Cyberchondria and Associated Factors Among Brazilian and Portuguese Dentists

Junia Maria Serra-Negra[1], Saul M. Paiva[1], Ana Sofia Baptista[2], Alex Junio S. Cruz[3], Teresa Pinho[2], Mauro Henrique Abreu[3]

[1] Universidade Federal de Minas Gerais, Faculdade de Odontologia, Departamento de Saúde Bucal da Criança, Brasil.
[2] Cooperativa de Ensino Superior Politécnico e Universitário, Departamento de Medicina Dentária, Portugal.
[3] Universidade Federal de Minas Gerais, Faculdade de Odontologia, Departamento de Saúde Coletiva, Brasil.

ABSTRACT

Cyberchondria is a psychopathological behavior that affects people who compulsively consult the internet, by searching the symptoms of different pathologies from which they believe they are suffering, and when influenced by what they read, are sure they have some of these diseases. The aim of this study was to assess the cyberchondria level and associated factors among Brazilian and Portuguese dentists. A total 597 Brazilian and Portuguese dentists participated in this cross-sectional study. They were contacted via WhatsApp and asked to complete an online questionnaire on the Google Forms platform, from January 17 to 31, 2021, during the COVID-19 pandemic. Sociodemographic information was collected and cyberchondria was measured using the Portuguese language version of the Cyberchondria Severity Scale. Binary logistic regression models were used to estimate the unadjusted and adjusted Odds Ratio (OR) and corresponding 95% confidence interval (CI) for the association of cyberchondria and covariates. Each covariate was individually included in the regression model, and the unadjusted OR (95% CI) was estimated. Most participants were Brazilian (62.8%), women (75.5%), married (60.5%) and with children (55.6%). Average age was 42.1 years (+ 12.5). In the final model, it was found that with each increase of one year in age, the chance of a high level of cyberchondria decreased (OR=0.97; 95% CI 0.95-0.98). Brazilian dentists were 1.85 times more likely (95% CI 1.25-2.75) to have a high level of cyberchondria than Portuguese dentists. Women were 1.62 times more likely (95% CI 1.07-2.44) to have a high level of cyberchondria than men. It was concluded that young age, Brazilian nationality, and female gender favored the high level of cyberchondria among the participants in this sample during COVID-19 pandemic.

Keywords: *behavior - somatoform disorder - dentistry - epidemiology - COVID-19 pandemic.*

Cibercondria e fatores associados entre dentistas brasileiros e portugueses

RESUMO

A cibercondria é um comportamento psicopatológico que atinge as pessoas que consultam compulsivamente a internet, pesquisando os sintomas das diferentes patologias de que acreditam estar sofrendo e, quando influenciadas pelo que leem, têm a certeza de possuir alguma dessas doenças. O objetivo deste estudo foi avaliar o nível de cibercondria e fatores associados entre dentistas brasileiros e portugueses. Participaram deste estudo transversal 597 dentistas brasileiros e portugueses. Eles foram contatados via WhatsApp e solicitados a preencher um questionário online na plataforma do Google Forms, no período de 17 a 31 de janeiro de 2021, durante a pandemia de COVID-19. Informações sociodemográficas foram coletadas e a cibercondria foi mensurada através da versão em língua portuguesa da Cyberchondria Severity Scale. Modelos de regressão logística binária foram usados para estimar a Odds Ratio (OR) não ajustada e ajustada e o intervalo de confiança (IC) de 95% correspondente para a associação de cibercondria e covariáveis. Cada covariável foi incluída individualmente no modelo de regressão, e o OR não ajustado (IC 95%) foi estimado. A maioria dos participantes eram brasileiros (62,8%), mulheres (75,5%), casados (60,5%) e com filhos (55,6%). A média de idade foi de 42,1 anos (+ 12,5). No modelo final, verificou-se que a cada aumento de um ano de vida, a chance de um nível elevado de cibercondria diminuía (OR = 0,97; IC95% 0,95-0,98). Os dentistas brasileiros tiveram 1,85 vezes mais probabilidade (IC95% 1,25-2,75) de apresentar alto índice de cibercondria quando comparados aos portugueses. As mulheres tinham 1,62 vezes mais probabilidade (IC 95% 1,07-2,44) de ter um alto nível de cibercondria em comparação com os homens. Concluiu-se que a idade mais jovem, a nacionalidade brasileira e o sexo feminino favoreceram o alto índice de cibercondria entre os participantes desta amostra durante a pandemia COVID-19.

