that the groups are mostly characterized as “minimal or no depression” (43.48%) or with “mild depression” (43.48%). Analyzing individually the predominant classification of each group, 38.45% of the hypertensive sample were classified as “without depression” and 38.45% with “mild depression”. On the other hand, diabetics presented 50% of the sample with “mild depression” and 50% “without depression”.

Regarding anxiety, the results were obtained through BAI among the studied groups. In the majority of cases, the sample was classified as “Minimal or no anxiety” (47.9%) and “Light anxiety” (34.8%). Analyzing the groups individually, the hypertensive individuals were classified, predominantly as “Mild anxiety” (46.2%) followed by “Minimal or no anxiety” (30.7%). For diabetics, 70% of the sample showed “No anxiety” followed by 20% who presented “Mild anxiety”. No significant differences were found between the groups in both questionnaires.

Table 3 refers to the mean scores obtained through the BDI and BAI questionnaires in both female and male subjects of both pathologies. The results of the BDI mean scores were 11.92 for females and 16.0 for males. The mean BAI scores for females were 13.14 and 11.11 for males. No significant differences were found between the samples.

Table 4 presents the BDI and BAI classification of female and male individuals present in both groups of pathologies. For BDI, the female sample presented a predominant classification as “No depression” (57.1%), followed by “Mild depression” (37.7%). The male sample was classified as predominantly “Mild depression” (55.6%), followed by “No depression” (22.2%).

In the BAI classification, both genders were mostly “No anxiety” with 43.48% (44.4% for men and 50.0% for women), followed by “Mild anxiety” with 43.48% (33.3% for men and 35.7% for women). There were no significant differences between the groups in any of the questionnaires.

**Table 2.** Classification of the Beck Depression Inventory and Beck Anxiety Inventory in hypertensive and diabetic patients of both sexes.

Classification BDI	n hypertension(%)	n diabetes(%)	Total(%)
Minimal or no depression	5(38.45)	5(50.0)	10(43.48)
Mild depression	5(38.45)	5(50.0)	10(43.48)
Moderate depression	2(15.4)	0(0.0)	2(8.7)
Severe depression	1(7.7)	0(0.0)	1(4.34)
Total	13(100.0)	10(100.0)	23(100.0)

Classification BAI	n hypertension(%)	n diabetes(%)	Total(%)
Minimal or no anxiety	4(30.7)	7(70)	11(47.9)
Mild anxiety	6(46.2)	2(20)	8(34.8)
Moderate anxiety	1(7.7)	1(10)	2(8.7)
Severe anxiety	2(15.4)	0.0(0,0)	2(8.7)
Total	13(100.0)	10(100.0)	23(100.0)

Note: BDI- Beck Depression Inventory; BAI- Beck Anxiety Inventory; BAI\* p= 0.050

**Table 3.** Mean of the total score of the Beck Depression Inventory and Beck Anxiety Inventory in both male and female groups.

Classification	Female		Male	
	BDI	BAI	BDI	BAI
Mean	11.92	13.14	16.0	11.11
Standard Deviation	±7.76	±10.84	±10.19	±8.78
Minimum	0.0	3.0	3	1
Maximum	32.0	38.0	38	31

**Table 4:** Classification of the Beck Depression Inventory and Beck Anxiety Inventory in female and male subjects of both pathologies.

Classification BDI	n Male(%)	n Female(%)	Total(%)
Minimal or no depression	2(22.2)	8(57.1)	10(43.48)
Mild depression	5(55.6)	5(37.7)	10(43.48)
Moderate depression	1(11.1)	1(7.1)	2(8.7)
Severe depression	1(11.1)	0(0.0)	1(4.34)
Total	9(100.0)	14(100)	23(100)

Classification BAI	n Male(%)	n Female(%)	Total(%)
Minimal or no anxiety	4(44.4)	7(50.0)	11(47.9)
Mild anxiety	3(33.3)	5(35.7)	8(34.8)
Moderate anxiety	1(11.1)	1(7.1)	2(8.7)
Severe anxiety	1(11.1)	1(7.1)	2(8.7)
Total	9(100.0)	14(100.0)	23(100.0)



