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ORIGINAL ARTICLE

CYBERCHONDRIA: ROLE OF POTENTIAL RISK FACTORS

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ABSTRACT

OBJECTIVE: To investigate the relationship between intolerance of uncertainty and cyberchondria and to find out the mediating role of anxiety sensitivity in this relationship.

METHODS: This cross-sectional study was conducted from September 2021 to January 2022 at Bahauddin Zakariyya University, Multan, Pakistan. Participants ranging in age from 18 to 55 years were selected through purposive sampling techniques from different cities of Southern Punjab. Participants who actively use social media for online information-seeking of disease-related symptoms were included in the study and participants who confirmed having a physical or psychological health condition were excluded. Cyberchondria, anxiety sensitivity index-3, and intolerance of uncertainty scale were used for measurement. The data were analyzed using structural equation modelling.

RESULTS: Out of 413 participants, 148 (42%) were males and 265 (64.2%) were females. Majority (n=188/413; 45.6%) spent >5 hours on net. Main symptoms searched on internet were psychological (n=61; 14.8%), Physiological (n=175; 42.4%) and both (n=177; 42.8%). Correlation metrics showed that intolerance of uncertainty has a moderate positive correlation with anxiety sensitivity (r=0.59) and cyberchondria (r =-0.41). Similarly, anxiety sensitivity is also positively correlated with cyberchondria (r=0.38). Results further revealed that intolerance of uncertainty has a significant impact on cyberchondria (β=0.48, R^2=0.30). Anxiety sensitivity significantly mediates the relationship between intolerance of uncertainty and cyberchondria among the general population (β=0.64, R^2=0.41) (β=0.25, R^2=0.26).

CONCLUSION: A significant positive relation exists between intolerance of uncertainty, cyberchondria, and anxiety sensitivity. Intolerance of uncertainty significantly impacts cyberchondria. Anxiety sensitivity significantly mediates the relationship between intolerance of uncertainty and cyberchondria.

KEYWORDS: Cyberchondria (Non-MeSH); Anxiety sensitivity (Non-MeSH); Intolerance of uncertainty (Non-MeSH); Risk Factors (MeSH); General population (Non-MeSH); Internet (MeSH); Social Media (MeSH); Information Seeking Behavior (MeSH).

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INTRODUCTION

Internet is one of the most popular mediums to search for health-related symptoms. According to a survey, 75% of the population in the USA, Russia, Brazil, and Asia use social networking sites to collect information regarding their health.[1] In Pakistan the prevalence of self-medication is 84.4% (males 88.4%, females 81.2%) and the most common symptoms searched for are fever, cancer and headaches.[2] Repeatedly checking for symptoms is the main feature of cyberchondria that's why some studies suggest that it shares some characteristics of psychological disorders like obsessive-compulsive disorder, internet addiction, and anxiety. Other studies defined it as the complement of hypochondria. Thus it can be conceptualized as repeated and excessive online symptom-checking behavior, basically, it consists of four main dimensions' excessiveness, distress, compulsion, and reassurance seeking.[3]

The conceptual model proposed that the reassurance-seeking behavior decreases anxiety for the short term and reinforced the compulsive behavior of online searching.[4] But theoretically in long term the anxiety-provoking situation continued to exist and provoke the potential possibility of excessive apprehension and anxiety-related disorders.[5] Thus cyberchondria is a multidimensional construct and not just online information-seeking behavior as it is motivated by a desire for compulsiveness and has a robust relationship with health anxiety and intolerance of uncertainty.

Intolerance of uncertainty can be defined as the incapability to endure an aversive response that is characterized by the uncertainty of events and information and caused by the absence of a salient key factor.[6] People with high levels of intolerance of uncertainty misinterpret ambiguous stimuli for a threat and experience different physiological and psychological responses like heart rate acceleration, pain, and anxiety.[7] Similarly anxiety sensitivity can be characterized as the presentation of mild- severe symptoms and worries along with the concern about illness regardless of its actual presentation. People with heightened health anxiety are more likely to misinterpret their physical symptoms for more severe disorders just as a patient who came with a headache interprets its symptoms as a brain tumor.[8] Many studies reported that people with high illness anxiety are more prone to search online for information seeking and one source of information is not enough for them so they move to other sources for reassurance which can lead to physical symptoms, like headaches, lump in the throat, increased heartbeat and emotional disability and they spend