Palavras-chave: *comportamento - transtorno somatoforme - odontologia – epidemiologi -- pandemia COVID-19.*

INTRODUCTION

The term "Cyberchondria" was coined by joining the words cyber and hypochondria to characterize a psychopathological behavior, a somatoform disorder, now also called digital hypochondria. A cyberchondriac is a person who performs repeated internet searches for health information, which are associated with increasing levels of health anxiety[1]. The impact of internet on access to health information has increased over time[2], and although finding information on the characteristics, prevention and self-care of illnesses has enabled people to improve their health outcomes[3], it should be noted that internet can provide access to both trustworthy and untrustworthy content[2].

Cyberchondria entails excessive online searches to seek reassurance about the nonthreatening nature of the self-perceived signs and symptoms. This condition has been associated with obsessive-compulsive disorders, hypochondriasis, and health anxiety, and can be a risk factor for the development of more mental illness[4]. People with cyberchondria have heightened anxiety, often because of new pathologies that they have discovered online, and this generates new concerns that are amplified in the mind of the cyberchondriac. Anxiety disorders can lead to discomfort, accelerated heartbeat, cold sweat and poor sleep quality[5].

Cyberchondria has been studied since 2000[1]. Since then, professionals have sought to analyze this behavior that can be adopted by anyone, including students of health sciences. Students of medicine, nursing, dentistry, and other health sciences may incorrectly believe that they have contracted certain diseases they have studied[6]. This can also be observed in the form of anxiety. Health anxiety, cyberchondria and sociodemographic factors may show specific behavior patterns among students of health sciences. Medical students in Turkey had high scores of health anxiety and men were more suspicious of doctors, seeking information on the internet prior to going for medical consultations[6]. This mistrustful behavior can compromise the promotion of physical and emotional health[6]. A study on Indian computer technicians found a prevalence of 55.6% of high level of cyberchondria[7], and the authors emphasized that this high prevalence deserved preventive care. Cyberchondria compromises mental health, so finding ways to prevent it can help promote public health[7].

In view of the relevance and scarcity of data about the topic in the field of dentistry, the aim of this study was to assess the level of cyberchondria and factors associated with it among Brazilian and Portuguese dentists.

MATERIALS AND METHODS

Ethical Aspects

This study was conducted in compliance with the principles of the Declaration of Helsinki (revised in World Medical Association 2013), and approved by the Human Research Ethics Committee of the Federal University of Minas Gerais (Brazil) (Protocol #91561018.5.0000.5149).

Design, Population, and Study Sample

This study included Brazilian and Portuguese dentists who consented to answer an online questionnaire posted on the Google Forms platform from January 17 to 31, 2021. Subjects were invited to participate by means of a link disseminated via WhatsApp, Facebook Messenger, and online forums for Dentists. Dentists were contacted through both Brazilian and Portuguese dental class societies.

The questionnaire was structured into two sections: one for collecting sociodemographic information, and another to measure cyberchondria using the Portuguese language version of the Cyberchondria Severity Scale (CSS)[8]. The original CSS was developed by Irish psychologists with undergraduate students[9].

To participate in the study, each participant was asked to complete and sign a free and informed consent form. Only dentists were included. The exclusion criterion was anyone who was not a dentist from Portugal or Brazil. Each participant received his/her personal score for the CSS.

Data Collection and Variables

Participants answered a questionnaire with 40 closed questions. The questionnaire included seven questions to collect participants' demographic information.

The CSS includes 33 statements that allow each participant to define his/her typical behavior, using a five-point scale: Never; Rarely; Sometimes; Frequently; Always[8]. The total score ranged from zero to 132 points. The higher the score, the higher the level of cyberchondria[8].

Pilot Study

A pilot study to evaluate the proposed methodology was conducted on 21 dentists. The results of the pilot

study demonstrated that there was no need to modify the proposed methods of the main study. Pilot study participants were not included in the main study.

Statistical Analysis
Descriptive data analysis was performed with the calculation of proportions, central tendency and variability measures. The dependent variable was the Cyberchondria score, which ranged from 0 to 132. The score was categorized by the median, into low level of Cyberchondria (0-35), and high level of Cyberchondria (36-132).
Binary logistic regression models were used to estimate the unadjusted and adjusted Odds Ratio (OR) and corresponding 95% Confidence Interval (CI) for the association of Cyberchondria and covariates. Each covariate was individually included in the regression model, and the unadjusted OR (95% CI)

was estimated. All covariates were simultaneously included in the final binary logistic model, in which only variables with P values lower than 0.05 remained significant. Linearity of logit of quantitative variables was also checked. Collinearity diagnosis was made by the Variation Inflation Factor. The Hosmer & Lemeshow test was used to check the goodness of fit of the final model. All statistical analysis was performed using SPSS software for Windows version 26.0 (SPSS Inc., Chicago, IL, USA).