## DISCUSSION

The disorders caused by anxiety have great morbidity in the health of the human being, reaching about a third of the society at some point in their life, becoming a risk factor that deserves attention of the authorities responsible for world health<sup>(18)</sup>. Associating anxiety with hypertension, a study using the National Health Research database, with hypertensive and non-hypertensive individuals, found that individuals with the disease had higher anxiety rates when compared to the general population<sup>(19)</sup>, fact that can be justified through another study<sup>(20)</sup>, in which reported that the diagnosis of hypertension is significantly associated with anxiety, acting as a risk factor for this pathology. The data from this study showed that 69.3% of the hypertensive sample had anxiety at some level, predominantly mild anxiety (46.2%), corroborating with the studies presented in relation to the association between anxiety and hypertension.

Regarding diabetes and anxiety, the results of this study indicate that 70% of the sample were classified as without anxiety and 30% presented anxiety at some level, being predominant mild anxiety (20%), corroborating with another study<sup>(21)</sup>, which was performed with diabetics of both sexes and obtained that 21.8% had some anxiety disorder.

Another relevant psychological disorder is depression. When associated with hypertension and diabetes, this disease acts as an aggravating factor and provides worse outcomes in the clinical manifestations of the disease<sup>(12)</sup>. Relating depression with diabetes, a study with 60 diabetic subjects of both sexes attended by the Basic Health Unit through BDI found that 36% of the sample had mild to severe depression<sup>(22)</sup>, data that resemble this research regarding the sample, applied methodology and results, which obtained that 50% of the sample presents depression. In a study with 133 diabetics of both sexes through BDI, 36.8% of the sample presented depression at all levels, mainly mild depression (26%), which corroborate with this research, since most of the individuals have mild depression (50%)<sup>(23)</sup>. These data can be explained through the study of Rotella and Manucci<sup>(24)</sup>, which found that diabetes may be a risk factor for the development of depressive disorders.

Relating individuals from both groups with depression, one study showed that men are more susceptible to anxious pictures than women<sup>(25)</sup>, since it corroborates with the current study, in which the majority of the sample of men presented mild depression (55.6%), followed by without depression (22.2%), whereas the predominant female classification was without depression (57.1%), followed by mild depression (37.7%), even though they did not present significant differences between the groups.

## CONCLUSION

It is concluded that the sample studied, both hypertensive and diabetic patients, mostly present mild depression and anxiety. And when compared between the genders women showed to be more vulnerable than men. However, in-depth

studies are needed to evaluate the impacts of this relationship of pathologies on the life of the individuals.

## AUTHOR'S CONTRIBUTION

JMVE, study design, data collection, interpretation of results, writing of the manuscript. VS, analysis of data and interpretation of results, LPMM, writing of the manuscript. IOS, analysis of data, interpretation of results, writing of the manuscript. IOS, WAL, HLR, JJJ, GPT, writing of the manuscript. PEMV, review all manuscripts, study design, writing of the manuscript.

## CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

## AUTHOR DETAILS

<sup>1</sup> Physical Education Student at University Center of Anápolis (UNIEVANGELICA), Anápolis (GO), Brazil. 3. School of Medicine, University Center of Anápolis (UNIEVANGELICA), Anápolis (GO), Brazil.

