International Journal of Biomedical and Clinical Sciences
Vol. 5, No. 4, 2020, pp. 322-340
http://www.aiscience.org/journal/ijbcs

Association of Cyberchondria with Health Anxiety During COVID 19 Pandemic Among Undergraduate Students, - a Cross Sectional Study

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Abstract

COVID-19 was declared as a "pandemic" on the 11th of March, 2020 by WHO, as the virus spread increasingly worldwide. In the midst of the covid-19 pandemic, health anxiety was expected to worsen, with individuals becoming increasingly concerned regarding their health. The objective of this study was to determine the association of cyberchondria with health anxiety related to the Covid-19 pandemic among the students of Melaka Manipal Medical College, Muar and Melaka Campus, Malaysia. Our study also proposes to determine the prevalence of health anxiety as well as the association of gender, religion, ethnicity, general internet connectivity, past personal and family history of serious medical illness with health anxiety related to the Covid-19 pandemic among the MMMC students. We conducted a cross-sectional study among the undergraduate students of MMMC, Malaysia by using an online survey. This study was carried out from the month of June 2020 up until July 2020, for a total of 6 weeks duration. Non-probability purposive sampling was used to enroll students in our study. Participants in this study consisted of MMMC undergraduate students from a variety of courses, namely Bachelor of Medicine and Bachelor of Surgery (MBBS), Bachelor of Dental Surgery (BDS) and Foundation in Science (FIS). They responded to our questionnaires which consisted of 5 parts; (1) Informed Consent, (2) Social-Demographic information, (3) Cyberchondria Severity Scale (CSS), (4) Short Health Anxiety Inventory (SHAI), (5) Coronavirus Anxiety Scale (CAS). Unpaired t test, ANOVA, and correlation were used as statistical tests and the level of significance was set as $P<0.05$. A total of 175 students participated in our study and we found that participants scored 28.57 in the cyberchondria severity scale with minimum and maximum scores of 13 and 47 respectively. As for the health anxiety scale, the mean score was 13.9. A mean score of only 0.91 for the coronavirus anxiety scale was recorded among the MMMC undergraduates. The association between cyberchondria and health anxiety was low and positive, while on the other hand the association between cyberchondria and coronavirus anxiety was positive but little if any. Lastly, the association between health anxiety and coronavirus anxiety was low and positive. All the associations described were indeed significant. However, in our study, we noted that there is no significant association between sociodemographic profile (religion, gender, ethnicity), general internet connectivity, past family history and personal history of chronic illness with health anxiety.

Keywords

Cyberchondria, Health Anxiety, Covid-19, Undergraduate Students

Received: July 27, 2020 / Accepted: September 3, 2020 / Published online: November 6, 2020

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1. Introduction

Epidemics, pandemics and outbreaks are the infectious disease disasters that may lead to a rise in morbidity and mortality worldwide, making up a quarter to a third of the universal fatality rate. [1] Since the 12th of December 2019, an ongoing occurrence of an undetermined acute respiratory tract infection was reported in Wuhan City, Hubei Province, China, originating from the Hunan South China Seafood Market. [2, 3] The geographical spread of the epidemic was rapid and uncontrollable thenceforward. [4] The aetiological cause of this epidemic outbreak was a novel coronavirus discovered in 2019 (2019-nCoV), also known as "severe acute respiratory coronavirus 2 (SARS-CoV-2)". This virus was publicized by the International Committee on Taxonomy of Viruses (ICTV) on the 11th of February 2020. Coronavirus disease 2019 (COVID-19) was proclaimed by the World Health Organization (WHO) as the name of the disease on that same day. [5] The Novel Coronavirus is a newly discovered strain of the coronavirus which has never been recognised previously through the sequencing and evolutionary tree analysis of the virus. [6] The mode of spread of the virus is by human-to-human transmission via respiratory droplets or by direct contact, with a period of 6.4 days predicted mean incubation period and a basic reproduction number of 2.24–3.58. [7] As the virus spread increasingly worldwide, COVID-19 was declared as a "pandemic" on the 11th of March, 2020 by WHO. [8] To date, a total of 10,185,374 confirmed cases of COVID-19, including 503,862 deaths, were reported to WHO globally. [9] The first case in Malaysia was detected on the 25th of January 2020, with 4 confirmed cases of COVID-19 reported to the Ministry of Health (MOH). [10] The affirmed cases kept soaring in Malaysia and two fatalities due to COVID-19 were first recorded by MOH on the 17th of March of 2020. [11] Most of the cases reported were traced back to a religious social event held at the end of February at Seri Petaling mosque in Selangor, that has emerged as a wellspring of several new coronavirus spreads across the nation. [12] As of 30th of June 2020, there has been a total of 8639 confirmed cases of COVID-19 with a current recovery rate of 96.7% and a mortality of 121 reported in Malaysia. [13]