RESULTS
A total 597 dentists participated in this study, of whom 62.8% were Brazilian, and 37.2%, Portuguese. The majority had graduate degrees (57.2%), were women (75.5%), married (60.5%) and had children (55.6%). Age ranged from 22 to 77 years, with mean age 42.1 (+12.5) (Table 1). The power of the sample

Table 1- Descriptive analysis of the study variables			
Quantitative variables	**Mean (Median)**	**SD**	**Min-Max**
Cyberchondria score (N=597)	36.8 (35.0)	17.4	0-110
Age (N=596)	42.1 (41.0)	12.5	22-77
Years since graduation (N=597)	18.4 (17.0)	12.6	0-51
Hours of sleep per night (N=597)	6.9 (7.0)	0.9	3-10
Categorical variables	**Frequency**		**%**
Country (N=597)			
Brazil	375		62.8
Portugal	222		37.2
Sex (N=597)			
Female	451		75.5
Male	146		24.5
Marital status (N=597)			
single / divorced / widowed	236		39.5
married / cohabitation	361		60.5
BMI (N=597)			
Low weight	15		2.5
Overweight or Obesity	219		36.7
Suitable Weight	363		60.8
Graduate degree (N=596)			
Master/PhD/post-doctoral stage	341		57.2
Specialization	172		28.9
Undergraduate	83		13.9
Children (N=597)			
No	265		44.4
Yes	332		55.6
Note: Not all participants answered all questions. SD= standard deviation			

test was calculated, and when analyzing the variable referring to the countries Brazil and Portugal, a power of 78.5% was found.

The final model showed that for each one-year increase in age, the chance of high level of cyberchondria decreased (OR = 0.97; 95% CI 0.95-0.98). Brazilian dentists were 1.85 (95% CI 1.25-2.75) times more likely to have a high level of cyberchondria than Portuguese dentists. Women had 1.62 (95% CI 1.07-2.44) times greater chance of high level of cyberchondria than men. When evaluating multicollinearity, the variable ''graduated a given number of years ago" was removed from the final model VIF> 10 (Table 2). After this removal, there were no further collinearity problems in the final model. The assumption of linearity of the logarithm for the age variable was not violated. The assessment of influential cases by Cook's distance did not reveal values higher than one, indicating the absence of influential cases. The final model was

Table 2- Analysis of the association between cyberchondria scores and study variables between Brazilian and Portuguese dentists

Variables	Frequency (%) Cyberchondria score higher than the median (36-110)	Unadjusted Odds Ratio (CI 95%)	P	Adjusted Odds Ratio (CI 95%)	P
Age		0.97 (0.96-0.99)	<0.001	0.97 (0.95-0.98)	<0.001
Years since graduation		0.98 (0.96-0.99)	0.001		
Hours of sleep per night		0.96 (0.81-1.14)	0.649	0.93 (0.77-1.12)	0.467
Country (N=597)					
Brazil	52.3	1.46 (1.05-2.04)	0.025	1.85 (1.25-2.75)	0.002*
Portugal	42.8	1		1	
Sex (N=597)					
Female	51.9	1.68 (1.15-2.46)	0.007	1.62 (1.07-2.44)	0.023*
Male	39.0	1		1	
Marital status (N=597)					
single / divorced / widowed	57.6	1.81 (1.30-2.52)	<0.001	1.43 (0.95-2.15)	0.084
married / cohabitation	42.9	1		1	
BMI (N=597)					
Low weight	53.3	1.21 (0.43-3.42)	0.713	1.00 (0.34-2.92)	0.993
Overweight or Obesity	48.9	1.02 (0.73-1.42)	0.930	1.25 (0.85-1.83)	0.254
Suitable Weight	48.5	1		1	
Graduate Degree (N=596)					
Master/PhD/post-doctoral stage	50.1	1.08 (0.67-1.75)	0.750	1.19 (0.71-1.99)	0.515
Specialization	45.9	0.91 (0.54-1.54)	0.734	1.00 (0.56-1.78)	0.994
Undergraduate	48.2	1		1	
Children (N=597)					
No (N=265)	55.8	1.67 (1.21-2.32)	0.002	0.97 (0.61-1.52)	0.881
Yes (N=332)	43.1	1		1	

Note: Not all participants answered all questions. CI = confidence interval; p=probability value; BMI= body mass index. *: statistically significant values.

adequate according to the assessment made by the Hosmer & Lemeshow test (p = 0.498).

