


Prevalence of Anxiety and Depression Symptoms in People with Carpal Tunnel Syndrome*

Prevalência de sintomas de ansiedade e depressão em pessoas com a Síndrome do Túnel do Carpo

Henver Ribeiro Paiva Filho¹ Franco Luiz Cabral Pedrosa² Fernando Brito Bueno²
Valdênia Graças Nascimento Paiva¹  Elias Felix Oliveira¹ Murilo Antônio Rocha²

¹Universidade Federal do Triângulo Mineiro, Uberaba, MG, Brazil

²Orthopedics and Traumatology Service, Universidade Federal do Triângulo Mineiro, Uberaba, MG, Brazil

Address for correspondence Valdênia Graças Nascimento Paiva, MD, Ambulatório Maria da Glória – Ortopedia e Traumatologia, Hospital de Clínicas da Universidade Federal do Triângulo Mineiro (HC-UFTM), Uberaba, MG, Brazil (e-mail: vallfmtm@yahoo.com.br).

Rev Bras Ortop 2020;55(4):438–444.

Abstract

Objectives To demonstrate the prevalence of depression and anxiety symptoms in patients with carpal tunnel syndrome treated at a hand surgery outpatient clinic and to describe the clinical and epidemiological characteristics of this population.

Methods People diagnosed with carpal tunnel syndrome at the initial visit were evaluated over a 6-month period for data collection. Clinical and epidemiological characteristics were noted, and patients diagnosed with anxiety and/or depression were evaluated.

Results In total, 101 people had carpal tunnel syndrome, including 38 diagnosed with depression and 29 with anxiety. Most patients were low-income women, with elementary school-level education. More than half of the patients had at least one associated systemic comorbidity.

Conclusion Independent characteristics that statistically influenced anxiety and depression symptoms in patients with carpal tunnel syndrome were gender, smoking, and family income ($p < 0.05$).

Keywords

- ▶ carpal tunnel syndrome
- ▶ anxiety
- ▶ depression

Resumo

Objetivos Demonstrar a prevalência de sintomas de depressão e ansiedade em pessoas com a síndrome do túnel do carpo atendidas em um ambulatório de cirurgia da mão e descrever as características clínicas e epidemiológicas dessa população.

Métodos Foram avaliadas pessoas com o diagnóstico de síndrome do túnel do carpo na consulta inicial em um período de coleta de dados de 6 meses. Características clínicas e epidemiológicas foram anotadas, e as pessoas que possuíam diagnóstico de ansiedade e/ou depressão foram avaliadas.

* Work performed at the Orthopedics and Traumatology Service, Universidade Federal do Triângulo Mineiro, Uberaba, MG, Brazil.

Palavras-chave

- ▶ síndrome do túnel do carpo
- ▶ ansiedade
- ▶ depressão

Resultados Um total de 101 pessoas apresentavam síndrome do túnel do carpo e destas, 38 apresentavam diagnóstico de depressão e 29 de ansiedade. Houve prevalência de mulheres de baixa renda, com predominância do nível de escolaridade fundamental. Mais da metade dos pacientes apresentava pelo menos uma comorbidade sistêmica associada.

Conclusão Tanto para ansiedade como para depressão, as características que influenciaram estatisticamente nos sintomas em pacientes com síndrome do túnel do carpo independente das demais características avaliadas foram gênero, tabagismo, e renda familiar ($p < 0,05$).

Introduction

Carpal tunnel syndrome (CTS) is considered the most common peripheral neuropathy. It is characterized by numbness and tingling symptoms resulting from median nerve compression at the carpal tunnel level, with an estimated prevalence of 3% of the general population.¹ Depression is one of the most common mental health problems, affecting approximately 300 million people worldwide.² It is considered one of the leading causes of disability, with substantial job productivity losses and a major financial impact on society.³

The relationship between depressive symptoms and surgical outcomes in CTS is of particular interest, as both are highly prevalent conditions, especially in women.⁴

Evidence supports the significant role of lifestyles, including physical activity, alcohol consumption, smoking, and obesity, as determinants of depression.^{5,6}

Depression is diagnosed based on patient's complaints and active search for symptoms that may be neglected or not verbalized. Within this spectrum, diagnostic classifications (International Classification of Diseases and Related Health Problems – ICD 10 and the Diagnostic and Statistical Manual of Mental Disorders – DSM-5) define pathological categories as per clinical parameters, including duration, persistence, scope, psychological and physiological disfunction, and disproportion to a triggering factor. The number of people with depression has increased in some developed countries. In Japan, one of the countries with the highest suicide rates in the world, depression is the leading cause of sick leave among workers.⁷ Previous studies have shown that conditions such as depression and anxiety may contribute to functional limitation in patients with upper limb musculoskeletal disorders.⁸

It is crucial to understand the epidemiological, social, and cultural factors of people with CTS and mental health disorders, specifically anxiety and depression, to optimize patient care as a whole. Our study is warranted by the scarcity of published articles on this subject.

