



The development and initial validation of the cyberchondria severity scale (CSS)



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ARTICLE INFO

Article history:

Received 24 September 2013

Received in revised form

17 December 2013

Accepted 19 December 2013

Keywords:

Cyberchondria

Anxiety

Internet

Assessment

Health anxiety

ABSTRACT

Cyberchondria is a form of anxiety characterised by excessive online health research. It may lead to increased levels of psychological distress, worry, and unnecessary medical expenses. The aim of the present study was to develop a psychometrically sound measure of this dimension. A sample of undergraduate students ($N = 208$; 64% female) completed a pilot version of the cyberchondria severity scale (CSS) along with the short form version of the depression, anxiety and stress scale (DASS-21). Exploratory factor analysis identified a correlated five factor structure that were labelled 'Compulsion', 'Distress', 'Excessiveness', 'Reassurance Seeking' and 'Mistrust of Medical Professional'. The CSS demonstrated good psychometric properties; the subscales had high internal consistency, along with good concurrent and convergent validity. The CSS may prove useful in a wide variety of future research activities. It may also facilitate the development and validation of interventions for cyberchondria.

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1. Introduction

Due to the rapid developments in information and communications technology the internet has become a popular source of health information amongst the general public. It has been estimated that 80% of Americans use the internet to access health information, making it the fifth most common online activity (Pew Internet & American Life Project, 2012). Health related websites continue to see a steady growth in traffic. For example, WebMD saw user traffic increase by 28% between 2011 and 2012 (Howell, 2013). This equates to 117.4 million unique visitors a month and total page views of 2.57 billion (Howell, 2013). There are numerous reasons why the internet has become such a popular means of accessing health information; it is quick, easy to use, anonymous and relatively inexpensive (Starcevic & Berle, 2013).

Online health research (OHR) may lead to positive and preventative activities such as exercise, healthier eating habits, improved adherence to medication and empowered health decisions (Huberty, Dinkel, Beets, & Coleman, 2012; Lemire, Sicotte, & Paré, 2008). On the other hand, such practices present a challenge when used as a diagnostic device by laypersons (Aiken, Kirwan, Berry, & O'Boyle, 2012). While the internet provides access to a large body of information it is a crude means of self-diagnosis as it

fails to take age, gender, lifestyle and other subtleties into account (White & Horvitz, 2009a,b). Research also indicates that the quality of online health information is mixed and that few searchers check the reliability of their sources (Benigeri & Pluye, 2003).

Cyberchondria refers to an increase in anxiety about one's own health status, as a result of excessive reviews of online health information (Muse, McManus, Leung, Meghreblian, & Williams, 2012; Baumgartner & Hartmann, 2011; Bessièrè, Pressman, Kiesler, & Kraut, 2010; White & Horvitz, 2009a,b; Aiken & Kirwan, 2012; White & Horvitz, 2009a,b). Although research in this area is still in its infancy, studies have shown that OHR represents a reliable risk factor for heightened anxiety regarding subjective health status. Correlational studies have identified a statistically significant association between OHR and increased medical anxiety (Muse et al., 2012; White & Horvitz, 2009b). Experimental research has also demonstrated that OHR can lead to negative emotional responses such as fear and a sense of being over-whelmed (Lauckner & Hsieh, 2013). A longitudinal study by Bessièrè et al. (2010) found that health related internet use was associated with a small but reliable increase in depression over an 8 month period. This anxiety may manifest itself in impaired functionality; a large survey study by White and Horvitz (2009a,b) found that approximately 60% of respondents reported interruptions to both online and offline activities as a result of worrying health searches.

While it is clear that OHR can have an anxiety provoking effect, cyberchondria is also characterised by an element of excessiveness. This may occur in the form of repeated or lengthy searches for health information (Starcevic & Berle, 2013). For example, a survey of over 500 people found that 60% of respondents queried a specific health

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concern over multiple online sessions (White & Horvitz, 2009a,b). An analysis of thousands of online interaction logs found that 13.5% of searchers entered the exact same health related terms into a search engine on more than one occasion over an 11 month period (White & Horvitz, 2009a,b). It has been suggested that these excessive searches only serve to fuel a person's original anxiety (Starcevic & Berle, 2013). Aside from causing unwarranted levels of worry and distress, there may also be economic costs to cyberchondria. While no studies have examined the costs directly related to online health searches, there is evidence that those who are generally health anxious represent a significant economic burden. Healthcare costs and productivity losses associated with medically unexplained symptoms cost the UK economy an estimated £ 3 billion in 2008 alone (Birmingham, Cohen, Hague, & Parsonage, 2010). Cyberchondria is likely responsible for a significant proportion of this amount as an analysis of anonymised search logs found that those who searched for health information on line frequently ended their search sessions with queries about local healthcare services (White & Horvitz, 2010). Research has also suggested that OHR can lead to a deterioration in the doctor–patient relationship (Ravdin, 2008; Keller, Padala, & Petty, 2008; Lamberty, 2008). This in turn may lead to further healthcare costs (e.g. visits to multiple doctors, known as 'doctor shopping'). It is important, therefore, that our understanding of this new trend is increased in order to inform strategies to minimise its negative consequences.