DISCUSSION

The aim of this study was to assess the level of cyberchondria, and factors associated with it, among Brazilian and Portuguese dentists. Our results demonstrated that a high level of cyberchondria was more prevalent among women, among younger ages and among Brazilian dentists. These results will be discussed below.

The study of cyberchondria is still very recent. There are controversies about gender and age differences[10]. Our findings showed a higher level of cyberchondria among women, which was in agreement with the findings of Atikinson et al. (2009)[11]. However, other studies have found no differences between the genders[11-14]. These differences in results may be justified by the cultural differences in the studies mentioned.

A systematic review found that women tended to use the internet more frequently than men[15]. On the internet, the behavior between genders differs, as women tend to seek more information on health and social networking sites while men tended to consult video. Furthermore, women tend to be more anxious than men[16]. Studies have suggested that anxious people spend more time on the Internet[11-14]. With the already present fear of contracting numerous diseases, anxious people become even more concerned about their health as a result of online medical searches, and this is characteristic of cyberchondriacs[12]. People with a high level of anxiety are more likely to exaggerate the perception of signs and symptoms of their own or those of loved ones[11]. The more emotionally overwhelmed someone feels, the more the person tends to spend time looking for the specific symptom, and the more they search for disease symptoms, the more they convinced are that they are ill[13].

Internet use was found to decrease as age increased[17]. Young people are more familiar than the elderly with websites, software and social networks[1,17], and consequently, there are more younger than older cyberchondriacs, as seen in our findings. This result was in line with those reported by McMullan et al.[1]. The number of internet users in the world has increased in recent decades. In 2021, to date, there are 145.83 million internet users in Brazil and 7.7 million in Portugal. Brazil is the larger country, with a surface area of 8.516.000 sq km and population 211 million, while Portugal has a surface area of 92.212 sq km and population 10 million[18]. The proportion of internet users in both countries is similar, at 70%. The territorial and housing differences therefore do not explain the greater number of cyberchondriacs in Brazil than in Portugal. Our findings therefore suggest a cultural difference.

It is also important to emphasize that data were collected during the COVID-19 pandemic. Social distancing was in place in both countries at the time of data collection. However, Brazil was experiencing an uncontrolled situation of disease, with an average 3000 deaths every 24 hours. Portugal had already started the vaccination campaign against COVID-19, while Brazil had not. This increases anxiety and can influence the behavior of cyberchondriacs[2,10].

Limitations were noted in this study. The cross-sectional design allows analysis of association and does not allow analysis of cause and effect. Future studies with other longitudinal and qualitative designs should be encouraged. The sample, made up of dentists, limits the extrapolation of results to other communities and other professionals. The study of cyberchondria is still very recent and there are few studies with which to compare results, which would lead to a more in-depth discussion[19]. Our findings highlight the importance of educational campaigns on cyberchondria. Dentists are important health promoters[20] and should be encouraged to take care of their own physical and mental health.

CONCLUSION

Based on the results, it may be concluded that women, younger dentists, and those of Brazilian nationality seem to be more prone to high levels of cyberchondria than men, older persons and dentists of Portuguese nationality.

CORRESPONDENCE
Prof. Junia Maria Serra-Negra.
Universidade Federal de Minas Gerais, Faculdade de Odontologia.
Av Antonio Carlos 6627 – Pampulha – Belo Horizonte – Minas Gerais – Brazil. Zip Code 31270901
juniaserranegra@hotmail.com