The present study aimed to demonstrate the clinical, epidemiological, and socioeconomic characteristics of people with CTS and symptoms of anxiety and depression under outpatient follow-up.

Methods

An observational, descriptive, cross-sectional, qualitative and quantitative study evaluated individuals with CTS under outpatient follow-up, consecutively scheduled over a period of 6 months. All procedures were performed according to the ethical standards set by the Research Ethics Committee for research on human beings and the 1964 Declaration of Helsinki. All patients agreed with the study by signing a specific informed consent.

The inclusion criteria were male and female patients over 18 years-old with a clinical diagnosis of CTS under outpatient follow-up at the hand surgery service, and a clinical diagnosis of depression and/or anxiety under outpatient follow-up at the psychiatric service. People with other neuropsychiatric diseases and those with cognitive limitations impairing the ability to answer questions were excluded.

During outpatient care, the participants were asked about anxiety and depression symptoms according to the outpatient care protocol, which contained clinical and epidemiological variables (age, gender, body mass index, marital status, number of children, smoking, education, associated diseases, occupation, family income, and time since diagnosis) and a questionnaire based on anxiety and depression criteria from the DSM-5.²

Qualitative characteristics were described using absolute and relative frequencies, whereas age was described using mean and standard deviation. The prevalence of anxiety and depression was demonstrated according to each qualitative characteristic and chi-square or exact tests (Fisher exact test or likelihood-ratio test) were used to determine associations. Ages were described according to anxiety and depression and compared using Student t-test.⁹ Odds ratios of each variable evaluated for anxiety and depression were estimated at 95% confidence intervals using simple logistic regression.¹⁰

Multiple logistic regression models¹⁰ for anxiety and depression were estimated, selecting the variables with significance levels below 0.10 ($p < 0.10$) in bivariate tests, as well as clinically important anxiety and depression variables. The SPSS for Windows version 22.0 IBM Corp., Armonk, NY, USA) was used to perform analyses, and Microsoft Excel 2003

(Microsoft Corp., Redmond, WA, USA) was used for data tabulation. Tests were performed at a 5% significance level.

Results

► **Table 1** summarizes the clinical and epidemiological characteristics from our sample. In total, there were 101 people diagnosed with CTS, including 86 women (85.1%) and 15 men (14.9%). Mean age was 54.7 years \pm 10.8 (ranging from 35 to 78 years-old). Thirty-one patients (30.7%) were obese and 36 (35.6%) were overweight. Sixty-seven people (66.3%) were married, 15 (14.9%) were single, 13 (12.9%) were divorced and 6 (5.9%) were widows. Most patients (93.1%, or 94 cases) reported having children. There were 16 smokers and 16 former smokers (15.8% each). The predominant level of education was elementary school (46 cases). There were no associated comorbidities in 31 cases (30.7%), while 31 patients (30.7%) presented only 1 systemic disease (hypertension or diabetes) and 39 (38.6%) had two or more systemic conditions (at least hypertension and diabetes). Sixty-one

Table 1 Characteristics of patients with carpal tunnel syndrome.

Variable	Description (N = 101)
Age (years), mean \pm standard deviation	54.7 \pm 10.8
Gender, n (%)	
Female	86 (85.1)
Male	15 (14.9)
Body mass index, n (%)	
Overweight	36 (35.6)
Obesity	31 (30.7)
Normal	34 (33.7)
Marital status, n (%)	
Single	15 (14.9)
Married	67 (66.3)
Divorced	13 (12.9)
Widow	6 (5.9)
Children, n (%)	
Yes	94 (93.1)
No	7 (6.9)
Smoking, n (%)	
No	69 (68.3)
Yes	16 (15.8)
Former smoker	16 (15.8)
Level of education, n (%)	
Literate	24 (23.8)
Elementary and middle school, incomplete	28 (27.7)

Table 1 (Continued)

