Anxiety sensitivity, uncertainty and recursive thinking: A continuum on Cyberchondria conditions during the Covid Outbreak

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Anxiety sensitivity, uncertainty and recursive thinking: A continuum on Cyberchondria conditions during the Covid Outbreak

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ABSTRACT

Background. Cyberchondria is a term used to refer to excessive surfing the web looking for health care information, excessive checking behavior being related to health-related anxiety. This period of quarantine for the Covid-19 pandemic is increasing the pathological use of the internet, and the excessive surfing the web looking for health care information. Another dimension related to the Covid-19 outbreak refers to uncertainty intolerance, for this reason being necessary for the healthcare professionals to provide clear and linear information. *Aim*. The aim of this review is to identify the psychological correlations connected to cyberchondria in the quarantine period. *Methods*. Following the PRISMA guidelines, we carried out a systematic review of the literature on PubMed. The terms used for the search were "Cyberchondria" OR "Anxiety" AND "Quarantine". *Results*. As resulting from the reviewed literature, there is a relationship between anxiety for one's own state of health and cyberchondria, with negative psychological effects of quarantine, including post-traumatic stress symptoms, depression, anxiety, low mood, irritability, insomnia, uncertainty, emotional exhaustion, this condition being associated with hypervigilance, and catastrophic misinterpretation of bodily signs. *Conclusion*. In the light of this and according to the literature, it would be desirable that research can further explore the factors influencing the increase in cyberchondria in the future.

Introduction

The coronavirus disease 2019 (COVID-19) has had devastating effects on the human life worldwide, almost 24 million people have been infected, and more than 800,000 died, while this pandemic period exacerbated the psychological problems of many people [1].

In accordance with the studies in the literature, internet currently plays a vital role in everyday life, it has become a popular source of accessing health related information, evidence shows that more than 50% of the internet users have been searching for medical information during the quarantine period [2]. The term cyberchondria refers to the tendency of the patient to constantly look up for information on the web in order to obtain reassurance for their state of health [3-8].

DSM-5 has replaced the previous label of hypochondriac disorder with illness anxiety disorder and somatic symptoms disorder. The term hypochondria refers to a persistent preoccupation with or without fears about the possibility of having or developing one or more serious progressive or life-threatening diseases. The preoccupation is associated with a hypervigilance to and catastrophic misinterpretation of the bodily signs or symptoms including normal sensations and it is accompanied by avoidance or repetitive behaviors. Illness anxiety disorder refers to the existence of an excessive preoccupation accompanied by significant somatic symptoms [9,10].

Cyberchondria is related to hypochondria, and different psychopathologies as compulsive obsessive disorder (COD), specifically concerning contamination and compulsion [11-13]. Cyberchondria is different from other pathologies like compulsive obsessive disorder, anxiety for one's own state of health and the pathological abuse of the internet, although there are some relations between the different symptomatologies [14].

Cyberchondria is related to conceptualized empiricism, as consisting of four dimensions: compulsion, which reflects the extent to which health-related internet research interferes with daily activities; distress, or the tendency to do research resulting in anxiety; excessiveness, or the repetitive quality of an individual's searching; and reassurance, or the extent to which research motivates one by asking for medical consultation [11].

Cyberchondria means a constant search for information online, in order to obtain health-related information. This research can be carried out individually or through forum-sharing individuals who have similar pathologies [15].

During the quarantine period due to epidemics or pandemics, several studies reported an increase of hypochondria and especially cyberchondria, such as depression, stress, low mood, irritability, insomnia, post-traumatic stress, anger, and emotional exhaustion [16-18].

Recently, Jungmann and Witthöft (2020) have investigated the links between trait health anxiety, cyberchondria, and virus anxiety during the COVID-19 pandemic. They hypothesized the relationship between cyberchondria and the current virus anxiety, and the findings of this study suggested that trait health anxiety and cyberchondria serve as risk factors during the pandemic period [19].