TABLE I: SOCIO-DEMOGRAPHICS OF RESPONDENTS (N=413)

Variable		Frequency (n=413)	Percentage
Gender	Male	148	42
	Female	265	58
Marital Status	Married	69	16.7
	Unmarried	344	83.3
City	Multan	161	38.9
	Bahawalpur	110	2.6
	Dera Ghazi Khan	90	21.7
	Sahiwal	52	12.5
Ethnicity	Rural	88	21.3
	Urban	325	78.7
Family System	Nuclear	100	75.8
	Joint	313	24.2
No of hours spent of internet	1-2 hours	74	17.9
	3-4 hours	151	36.6
	5-more hours	188	45.5
Symptoms searched on internet	Psychological	61	14.8
	Physiological	175	42.4
	Both	177	42.8
Method of prescription	Self-prescription	71	17.3
	Medical prescription	199	48.1
	None	143	34.6
Currently on medication	Yes	58	14.1
	No	355	85.9
Satisfaction with physician	Yes	81	19.7
	No	39	9.4
	Not seeing any physician	293	70.9

TABLE II: PEARSON'S R CORRELATION BETWEEN INTOLERANCE OF UNCERTAINTY, ANXIETY SENSITIVITY, AND CYBERCHONDRIA

Measure	IOU	AS	CYB	Items	Cronbach's alpha
1.IOU	_			12	0.8
2.AS	0.59**	_		18	0.9
3.CYB	0.41**	0.38**	_	12	0.8
M	31.9	25.3	24.1		
SD	10.1	16.4	9.01		

Note: (n=413). M= mean, SD = standard deviation. IOU= intolerance of uncertainty, AS= anxiety sensitivity and CYB= cyberchondria *p <0.05, **P <0.01

TABLE III: STRUCTURAL EQUATION MODELLING SHOWING THE IMPACT OF INTOLERANCE OF UNCERTAINTY ON CYBERCHONDRIA.

Paths	B	S.D	t-value	p-value	R- Square	F square
IOU -> CYB	0.481	0.052	9.325	0.000***	0.23	0.301

Note: n=413, IOU= intolerance of uncertainty, and CYB= cyberchondria. S.D= standard deviation, B= beta. p <0.05, **P <0.01, ***p< = 0.001.

TABLE IV: ANXIETY SENSITIVITY ACTING AS MEDIATOR BETWEEN INTOLERANCE OF UNCERTAINTY AND CYBERCHONDRIA

Effects	Paths	Path coefficient	S.D	t-value	p-value	R^2	F square
Direct without mediator	IOU -> CYB	0.481	0.052	9.325	0.000	0.23	0.301
Indirect with mediator	IOU -> AS	0.645	0.036	17.87	0.000	0.41	0.711
	AS -> CYB	0.253	0.068	3.721	0.000	0.26	0.051
	IOU -> CYB	0.315	0.076	4.142	0.000	0.26	0.079

Note: n=413. , IOU= intolerance of uncertainty and CYB= cyberchondria, AS= anxiety sensitivity. S.D= standard deviation. *p <0.05, **P <0.01, ***p<0.001.

more and more hours to search for these symptoms until they become convinced that they actually have a health issue.[9]

Despite the association between intolerance of uncertainty and anxiety sensitivity more research is needed to explore their relation with cyberchondria. As previous researchers have considered it from a single perspective (frequency of online symptom searching).[6,9] The current study highlights the gaps in the previous literature by incorporating different aspects that are not been studied in Pakistan such as online symptom-seeking has much more implications because it increases the likelihood of self-medication, which is bad for the patient's health.

Although cyberchondria is not just prevalent in the clinical population but is also quite common in the general community. There is a need to do additional research to include the general community in order to demonstrate the detrimental effects of this phenomenon. The majority of studies are carried out in clinical settings with anxiety-related patients.[5] Therefore, the current work aims to investigate the potential risk factors of cyberchondria (intolerance of uncertainty, and anxiety sensitivity) and the prevalence of this destructive phenomenon in the general population in the light of meta-cognitive belief theory, along with the mediating role of anxiety sensitivity which could provide insight into the practices of clinicians whether to consider intolerance of uncertainty alone in treating anxiety disorders or to consider it from an anxiety sensitivity perspective.