Elementary and middle school, complete	18 (17.8)
High school, incomplete	5 (5)
High school, complete	21 (20.8)
College	5 (5)
Comorbidities, n (%)	
One systemic comorbidity	31 (30.7)
Two or more systemic comorbidities	39 (38.6)
No systemic comorbidities	31 (30.7)
Occupation, n (%)	
Retired/homemaker	40 (39.6)
Currently working	61 (60.4)
Family income, n (%)	
Up to 1 minimum wage	76 (75.2)
1–3 minimum wages	22 (21.8)
Above 3 minimum wages	3 (3)
Depression diagnosis, n (%)*	
Depression	18 (47.4)
Anxiety	8 (21.1)
Mixed – depression and anxiety	12 (31.6)
Time until diagnosis, n (%)*	
1 year	5 (13.2)
1–5 years	17 (44.7)
More than 5 years	16 (42.1)
Family history, n (%)*	
Yes	12 (31.6)
No	26 (68.4)
Anxiety, n (%)	
No	72 (71.3)
Yes	29 (28.7)
Depression, n (%)	
No	63 (62.4)
Yes	38 (37.6)

*Only cases with anxiety and/or depression.

people (60.4%) were currently working, while 40 people (39.6%) were retired. Family income was up to 1 minimum wage for 76 people (75.2%), while 3 people (3%) reported family income equal to or above 3 minimum wages. Depression was diagnosed in 38 cases (37.6%) and anxiety, in 29 (28.7%).

► **Table 2** describes the characteristics of people diagnosed with CTS and anxiety, and ► **Table 3** shows the characteristics of people with CTS and depression. ► **Table 4** demonstrates the results of models explaining the frequency of anxiety and depression adjusted by personal and clinical characteristics.

Table 2 Frequency of anxiety in patients with carpal tunnel syndrome according to personal and clinical characteristics and results of non-adjusted analysis.

Variable	Anxiety		Odds ratio	Confidence interval (95%)		P
	No (N = 72)	Yes (N = 29)		Inferior	Superior	
Age (years), mean \pm standard deviation	55.4 \pm 11.5	53.1 \pm 8.7	0.98	0.94	1.02	0.349**
Gender, n (%)						0.061*
Female	58 (67.4)	28 (32.6)	6.76	0.85	54.01	
Male	14 (93.3)	1 (6.7)	1.00			
Body mass index, n (%)						0.663
Overweight	24 (66.7)	12 (33.3)	1.63	0.57	4.66	
Obesity	22 (71)	9 (29)	1.33	0.44	4.03	
Normal	26 (76.5)	8 (23.5)	1.00			
Marital status, n (%)						0.123#
Single	8 (53.3)	7 (46.7)	1.00			
Married	52 (77.6)	15 (22.4)	0.33	0.10	1.06	
Divorced	7 (53.8)	6 (46.2)	0.98	0.22	4.34	
Widow	5 (83.3)	1 (16.7)	0.23	0.02	2.46	
Children, n (%)						0.406*
Yes	68 (77.2)	26 (27.7)	0.51	0.11	2.44	
No	4 (57.1)	3 (42.9)	1.00			
Smoking, n (%)						0.035#
No	52 (75.4)	17 (24.6)	1.00			
Yes	13 (81.3)	3 (18.8)	0.71	0.18	2.78	
Former smoker	7 (43.8)	9 (56.3)	3.93	1.27	12.17	
Level of education, n (%)						0.602#
Literate	18 (75)	6 (25)	1.00			
Elementary and middle school, incomplete	22 (78.6)	6 (21.4)	0.82	0.23	2.98	
Elementary and middle school, complete	12 (66.7)	6 (33.3)	1.50	0.39	5.77	
High school, incomplete	2 (40)	3 (60)	4.50	0.60	33.71	
High school, complete	14 (66.7)	7 (33.3)	1.50	0.41	5.48	
College	4 (80)	1 (20)	0.75	0.07	8.09	
Comorbidities, n (%)						0.315
One systemic comorbidity	25 (80.6)	6 (19.4)	0.59	0.18	1.91	
Two or more systemic comorbidities	25 (64.1)	14 (35.9)	1.37	0.50	3.78	
No systemic comorbidities	22 (71)	9 (29)	1.00			
Occupation, n (%)						0.264
Retired/homemaker	31 (77.5)	9 (22.5)	1.00			
Currently working	41 (67.2)	20 (32.8)	1.68	0.67	4.19	
Family income, n (%)						0.011#
Up to 1 minimum wage	58 (76.3)	18 (23.7)	1.00			
1–3 minimum wages	14 (63.6)	8 (36.4)	1.84	0.67	5.09	
Above 3 minimum wages	0 (0)	3 (100)	&			

Chi-square test; *Fisher exact test; # Likelihood-ratio test; **Student t-test; & No cases for estimation.