Cyberchondria incidence refers to about 1 to 5% of the population that reports having had at least one episode in the course of their lives [14]. According to the World Health Organization (WHO, 2020), the global effect of this pandemic has been devastating, and the major problem generated by the Corona Virus is the infodemic, a term that indicates the abundance of information, not always accurate, most people having open access to information due to internet connectivity and mass media, this information being overloaded, some information being fake news, and thus increasing anxiety and stress [20,21].

The study by Cava and co. showed that many people had psychological symptoms after the quarantine period, such as cyberchondria, vigilant handwashing and avoidance of crowds and, for some people, the return to normality was delayed by many months [22].

In a comparison between quarantined and non-quarantined health-care workers, the former were significantly more likely to report stigmatization, and rejection by the people in their local neighborhoods [23].

Several health-care workers involved in the Ebola outbreak in Senegal reported that quarantine had led their families to consider their jobs to be too risky, creating intra-household tension [17,22,24-26].

The scientific literature highlights that the part of the population that is mostly affected by cyberchondria are the students in the healthcare system, and healthcare workers, who are convinced of being affected by the pathologies they are studying [27].

Apart from students and healthcare workers, another professional category that is at high risk are the individuals working in the technological field, in these patients the metacognitive component being seriously compromised [28-30].

The possibility to access health-related information leads to an increase in anxiety and depressive symptoms, with a consequent sense of uncertainty leading to a pathological abuse of the internet [15].

Therefore, after the SARS epidemic, people considered that confusion stemmed from the differences in style, approach, and content of the various public health messages because of the poor coordination between the multiple jurisdictions and the levels of governmental involvement [31,32].

A recent meta-analysis carried out on a sample of 7,373 subjects has highlighted a significant relation between cyberchondria and anxiety for one's own state of health [12].

According to Fergus and Spada (2018), the information found by the patients on the internet can lead to some benefits if used moderately and if it is shared and discussed with their own doctors, searching on the net outlining illusory diagnosis and also spreading inadequate information [28].

Diagnostic information on the internet can lead to catastrophic diagnoses of symptoms of moderate severity (such as, headache) attributing them to more severe symptoms [8,33]. Cyberchondria is more related to internet abuse than to health anxiety [14]. In other studies, anxiety has been reported as a dimension related to the internet abuse, because the first determines an increase in searching for health-related information via the internet [34]. Cyberchondria can undermine the doctor-patient relationship, as patients have difficulty in accepting the health-related information reported by the doctor, because it is in contrast with what was reported on the internet [35].

Lack of trust in the doctor leads to an increase in sanitary costs because patients ask for several consultations to several health professionals [36].

Lastly, the impairment of the doctor-patient relationship undermines compliance. Patients can develop dysfunctional behavior like missing appointments and/or taking drugs without any medical prescription, and consequently these patients' quality of life results undermined [4,37].

Another psychological aspect related to cyberchondria is uncertainty, which is a predictor of health anxiety. Uncertainty occurs when health-related information results ambiguous and paradoxical [11]. The sense of uncertainty is a fundamental element. The study by Farooq (2020) investigated the negative impact of the information overload in the Covid-19 pandemic, and showed that the information overload does not allow to form an accurate

understanding of the situation, and increases the sense of uncertainty, consequently exacerbating health anxiety; moreover, the information overload makes it difficult to perceive the situation objectively [20].

Even the construct of self-esteem is related to cyberchondria, as a low self-esteem leads to obsessions and compulsions, consequently increasing hypochondriac behavior [38]. Another dimension related to cyberchondria is catastrophizing. Studies carried out on patients affected by chronic pain have revealed the importance of this element in the etiology of a disorder [33,39].

According to the World Health Organization Europe (2020), currently people are facing signs of fatigue and stress, deriving from the Covid-19 pandemic, this condition being called pandemic fatigue. This is a growing demotivation of people to implement the protective behaviors recommended for the health protection of both individuals and communities. The fear is cancelled when the population gets used to the threat and the same habits are repeated over time [40].

On the basis of the present literature, the aim of this review is to identify the psychological continuum connected to cyberchondria in the quarantine period for both epidemics and pandemics.