## REFERENCES

1. Brasil. Ministério da saúde. Diretrizes e recomendações para o cuidado integral de doenças crônicas não-transmissíveis: promoção da saúde, vigilância, prevenção e assistência. Brasília (DF); 2008.
2. Organização Mundial da Saúde. Prevenção de doenças crônicas: um investimento vital. Brasília (DF); 2005.
3. Lessa LR, Fontenelle L. Toxina botulínica como tratamento para fobia social generalizada com hiperidrose. *Rev Psiq Clin.* 2011;38(2):84-6.
4. Brasil. Ministério da saúde. Plano de ações estratégicas para o enfrentamento das doenças crônicas não transmissíveis (DCNT) no Brasil 2011-2022. Brasília (DF);2011.
5. Wijerathne B, Meier R, Agampodi T, Agampodi S. Dermatoglyphics in hypertension: a review. *Journal of Physiological Anthropology.* 2015;34(29).
6. Sociedade Brasileira de Cardiologia. VI diretrizes brasileiras de hipertensão. *Arq Bras Cardiol.* 2010;94(1 suppl):1-51.
7. Rabetti A, Freitas S. Avaliação das ações em hipertensão arterial sistêmica na atenção básica. *Rev Saúde Pública.* 2011;45(2):258-68.
8. Organização Mundial da Saúde. A global brief of hypertension: silent killer, global public crises. Geneva (SWZ); 2013.
9. Organização Mundial da Saúde. Global status report on noncommunicable diseases 2010. Geneva (SWZ); 2010.
10. American Diabetes Association. Classification and diagnoses of diabetes. *Diabetes care.* 2015;38(1 suppl).
11. Abelha L. Depressão, uma questão de saúde pública. *Cad. Saúde Colet.* 2014;22(3): 223.
12. Bangalore S, Gong Y, Cooper-dehoff R, Pepine C, Messerli F. 2014 eight joint national committee panel recommendation for blood pressure targets revisited. *Journal of the american college of cardiology.* 2014;64(8).
13. American Psychiatric Association. Manual e Diagnóstico de Transtornos Mentais DSM-5. 5ª ed. Porto Alegre: ARTMED; 2014.
14. Apostolo JLA, Figueiredo MH, Mendes AC, Rodrigues MA. Depressão, ansiedade e estresse em usuários de cuidados primários de saúde. *Rev Latino-Am. Enfermagem.* 2011;19(2).
15. Beck A, Ward C, Mendelson M, Mock J, Erbaugh J An inventory for measuring depression. *American Psychological Association.* 1967;4.
16. Cunha JA. Manual da versão em português das Escalas Beck. São Paulo: Casa do Psicólogo; 2001.
17. Beck A, Epstein N, Brown G, Steer R. An inventory for measuring clinical anxiety: psychometric properties. *American Psychological Association.* 1988; 56(6):893-897.



- 18 Bandelow B, Michaelis S. Epidemiology of anxiety disorders in the 21st century. *Dialogues in Clinical Neuroscience*. 2015;17(3).
- 19 Wu EL, Chien I, Lin CH. Increased risk of hypertension in patients with anxiety disorders: A population-based study. *Journal of Psychosomatic Research*. 2014;77:522-27.
- 20 Stein DJ, Aguilar-Caxiola S, Alonso J, Bruffaerts R, Jonge P, Liu Z, et al. Associations between mental disorders and subsequent onset of hypertension. *General Hospital Psychiatry*. 2014;36:142-9.
- 21 Edwards LE, Mezuk B. Anxiety and risk of type 2 diabetes: Evidence from the Baltimore Epidemiologic Catchment Area Study. *J Psychosom Res*. 2012; 73(6):418–23.
- 22 Mauro MN, Moreira DG, Paiva SC, Lisboa FT. Incidência de depressão em pacientes diabéticos em uma unidade de saúde. *An Congr Bras Med Fam Comunidade*. Belém, 2013 Maio; 12:695.
- 23 Arshad AR, Alvi KY. Frequency of depression in type 2 diabetes mellitus and an analysis of predictive factors. *J Pak Med Assoc*. 2016; 66(4):425-9.
- 24 Rotella F, Manucci E. Diabetes mellitus as a risk factor for depression. A meta-analysis of longitudinal studies. *Diabetes Research and Clinical Practice*. 2013;99:98-104.
- 25 Demmer RT, Gelb S, Suglia SF, Keys KM, Aiello AE, Colombo PC, et al. Sex Differences in the Association between Depression, Anxiety, and Type 2 Diabetes Mellitus. *Psychosom Med*. 2015;77(4):467–77.