Table 3 Frequency of depression in patients with carpal tunnel syndrome according to personal and clinical characteristics and results of non-adjusted analysis.

Variable	Depression		Odds ratio	Confidence interval (95%)		P
	No (N = 63)	Yes (N = 38)		Inferior	Superior	
Age (years), mean \pm standard deviation	55.1 \pm 11.3	54.1 \pm 10.1	0.99	0.96	1.03	0.653**
Gender, n (%)						0.127
Female	51 (59.3)	35 (40.7)	2.75	0.72	10.45	
Male	12 (80)	3 (20)	1.00			
Body mass index, n (%)						0.294
Overweight	19 (52.8)	17 (47.2)	2.15	0.80	5.76	
Obesity	20 (64.5)	11 (35.5)	1.32	0.47	3.74	
Normal	24 (70.6)	10 (29.4)	1.00			
Marital status, n (%)						0.198#
Single	6 (40)	9 (60)	1.00			
Married	46 (68.7)	21 (31.3)	0.30	0.10	0.97	
Divorced	7 (53.8)	6 (46.2)	0.57	0.13	2.57	
Widow	4 (66.7)	2 (33.3)	0.33	0.05	2.43	
Children, n (%)						0.100*
Yes	61 (64.9)	33 (35.1)	0.22	0.04	1.18	
No	2 (28.6)	5 (71.4)	1.00			
Smoking, n (%)						0.075
No	47 (68.1)	22 (31.9)	1.00			
Yes	10 (62.5)	6 (37.5)	1.28	0.41	3.98	
Former smoker	6 (37.5)	10 (62.5)	3.56	1.15	11.04	
Level of education, n (%)						0.791#
Literate	15 (62.5)	9 (37.5)	1.00			
Elementary and middle school, incomplete	18 (64.3)	10 (35.7)	0.93	0.30	2.87	
Elementary and middle school, complete	12 (66.7)	6 (33.3)	0.83	0.23	3.00	
High school, incomplete	2 (40)	3 (60)	2.50	0.35	17.94	
High school, complete	14 (66.7)	7 (33.3)	0.83	0.24	2.84	
College	2 (40)	3 (60)	2.50	0.35	17.94	
Comorbidities, n (%)						0.021
One systemic comorbidity	24 (77.4)	7 (22.6)	0.61	0.20	1.90	
Two or more systemic comorbidities	18 (46.2)	21 (53.8)	2.45	0.92	6.54	
No systemic comorbidities	21 (67.7)	10 (32.3)	1.00			
Occupation, n (%)						0.389
Retired/homemaker	27 (67.5)	13 (32.5)	1.00			
Currently working	36 (59)	25 (41)	1.44	0.63	3.33	
Family income, n (%)						0.028#
Up to 1 minimum wage	51 (67.1)	25 (32.9)	1.00			
1–3 minimum wages	12 (54.5)	10 (45.5)	1.70	0.65	4.47	
Above 3 minimum wages	0 (0)	3 (100)	&			

Chi-square test; *Fisher exact test; # Likelihood-ratio test; **Student t-test; & No cases for estimation.

Table 4 Results from models explaining the frequency of anxiety and depression adjusted for personal and clinical characteristics.

Outcome	Variable	Odds ratio	Confidence interval (95%)'		p
			Inferior	Superior	
Anxiety'	Age (years)	0.99	0.94	1.03	0.547
	Gender (female)'	18.55	1.65	208.27	0.018
	Smoker (Reference: No)'	1.00			
	Smoker	0.73	0.16	3.26	0.676
	Former smoker	6.05	1.64	22.34	0.007
	Family income'	5.18	1.75	15.37	0.003
Depression	Age (years)	0.99	0.64	1.05	0.782
	Gender (female)'	8.91	1.32	60.29	0.025
	Children	0.18	0.02	1.34	0.094
	Smoker (Reference: No)'	1.00			
	Smoker	1.77	0.49	6.40	0.387
	Former smoker	4.30	1.15	16.13	0.031
	Family income'	4.26	1.41	12.82	0.010
	Other conditions (Reference: No systemic comorbidities)	1.00			
	One systemic comorbidity	0.70	0.19	2.62	0.595
	Two or more systemic comorbidities	3.34	0.94	11.87	0.062

Multiple logistic regression.

Discussion

In patients with CTS, the prevalence of anxiety and depression is 28.7% and 37.6%, respectively. Smoking and family income were statistically significant associated with anxiety in patients with CTS ($p = 0.035$ and $p = 0.011$, respectively). Depression alone was statistically associated with other diseases and family income of CTS patients ($p = 0.021$ and $p = 0.028$, respectively).