Methods

Research Strategy

This systematic review has been carried out according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines [41]. Using 3 key terms related to the psychological aspects of cyberchondria ("Cyberchodria" OR "Anxiety" AND "Quarantine"), articles have been selected according to their title and abstract; the entire article was read if the title/abstract was related to the specific issue of the relation between health anxiety and cyberchondria in the quarantine period, to see whether the article potentially met the inclusion criteria or not. References of the selected articles were also examined to identify additional studies meeting the inclusion criteria.

Table 1. A list of the searched terms entered into the PubMed search engines for identification of the studies for this systematic review.

Number	Search term
1	Cyberchondria [all fields]
2	Anxiety [all fields]
3	Quarantine [all fields]
4	1 OR 2
5	AND 3
6	English [Language]
7	2015/01/01 to 2020/12/20 [publication date]

The selection criteria for the study

To select only the relevant criteria for the study, both the titles and the abstracts of all quotations identified in the literature search have been examined (Table 2), and thus, 396 publications have been identified, and therefore the total number of relevant publications was reduced to 15. The articles were included in the review according to the following inclusion criteria: English language, publication in peer-reviewed journals, quantitative information on the relationship between health anxiety and cyberchondria in the quarantine period for epidemics and pandemics. Some articles were excluded by title, abstract, or full text for irrelevance to the topic under discussion. Further exclusion criteria were review articles, editorial comments, and case reports/series.

Figure 1 shows the process diagram followed to select the included studies. All the articles were selected based on the presence/absence of the search criteria.
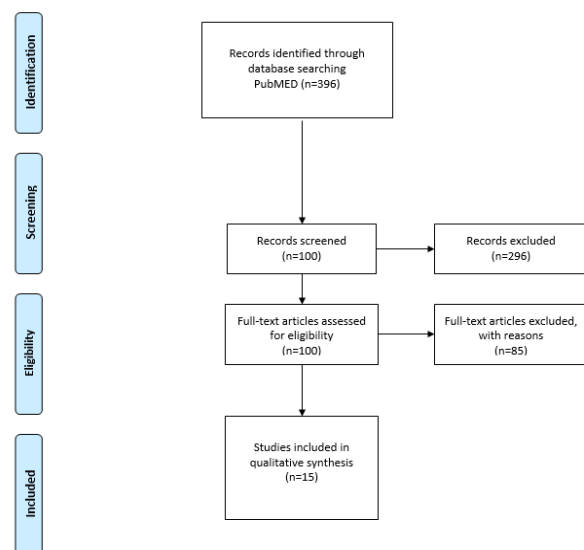

Figure 1. PRISMA 2009 Flow Diagram

Results

Figure 1 summarizes the flowchart of the articles selected for the review. The research on the PubMed database provided for a total of 396 quotations; no additional meeting inclusion criteria were identified by checking the reference list of the selected papers. After the screening, a total of 15 studies assessing the psychological aspects of cyberchondria met the inclusion criteria and were included in the systematic review (Table 2). The selected studies demonstrated the relationship between health anxiety and cyberchondria, in particular the examined literature suggests how constantly searching for online health-related information increases the anxiety levels during the pandemic and the epidemic period. In particular, Bai and colleagues (2004) investigated stress reactions among the staff members in the hospital, during

the Severe Acute Respiratory Syndrome (SARS), and the results highlighted the value of shortened work hours as a means by which the tremendous stress caused by a SARS outbreak can be reduced and the value of unambiguous information can reduce uncertainty [23]. Casagrande et al. (2020) investigated the effects of the quarantine period for Covid-19 among the Italian population [42]. The results of this study revealed that the participants reported poor sleep, high anxiety, and high distress. Cava et al. (2005) explored the experience of home quarantine during the Severe Acute Respiratory Syndrome (SARS) and showed that people felt uncertainty and anxiety after the quarantine period [22]. Desclaux et al. (2017) studied contact cases' perceptions and acceptance of contact monitoring at the field level, during the Ebola virus [24]. The quarantine period for the Ebola epidemic was associated with mood disorders. DiGiovanni et al. (2004) explored the factors influencing compliance with quarantine in Toronto during the 2003 SARS outbreak; the findings of this study showed that there was increased stress in people after the quarantine period [31]. Farooq (2020) investigated the impact of the online information on the individual-level intention to voluntarily self-isolate during the pandemic, and the results of this research showed the relationship between online information and self-isolation during the pandemic period (COVID-19) [20]. Hashemi et al. (2020) proposed a model in order to understand the associations between problematic internet use (PIU), cyberchondria, anxiety sensitivity, metacognition beliefs, and fear of COVID-19 [2]. Jalloh et al. (2018) studied the impact of Ebola experiences and the risk perceptions on mental health, during this period people feeling anxiety and depression [43]. Jokic-Begic et al. (2020) examined the way in which cyberchondria is related to changes in the levels of

