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

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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.

Keywords ➤ síndrome do túnel do carpo ➤ ansiedade ➤ depressão

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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. Depression is one of the most common mental health problems, affecting approximately 300 million people worldwide. It is considered one of the leading causes of disability, with substantial job productivity losses and a major financial impact on society.

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

Evidence supports the significant role of lifestyles, including physical activity, alcohol consumption, smoking, and obesity, as determinants of depression. 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 dysfunction, 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.

Previous studies have shown that conditions such as depression and anxiety may contribute to functional limitation in patients with upper limb musculoskeletal disorders. 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 presente 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.

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. Odds ratios of each variable evaluated for anxiety and depression were estimated at 95% confidence intervals using simple logistic regression.

Multiple logistic regression models 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 IIBM 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 ± 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 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.

| Variable                        | Description (N = 101) |
|---------------------------------|------------------------|
| Age (years), mean ± standard deviation | 54.7 ± 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) |

*Only cases with anxiety and/or depression.

**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 (%)     | 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)       |

- 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 ± standard deviation  | 55.4 ± 11.5 | 53.1 ± 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 | P     |
|-----------------------------------|------------|------------|---------------------|-------|
|                                   | No (N = 63) | Yes (N = 38) | Inferior       | Superior       |       |
| Age (years), mean ± standard deviation | 55.1 ± 11.3  | 54.1 ± 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 |
| Yes                               | 10 (62.5)  | 6 (37.5)   | 1.28           | 0.41           | 3.98   |
| No                                | 47 (68.1)  | 22 (31.9)  | 1.00           |                |        |
| 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.
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).

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.

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.
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