METHODS

A cross-sectional study was conducted from September 2021 to January 2022 at the Department of Applied Psychology Bahauddin Zakariyya University, Multan, Pakistan after approval of the Advanced Studies Research Board of the university (PSY-12966-2021). Four hundred and thirteen participants with ages ranging from 18 to 55 years were selected through the purposive sampling technique from different cities of

Southern Punjab (Multan, Bahawalpur, Dera Ghazi Khan, and Sahiwal) via an online survey. According to the inclusion criteria, only those participants were selected who actively use social networking sites and also use these mediums for online information seeking of disease-related symptoms and participants who confirm having a physical or psychological health condition were excluded. The survey consists of three highly reliable questionnaires along with a demographic sheet and informed consent. There were no specific limitations for taking part unless the ethical standards of the American Psychological Association (APA) are not contravened. The participants were required to provide electronic consent before moving to the main theme of the survey. It will take 25-30 minutes to complete the questionnaire. Cyberchondria severity scale, anxiety sensitivity index-3, and intolerance of uncertainty scale were used for measurement. The data were analyzed using Smart PLS software.

Cyberchondria severity scale is a 12-item scale used to measure the online symptom-checking behavior and anxiety associated with it. It was adapted from a 33 items scale. Consisted of four subscales 1. Distress, 2. Excessiveness, 3. Reassurance seeking and 4. Compulsion. Expressed on a 5-point Likert scale ranging from (never to always). It has an internal consistency of 0.86. The scale has a significant correlation with similar constructs such as health anxiety, obsessive-compulsive disorder, and general anxiety.[10]

Anxiety sensitivity index-3 is 18 items scale that is used to measure anxiety (not actual) fear and arousal-related sensations. Consisted of three domains 1. Physical, 2. Social and 3. Cognitive. Each domain has 6 items expressed on a 5-point Likert scale ranging from (very much to very little). It shows good internal consistency at 0.93. It shows a significant correlation with similar constructs such as general anxiety and panic attacks.[11]

Intolerance of uncertainty scale is a 12 items scale used to measure the ability of a person to tolerate the ambiguity related to events and situations (future and present). Consisted of two sub-scales 1. Inhibitory intolerance (intolerance of present events) and 2. Prospective intolerance (intolerance of future events). Expressed on a 5 point Likert scale ranging from (not at all to entirely of me). It has an internal consistency of 0.94.[12]

RESULTS

The statistical analysis included: (1) Demographic characteristics of participants. (2) Reliability analysis. (3) Pearson's correlation analysis to identify the relationship between study variables. (4) Structural equation modeling analysis to access the causal relationship between intolerance of uncertainty and cyberchondria. (5) Mediation analysis to determine the mediating effects.

Demographic characteristics of respondents (n= 413) show that the average age of the participants is 23 years and most of them are females. Many belong to urban backgrounds living in a joint family system. The average hours spent on the internet is more than 5 searching for psychological and physiological symptoms both while the general population is not satisfied with their treatment and is not currently on medication from a physician.

Table II shows Cronbach's alpha and correlations among the variables. The value of alpha is acceptable as all the scales show good reliability (0.8-0.9) thus further analysis can be done because the scales are reliable. The descriptive shows the mean and standard deviation of intolerance of uncertainty (M=31.9, SD=10.1), anxiety sensitivity (M=25.3, SD=16.4), and cyberchondria (M=24.1, SD=9.01). The correlation metrics showed that intolerance of uncertainty is moderately correlated with anxiety sensitivity (Pearson's r =0.59, $p<0.01$) and cyberchondria (Pearson's r =-0.41 p=<0.01). Similarly, anxiety sensitivity is positively correlated with cyberchondria (Pearson's r =0.38, p=<0.01).

Table III shows that intolerance of uncertainty has a significant impact on cyberchondria ($\beta=0.48$, $p<0.001$, $R^2 = 0.30$) thus it shows that 30% variation in the model is explained by intolerance of uncertainty.

Table IV indicates that anxiety sensitivity significantly mediates the relationship between intolerance of uncertainty and cyberchondria. The indirect effect between intolerance of uncertainty and anxiety sensitivity is significant ($\beta=0.64$, $p<0.001$, $R^2 = 0.41$), and the indirect effect between anxiety sensitivity and cyberchondria is also significant ($\beta=0.25$, $p<0.001$, $R^2 = 0.26$).