COVID-19 in Croatia, and showed that cyberchondria played an important role in the pandemic period, and increased the mental health problems, such as anxiety [16]. Jungmann & Witthöft (2020) investigated the links between trait health anxiety, cyberchondria, and virus anxiety during the COVID-19 pandemic, and demonstrated that Cyberchondria showed positive correlations with current virus anxiety [19]. Lee et al. (2005) studied stigma among residents of Amoy Gardens (AG), the first officially recognized site of community outbreak of SARS in Hong Kong [17]. The findings showed that stigma affected most residents and took various form of being shunned, insulted, marginalized, and rejected by the people. Lei et al. (2020) assessed and compared the prevalence and associated factors of anxiety and depression among the public affected by the quarantine during Covid-19 [44]. This study demonstrated there was a prevalence of anxiety and depression in people during the pandemic period. Liu et al. (2020) identified factors associated with depression, anxiety, and PTSD symptomatology during the COVID-19 pandemic, people reporting high levels of depression, anxiety and PTSD symptoms, and high levels of loneliness [45]. Maftei & Holman (2020) investigated the effect of two opposing traits, optimism and neuroticism, on cyberchondria during the COVID-19 pandemic, and showed that neuroticism, age, and being female are positively associated with cyberchondria [1]. Mihashi et al., (2009) investigated strategies for broad mass isolation during the outbreak of infectious diseases, and suggested important strategies for the management of the psychological aspects of infectious diseases [18]. Wester et al. (2019) studied stigma during the exposure of healthcare workers to the Ebola virus; the results reported that the infectious disease increased anxiety among people [26].

Table 2. The characteristics of the studies included in the review

REFERENCES (Author)	AIM	SAMPLE	TYPE OF MEASURE	FINDINGS
Bai *et al*. (2004) [23]	This study investigated stress reactions among staff members in the hospital, during the Severe Acute Respiratory Syndrome (SARS).	338 staff members in a hospital in East Taiwan.	-Anonymous SARS-related stress reactions questionnaire, comprising acute stress disorder criteria according to DSMIV criteria and related emotional and behavioral changes. -The personnel department sent the questionnaires.	The results highlighted the value of shortened work hours as a means by which the tremendous stress caused by a SARS outbreak can be reduced and the value of unambiguous information in reducing uncertainty. Quarantined staff members were at a high risk of developing an acute stress disorder.
Casagrande *et al.* (2020) [42]	This study investigated the effects of the quarantine period for Covid-19, in the Italian population.	2,291 participants.	- The online survey collected information on the socio-demographic data and additional information concerning the Covid-19 pandemic.	The results revealed that the participants reported poor sleep, high anxiety, and high distress.