REFERENCES

1. McMullan RD, Berle D, Arnáez S, Starcevic V. The relationships between health anxiety, online health information seeking, and cyberchondria: Systematic review and meta-analysis. J Affect Disord. 2019 Feb 15;245:270-278. https://doi.org/10.1016/j.jad.2018.11.037
2. Jokic-Begic N, Lauri Korajlija A, Mikac U. Cyberchondria in the age of COVID-19. PLoS One. 2020 Dec 17;15(12): e0243704. https://doi.org/10.1371/journal.pone.0243704
3. Chen X, Hay JL, Waters EA, Kiviniemi MT et al. Health Literacy and Use and Trust in Health Information. J Health Commun. 2018;23(8):724-734.https://doi.org/10.1080/10810730.2018.1511658
4. Menon V, Kar SK, Tripathi A, Nebhinani N et al. Cyberchondria: conceptual relation with health anxiety, assessment, management and prevention. Asian J Psychiatr. 2020 Oct;53:102225. https://doi.org/10.1016/j.ajp.2020.102225
5. Starcevic V, Aboujaoude E. Cyberchondria, cyberbullying, cybersuicide, cybersex: "new" psychopathologies for the 21st century? World Psychiatry. 2015 Feb;14(1):97-100. https://doi.org/10.1002/wps.20195
6. Bati AH, Mandiracioglu A, Govsa F, Çam O. Health anxiety and cyberchondria among Ege University health science students. Nurse Educ Today. 2018 Dec;71:169-173. https://doi.org/10.1016/j.nedt.2018.09.029
7. Makarla S, Gopichandran V, Tondare D. Prevalence and correlates of cyberchondria among professionals working in the information technology sector in Chennai, India: A cross-sectional study. J Postgrad Med. 2019 Apr-Jun;65(2):87-92. doi: 10.4103/jpgm.JPGM_293_18
8. Silva FG, Andrade R, Silva I, Cardoso A. Cross-cultural adaptation of the Cyberchondria Severity Scale for Brazilian Portuguese. Trends Psychiatry Psychother. 2016 Apr-Jun;38(2):90-5.https://doi.org/10.1590/2237-6089-2015-0063
9. McElroy E, Shevlin M. The development and initial validation of the cyberchondria severity scale (CSS). J Anxiety Disord. 2014 Mar;28(2):259-65. https://doi.org/10.1016/j.janxdis.2013.12.007
10. Maftei A, Holman AC. Cyberchondria During the Coronavirus Pandemic: The Effects of Neuroticism and Optimism. Front Psychol. 2020 Oct 30;11:567345. https://doi.org/10.3389/fpsyg.2020.567345
11. Atkinson NL, Saperstein SL, Pleis J. Using the internet for health-related activities: findings from a national probability sample. J Med Internet Res. 2009 Feb 20;11(1):e4. https://doi.org/10.2196/jmir.1035
12. Bajcar B, Babiak J, Olchowska-Kotala A. Cyberchondria and its measurement. The Polish adaptation and psychometric properties of the Cyberchondria Severity Scale CSS-PL. Psychiatr Pol. 2019 Feb 28;53(1):49-60. https://doi.org/10.12740/PP/81799
13. Akhtar M, Fatima T. Exploring cyberchondria and worry about health among individuals with no diagnosed medical condition. J Pak Med Assoc. 2020 Jan;70(1):90-95. https://doi.org/10.5455/JPMA.8682
14. Zarcadoolas C, Blanco M, Boyer JF, Pleasant A. Unweaving the Web: an exploratory study of low-literate adults' navigation skills on the World Wide Web. J Health Commun. 2002 Jul-Sep;7(4):309-24. https://doi.org/10.1080/10810730290088157
15. Jaafar NRN, Bahar N, Ibrahim N, Wan Ismail WS et al. Excessive internet use in young women: What are the implications? Curr Opin Psychiatry. 2017 Jul;30(4):260-267. https://doi.org/10.1097/YCO.0000000000000336
16. Faravelli C, Alessandra Scarpato M, Castellini G, Lo Sauro C. Gender differences in depression and anxiety: the role of age. Psychiatry Res. 2013 Dec 30;210(3):1301-3. https://doi.org/10.1016/j.psychres.2013.09.027
17. Xu Y, Huang Y. Chinese Middle-Aged and Older Adults' Internet Use and Happiness: The Mediating Roles of Loneliness and Social Engagement. J Appl Gerontol. 2021 Dec;40(12):1846-1855. https://doi.org/10.1177/0733464820959168
18. Statista. Number of internet users in Brazil from 2015 to 2025. Published July 20, 2020; https://www.statista.com/statistics/255208/number-of-internet-users-in-brazil/. Accessed August 10, 2021.
19. Vismara M, Caricasole V, Starcevic V, Cinosi E et al. Is cyberchondria a new transdiagnostic digital compulsive syndrome? A systematic review of the evidence. Compr Psychiatry. 2020 May;99:152167. https://doi.org/10.1016/j.comppsych.2020.152167
20. Kisely S, Sawyer E, Siskind D, Lalloo R. The oral health of people with anxiety and depressive disorders - a systematic review and meta-analysis. J Affect Disord. 2016 Aug;200:119-32. https://doi.org/10.1016/j.jad.2016.04.040