DISCUSSION

The study investigated the factors associated with cyberchondria and the mediating effect of anxiety sensitivity. The findings revealed that there exists a positive correlation between intolerance of uncertainty and cyberchondria. The results are consistent with other studies. Norr et al., suggested that intolerance of uncertainty would share a distinctive link with excessiveness the reason is that people with an elevated level of intolerance of uncertainty have developed an uncontrollable desire to overcome the uncertainty of events either they are future-related (inhibitive intolerance of uncertainty) or present-related (prospective intolerance of uncertainty) that's why they use digital mediums for online medical information in order to reduce the anxiety associated with the loss of controllability.[1,3]

It was hypothesized that anxiety sensitivity and intolerance of uncertainty are positively correlated and the previous literature supported the results. According to Hock et al., people who dislike ambiguity or seek to avoid it may therefore be more prone to feel more depressive symptoms after searching for medical information online, possibly by thinking more drastically about the unknown nature of the searched symptoms. The reason is that sometimes online information-seeking behavior may increase anxiety and people get more and more anxious by knowing the symptoms related to the disease, which will affect their sense of integrity and trigger the fear associated with the disease.[8] Singh et al., suggested that anxiety sensitivity and

cyberchondria are positively linked the motive behind this association is that to avoid the fear associated with health-related diseases people became engaged in safety-seeking behaviors, searching for disease-related symptoms online over and over again to take control of the health-related issues.[5,9]

The findings of the current study suggested that anxiety sensitivity significantly impacts cyberchondria and previous literature supported the findings.[1] According to Fregus the anonymity of online searches may make it more appealing for people with heightened social anxiety to often use the internet to look up health information in order to avoid unfavorable judgment because life is full of challenges with the increasing number of diseases and the unknown reasons for their occurrence there exist a fear of uncertainty about the events thus to overcome this uncontrollability people use defensive behavior. The basic reason behind this behavior is that when people came across a problem they try to evaluate the fear associated with it and when the conditions are not in their favor a sense of incoherence develops and people became inclined to use defensive behaviors such as online information-seeking in order to take control of the situation.[6,7]

The findings also supported that anxiety sensitivity significantly mediates the relationship between intolerance of uncertainty and cyberchondria. According to Olatunji et al., the two potential risk factors (intolerance of uncertainty and anxiety sensitivity) share many common features and are positively linked to reassurance-seeking and excessiveness. The reason is that the elevated levels of these two variables may lead to cyberchondria.[13] People mostly use reassurance as a safety mechanism to reduce the elevated levels of anxiety associated with bodily sensations in a different context. Many studies have also contributed that an increased sense of uncertainty may aggravate the arousal and disorder related anxiety symptoms. It was suggested that individuals who are seeking treatment are more inclined to develop anxiety-related disorders and are more associated with online searching of medical symptoms to gain certainty about future outcomes.[14] The role of intolerance of uncertainty and anxiety sensitivity in clinical populations is studied in many kinds of research but in Pakistan, the phenomena of cyberchondria did not gain attention. As earlier research has shown, there is a gap in the literature due to the absence of information addressing these potential risk factors that's why the present study takes an initiative to introduce this phenomenon in the general population to terminate its deleterious effects.

CONCLUSION

A significant positive relation exists between intolerance of uncertainty, cyberchondria, and anxiety sensitivity. Intolerance of uncertainty significantly impacts cyberchondria. Anxiety sensitivity significantly mediates the relationship between intolerance of uncertainty and cyberchondria among the general population (people having no physical or psychological illness).

LIMITATIONS

In light of several limitations, the current study should be considered as the sample consisted of the general population (people having no physical or psychological illness) to investigate the relationship between variables (intolerance of uncertainty, anxiety sensitivity, and cyberchondria) although the clinical population could provide more evidence of their potential risk. The use of cross-sectional data allows to investigate the relationship between variables but limits the evidence of a causal relationship, that intolerance of uncertainty and anxiety sensitivity are the robust predictors of cyberchondria. Future research could use longitudinal or experimental research to ensure the advancement of understanding of cyberchondria.

IMPLICATIONS

The study provides insight into the motives behind the excessive desire to search for health-related symptoms online and the behavior associated with it. In the clinical setting, the findings not only point to the importance of targeting anxiety sensitivity, but also to the importance of targeting intolerance of uncertainty in order to achieve the greatest reductions in anxiety-related disorders.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

IB: Concept and study design, analysis and interpretation of data, drafting the manuscript, critical review, approval of the final version to be published.

HB: Acquisition, analysis and interpretation of data, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest

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