Cava *et al.* (2005) [22]	The aim of this study was to explore the experience of home quarantine during the Severe Acute Respiratory Syndrome (SARS)	21 participants.	-All interviews were audiotaped and followed a semi structured interview guideline.	The results showed that people felt uncertainty and anxiety after the quarantine period.
Desclaux *et al.* (2017) [24]	The aim of this study was to analyze the contact cases' perceptions and acceptance of contact monitoring at the field level, during the Ebola virus.	74 participants.	-Semi-Structured interview	The quarantine period for the Ebola epidemic was associated with mood disorders.
DiGiovanni *et al.* (2004) [31]	The aim of this study was to explore the factors influencing compliance with quarantine in Toronto during the 2003 SARS outbreak.	35 participants were affected by the SARS epidemic.	-General Population Survey.	The results of this study showed increased levels of stress in people after the quarantine period.
Farooq *et al.* (2020) [20]	This study investigated the impact of online information on the individual-level intention to voluntarily self-isolate during the pandemic (COVID-19)	11 participants.	- Multi-item scales were used to measure cyberchondria, information overload, threat and coping appraisal construct. All the constructs were measured using a 5-point scale.	The author showed the relationship between online information and self-isolation during the pandemic period (COVID-19). During COVID-19, the frequent use of social media contributed to information overload and over concern among individuals.
Hashemi *et al.* (2020) [2]	This study proposed a model in order to understand the associations between problematic internet use (PIU), cyberchondria, anxiety sensitivity, metacognition beliefs, and fear of COVID-19.	651 participants.	Utilizing a cross-sectional online survey, 651 Iranians completed the following psychometric scales: Metacognition Questionnaire-30 (MCQ-30), Anxiety Sensitivity Questionnaire (ASI), Cyberchondria Severity Scale-Short Form (CSS-12), Fear of COVID-19 Scale (FCV–19S), and Generalized Problematic Internet Use Scale (GPIUS).	The relationship between problematic use internet and cyberchondria with fear of COVID-19 was significantly mediated by anxiety sensitivity and metacognitive beliefs, because the fear of COVID-19 was found to be significantly associated with cyberchondria and anxiety sensitivity.
Jalloh *et al.* (2018) [43]	The authors studied the impact of the Ebola experiences and risk perceptions on Mental health.	3,564 participants.	-Patient Health Questionnaire-4. -Events of Events Scale-revised.	During this period, people felt anxiety and depression.
Jokic-Begic *et al.* (2020) [16]	The aim of this study was to examine how cyberchondria is related to changes in levels of COVID-19.	966 participants.	-Short Cyberchondria Scale (SCS) -Questionnaire regarding COVID-19	The results demonstrated that the cyberchondria plays an important role in anxiety during the pandemic period.

Jungmann & Witthöft (2020) [19]	The aim of this study was to investigate the links between trait health anxiety, cyberchondria, and virus anxiety during the COVID-19 pandemic.	1,615 participants	- The German short version of the Cyberchondria Severity Scale (CSS15). - The Short Health Anxiety Inventory (SHAI) - The Short Cognitive Emotion Regulation Questionnaire (CERQ short) - Questions specific to the COVID-19 pandemic.	The participants reported a significantly increasing virus anxiety in recent months (the previous months recorded retrospectively), especially among individuals with heightened trait health anxiety. Cyberchondria showed positive correlations with the current virus anxiety.
Lee *et al*. (2005) [17]	This research studied stigma among the residents of Amoy Gardens (AG), the first officially recognized site of community outbreak of SARS in Hong Kong.	15 participants.	-A self–report questionnaire was constructed from a content analysis of the focus group.	The findings showed that stigma affected most residents and took various forms of being shunned, insulted, marginalized, and rejected by the people.
Lei *et al*. (2020) [44]	This research aimed at assessing and comparing the prevalence and associated factors of anxiety and depression among the public affected by quarantine during Covid-19.	1,593 participants.	-Self-rating Anxiety Scale (SAS)	This study demonstrated there was a prevalence of anxiety and depression in people during the pandemic period.
Liu *et al*. (2020) [45]	This study identified factors associated with depression, anxiety, and PTSD symptomatology during the COVID-19 pandemic.	898 young adults (18-30 years).	-questionnaire for assessing the levels of anxiety, depression and PTSD symptoms.	People reported high levels of depression, anxiety and PTSD symptoms, and high levels of loneliness.
Maftei & Holman (2020) [1]	This study investigated the effect of two opposing traits, optimism and neuroticism, on cyberchondria during the COVID-19 pandemic.	880 participants.	- The Life Orientation Test (LOT) - the Cyberchondria Severity Scale (CSS) - The Neuroticism Scale from the international personality item pool— IPIP)	The results showed that neuroticism, age, and being female are positively associated with cyberchondria.
Mihashi *et al*. (2009) [18]	This study investigated strategies for broad mass isolation during the outbreaks of infectious diseases.	300 participants.	-General Health Questionnaire.	This study suggested important strategies for the management of the psychological aspects of infectious diseases.
Wester *et al*. (2019) [26]	This study studied stigma during the exposure to the infection with Ebola among healthcare workers.	Swedish Healthcare workers who worked in Africa during 2014 (in Ebola period).	-General Health Questionnaire.	This study reported that the infectious diseases increased anxiety among people.