Our study showed that women with CTS were 18.55 times more likely to have anxiety than men. Estrogen concentrations induced by aromatase inhibitors are believed to reduce the estrogen antinociceptive effect, decreasing the threshold for painful stimuli and, consequently, increasing the risk of musculoskeletal disorders symptoms, including CTS.¹¹

Anxiety risk in former smokers was 6.05 times higher compared to non-smokers. Each increase in family income category led to a 5.18-fold increase in anxiety risk, regardless of other characteristics.

Women with CTS were 8.91 times more likely to be depressed than men. Former smokers presented 4.30 times higher risk of depression than non-smokers, and each increase in family income category resulted in a 4.26-fold increase in depression risk, regardless of other characteristics.

Adherence to multiple healthy lifestyles, body mass index within normal range, non-smokers, adequate physical and leisure activity, high intake of vegetables and fruits, and adequate sleep duration were associated with a significantly lower risk of depression.¹² Our study showed

that, although there were no statistically significant differences ($p > 0.05$) when compared alone, the number of overweight or obese people was still high if evaluated together, corresponding to more than half of our sample (66.3%).

Our findings are consistent with previous studies showing a significant association between some combined healthy lifestyle factors and depressive symptoms. According to Adjibade et al.¹² patients with multiple healthy lifestyle factors (no smoking, low alcohol intake, being physically active, healthy diet and normal body mass index) presented lower risk for depressive symptoms compared to those patients with only two or less healthy lifestyle factors. Although body mass index was not correlated with a higher depression or anxiety index when compared alone, almost two thirds of our patients presented values above normal. In our study, the characteristics that statistically influenced both anxiety and depression symptoms in CTS patients regardless of other characteristics were gender, smoking and family income ($p < 0.05$).

Conclusion

The prevalence of symptoms of depression and anxiety in people with CTS is high. Female gender, smoking, and low family income were the most important characteristics influencing such symptoms.

Conflict of Interests

The authors declare that have no conflict of interests.

References

- 1 Li Pi Shan R, Nicolle M, Chan M, et al. Electrodiagnostic Testing and Treatment for Carpal Tunnel Syndrome in Canada. *Can J Neurol Sci* 2016;43(01):178–182
- 2 World Health Organization. Depression and other common mental disorders: global health estimates. Disponível em: http://apps.who.int/iris/bitstream/handle/10665/254610/WHO-MSD-MER-3032017_2-eng.pdf?sequence=1. [Acessado em 20 de dezembro de 2018]
- 3 Doris A, Ebmeier K, Shajahan P. Depressive illness. *Lancet* 1999; 354(9187):1369–1375
- 4 Atroshi I, Gummesson C, Johnsson R, Ornstein E. Diagnostic properties of nerve conduction tests in population-based carpal tunnel syndrome. *BMC Musculoskelet Disord* 2003;4:9
- 5 Bakhshaie J, Zvolensky MJ, Goodwin RD. Cigarette smoking and the onset and persistence of depression among adults in the United States: 1994-2005. *Compr Psychiatry* 2015;60:142–148
- 6 Pereira-Miranda E, Costa PRF, Queiroz VAO, Pereira-Santos M, Santana MLP. Overweight and Obesity Associated with Higher Depression Prevalence in Adults: A Systematic Review and Meta-Analysis. *J Am Coll Nutr* 2017;36(03):223–233
- 7 Harvey SB, Modini M, Joyce S, et al. Can work make you mentally ill? A systematic meta-review of work-related risk factors for common mental health problems. *Occup Environ Med* 2017;74(04):301–310
- 8 Nunez F, Vranceanu AM, Ring D. Determinants of pain in patients with carpal tunnel syndrome. *Clin Orthop Relat Res* 2010;468(12):3328–3332
- 9 Kirkwood BR, Sterne JA. *Essential medical statistics*. 2nd ed. 2006. Massachusetts, USA: Blackwell Science; 2006
- 10 Hosmer DW, Lemeshow S. *Applied Logistic Regression*. 2nd ed. New York: Wiley; 2000
- 11 Al-Rousan T, Sparks JA, Pettinger M, et al. Menopausal hormone therapy and the incidence of carpal tunnel syndrome in postmenopausal women: Findings from the Women's Health Initiative. *PLoS One* 2018;13(12):e0207509
- 12 Adjibade M, Lemogne C, Julia C, et al. Prospective association between combined healthy lifestyles and risk of depressive symptoms in the French NutriNet-Santé cohort. *J Affect Disord* 2018;238:554–562