Cyberchondria appears to be a multi-dimensional construct, reflecting both anxiety and an element of compulsiveness. While there are a number of validated scales used to measure similar forms of anxiety, such as health anxiety and general anxiety. However such instruments are not appropriate to assess the unique anxieties that occur as a result of OHR. Indeed, much of the early research has relied on single items to measure cyberchondria. Single item scales have questionable reliability and do not take the multidimensional nature of a construct into account (Gliem & Gliem, 2003; McCormack, Horne, & Sheather, 1988). The aim of this study was to develop a reliable, multidimensional measure of cyberchondria. The development of such a scale will have important implications in both the research and treatment of cyberchondria.

The primary aim of this study was to develop and evaluate the psychometric properties of a self-report measure of anxiety as a result of online searches for health information, the cyberchondria severity scale (CSS). It was predicted that the CSS would be multidimensional, reflecting anxiety and excessive searching behaviours. This study also aimed to assess the initial validity of the CSS. To this end, the concurrent and convergent validity of the CSS were examined. Concurrent validity was assessed by correlating CSS scores with a validated measure of anxiety, depression and stress and it was predicted that the CSS would correlate positively and significantly with these scores. Convergent validity is demonstrated when scores on a measure correlate with scores from other established measures, to varying degrees, depending on how theoretically similar the constructs are (Lamping et al., 2002). It was predicted that the CSS would demonstrate good convergent validity; i.e. total scores on the CSS will correlate highest with an established measure of anxiety, and with lower correlation for depression and stress. Also, it was predicted that any identified subscales would correlate in a theoretically predictable manner with established measures of depression, anxiety and stress.

2. Method

2.1. Respondents

An opportunity sample of university undergraduate students ($N=208$) was recruited (133 females, 73 males, 2 unspecified). The

majority of the sample (67%) were Psychology students, while the remainder (33%) were Business Studies students. The age range of respondents was between 18 and 60 years ($M=24.19$, $SD=8.2$).

2.2. Measures

Cyberchondria was measured by the preliminary version of the cyberchondria severity scale (CSS). The baseline version of the CSS consisted of 43 items. Each item consisted of a 5 point Likert-scale indicating frequency (1 'Never', 2 'Rarely', 3 'Sometimes', 4 'Often' and 5 'Always'). The baseline questionnaire asked participants for information about how they conducted OHR (e.g. 'When researching symptoms or medical conditions online I visit both trustworthy websites and user-driven forums'), how distressing they found OHR (e.g. 'I feel more anxious or distressed after researching symptoms or perceived medical conditions online') and how OHR affected both their online and offline activities (e.g. 'Researching symptoms or perceived medical conditions online interrupts my offline social activities'). The CSS was designed to be a continuous measure of distress, not a categorical measure for the purpose of diagnosis.

Depression, anxiety and stress levels were assessed by the short form version of the depression, anxiety and stress scale (DASS-21). The DASS-21 consists of 21 self-report questions. Three 7-item subscales measure anxiety, depression and stress with using a 4-point Likert scale, ranging from '0—Never' to '3—Almost Always'. Responses are summed producing possible subscale ranging from 0 to 21 with higher scores indicating higher level on each dimension. Responses on all 21 items can also be summed (possible scores 0 to 63) to assess general psychological distress (Henry & Crawford, 2005). Studies have shown that the DASS has high internal reliability and validity in both clinical and non-clinical samples (Osman et al., 2012; Henry & Crawford, 2005). For example, Crawford and Henry (2003) found that Cronbach's alpha was .897 for the anxiety scale, .947 for the depression scale, .933 for the stress scale and .966 for the total score in a large non-clinical sample.

2.3. Procedure

First, an initial pool consisting of 43 items was developed for the CSS. Items were generated based on a review of existing literature on cyberchondria and conceptually similar anxiety disorders. In writing the items, the guidelines of McColl et al. (2001) were followed; items were designed to be clear, concise and easy to understand. Following approval from the University of Ulster Research Ethics Committee, the initial item pool was reviewed by two academics at the University of Ulster; an expert in psychometrics and an experienced health psychologist. After collecting feedback regarding item clarity, poorly worded items were corrected. At this stage a preliminary item pool of 43 items formed the baseline for the CSS. The Flesch–Kincaid Grade Level of the items at this point was 10.1, meaning the questionnaire was appropriate for those with a 10th grade reading level (i.e. appropriate for mid-to-late adolescence and above). It was concluded that this was an acceptable level of readability, as it can be assumed that moderate literacy is required to understand medical information found online. The baseline CSS was compiled with an information sheet, a consent form and the DASS-21 to create a self-report questionnaire booklet. The questionnaire booklets were distributed to the sample of undergraduate participants prior to lectures.

2.4. Initial item deletion

A process of item deletion was undertaken based on the guidelines of Lamping et al. (2002). First, any item that had 5% or more

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