Discussion

The influence of the internet on healthcare systems and on public health is likely to continue to grow and expand, especially in quarantine periods. Although a small proportion of those seeking health-related information online may indeed be cyberchondriacs, many, if not most, may have legitimate undertreated symptoms [46]. The construct of cyberchondria refers to a pattern of dysfunctional behavior occurring in patients facing preoccupations related to their state of health, showing excessive restlessness, anguish and dysfunctional behavior due to their compulsive research for online information [35,47-49]. This disorder seems to be associated to other symptomatology, although with some differences, such as health anxiety disorder, compulsive obsessive disorder, pathological internet abuse [50,51]. The examined literature suggests how constantly searching for online health-related information increases anxiety levels, and the Covid-19 pandemic created an infodemic, with excessive, and unfounded information (fake news); the public being bombarded with vast quantities of information, most of which not being scientifically correct, and the social media manipulating the public opinions. Therefore, the individuals may be misinformed by the social media, which exacerbates fears of COVID-19, cyberchondria and other mental health problems [52-55]. The relationships between cyberchondria and internet abuse, as demonstrated in the literature, are significant (Rs=0.59) compared to other constructs, although even this would seem relatively independent from cyberchondria [14]. According to Hashemi et al., (2020) cyberchondria is directly associated with metacognitive beliefs, anxiety sensitivity, and indirectly associated with fear of COVID-19 [2]. Cyberchondria represents a potentially important avenue for research in the context of chronic pain, individuals with chronic pain being often anxious about their health due to the uncertainty about the origin of their pain problems [33,46,56]. The construct of uncertainty intolerance has been highlighted in patients with pathologies in the quarantine period, thus revealing how intolerance to uncertainty determines an increase in the use of internet in order to look for health-related information and, thus, an increase in health anxiety [17,26,39,57]. Therefore, the information obtained online can increase uncertainty about health, perhaps ultimately leading to cyberchondria in individuals who have greater difficulty in tolerating uncertainty [14,58]. Moreover, it is important that public healthcare workers maintain clear lines of communication with the people quarantined about what to do if they experience any symptoms. The pattern of associations with compulsion highlighted a suppression effect, as controlling for inhibitory intolerance to uncertainty led to the association between prospective intolerance of uncertainty and compulsion to be negative in direction [11,59,60]. In other words, cyberchondria not only refers to looking for health information online, but it involves excessive research that is driven by and/or leads to distress and anxiety [61].

Conclusions

According to the cognitive behavioral model of health anxiety, the general dysfunctional beliefs about health, erroneous appraisals of nonthreatening symptoms as a serious health threat, and intolerance to any uncertainty related to health may evoke health anxiety as well as attempts to reduce it through safety seeking i.e., searching for reassurance of good health [62-65]. A successful treatment depends very much on sharing health-related information between the patient and the doctor and vice-versa [66]. In fact, as pointed out in the previous literature, poor medical knowledge leads to the risk of misunderstanding of what patients read on the internet, with the consequent and increasing self-medicalization of patients [67,68].

In conclusion, different patterns of behavior of users searching for health information online have been explored in this review and the different dimensions of the construct of cyberchondria have been examined. It would be useful that clinicians and researchers pay attention to the significant relations between health-anxiety and pathological abuse of the internet, especially in restricted periods of isolation and vulnerability for people.

Conflict of interest disclosure

There are no known conflicts of interest in the publication of this article. The manuscript was read and approved by all authors.

Compliance with ethical standards

Any aspect of the work covered in this manuscript has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

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