The health anxiety phenomenon depicted by Salkovskis and Warwick in 1986 provided a basis for the concept of Health Anxiety Disorders, which is presently classifiable as an anxiety disorder in affiliation with Post Traumatic Stress Disorder, Obsessive-Compulsive Disorder, Pitiful, Personality Disorder and General Anxiety Disorder. [14, 15] Health anxiety extends from irregular concern to an obsessive distraction with fears of sickness that may meet standards for a diagnosis of hypochondriasis. [16] The cognitive behavioral model proposes that anxious people hold dysfunctional beliefs and presumptions about wellbeing and sickness, which leads them to misjudge a stimulus (e.g. sensations of the body) as proof that they may be, or in danger of turning out to be, very sick. [15, 17] Based on this model, looking for online health information seems to contribute to health concerns and anxiety in a few ways, counting as a source of dysfunctional assumptions and convictions and by giving clashing information which causes a rise in uncertainty. [18] When looking at particular samples, recent studies found that medical staff and individuals influenced by isolation (themselves or somebody they know) in particular suffer from anxiety and distress. [19-21] Younger individuals tend to get a huge amount of information from social media that can trigger stress. [22] Individuals with higher education tended to have more distress, maybe due to high self-awareness of their health. [23] Considering the huge number of the aging Chinese population, and their susceptibility to COVID-19, these older people with psychiatric conditions may be encountering further distress. [24] A recent study among undergraduates in Changzi medical college and the general community in China found that around 25–35% of respondents endure anxiety symptoms or mental stress during the COVID-19 pandemic. [25-27] More than half of the respondents from the Chinese population expressed that they had concerns in general about the COVID-19 pandemic, or that their family members might be infected with this deadly virus. [28, 29] A study in China which consist of 253 individuals from one of the most influenced by the COVID-19 pandemic reported a 7% incidence of post-traumatic stress symptoms 1 month after the outbreak. [30] In addition, a recent studies have suggested that the negative social and financial effects of current stay-at home orders and the COVID-19 widespread itself (e.g., financial downturn, exposure to disturbing media) seem contribute to the adverse physiological results, which includes feeling very lonely, reduced social support, depression, anxiety and more worried regarding their financial [31-33]

The Internet has become one of the important sources of health information and provides the general public with access to enormous amounts of medical information. [34] However, for a few individuals, the use of the Internet to look for medical information might lead to erroneous beliefs that innocuous symptoms are the sign of a serious medical condition. [35] As a matter of fact, frequent searches regarding health status on the internet is related to health anxiety. [36, 37] An increase in health anxiety due to online health information seeking has frequently been coined as 'cyberchondria'. [38]

Cyberchondria alluded to searching the web excessively for health care related information. [39] More as of late, it was characterized by the excessive and repetitive behavior of symptom-checking on the Internet and it is suspected to be

related to underlying health anxiety.[40] Excessive searching on the internet increased the likelihood of feeling "frightened" of health-related online information and worsening of health anxiety as information gathered from internet is not necessarily true and can be deceiving. Those with concerns about diseases are even less likely to attend to source validity [41] and are more afraid of what they see. [36]

In the midst of the covid-19 pandemic, health anxiety is expected to worsen, with individuals becoming increasingly concerned regarding their health. [31, 42] Previous studies have shown that many people have looked up information regarding the pandemic, as there is a wealth of information which has been posted on social media and other internet sites. [43, 44] However, some individuals may attribute the disease to themselves when they look up health-related information online in a pathologic manner (cyberchondria). [44, 45]

Aside from cyberchondria, there are a number of other variables which have been proven to affect health anxiety; namely gender, past and present history of psychiatric illnesses, and past and family history of chronic illnesses. Previous studies have shown that individuals who have chronic diseases which can increase their risk of being infected experience an increase in their health anxiety. [46] Studies have also shown that women as well as individuals with psychiatric illnesses may be more aware of the bodily sensations they experience, and hence they may experience higher levels of health anxiety. [46, 47]

At the moment, there is still a lack of research associating cyberchondria and health anxiety in Malaysia. As a matter of fact, this is the first study regarding the association of cyberchondria with health anxiety in the context of the Covid-19 pandemic among MMMC students. Medical students are commonly thought to be more susceptible to experience health anxiety. This is commonly referred to as the ''medical student syndrome''. [48, 49] Medical students also tend to be more vulnerable to the development of various mental health conditions due the high amounts of stress they commonly experience during the course of their studies. [50] The prevalence of high anxiety scores is greater in the medical student population (40%-79%) as compared to the scores in the general population, which was approximately 14%. [50-52] The medical student population is exposed to a sizable amount of information online, and this in turn can predispose them to the development of cyberchondria. [50] Thus, this medical student-based evaluation is very much needed.

As a conclusion, the objective of this study was to determine the association of cyberchondria with health anxiety related to the Covid-19 pandemic among the students of Melaka Manipal Medical College, Muar and Melaka Campus, Malaysia. Our study also proposes to determine the prevalence of health anxiety as well as the association of gender, religion, ethnicity, general internet connectivity, past personal and family history of serious medical illness with health anxiety related to the Covid-19 pandemic among the MMMC students.

2. Research Methodology

2.1. Study Design, Setting, Time and Population

A cross-sectional study was conducted among undergraduate medical students of a private medical college, Melaka Manipal Medical College (MMMC), Melaka campus and Muar campus, Malaysia. This study was carried out from the month of June 2020 up until July 2020, for a total of 6 weeks duration. Participants in this study consisted of MMMC undergraduate students from a variety of courses, namely Bachelor of Medicine and Bachelor of Surgery (MBBS), Bachelor of Dental Surgery (BDS) and Foundation in Science (FIS) with a population of approximately 992 students. Participants were self-selected and received no compensation for completing the questionnaire so as to minimize selection bias and secondary gain. Students of MMMC in Semester 6 and 7 of the Bachelor of Medicine, Bachelor of Surgery (MBBS) program in the Muar campus and students in Semester 8, 9, 10 of the MBBS program in the Melaka campus were selected to participate in this study. Aside from that, both students in Semester 7, 8 and 9 of the Bachelor of Dental Surgery (BDS) programs and the students of Foundation in Science in Melaka campus were included in the study.

2.2. Sample Size

The sample size for this study was calculated using the Epi Info™ 7 Version 7.2.4.0 application. An image of the sample size calculation is shown in figure 1 below.

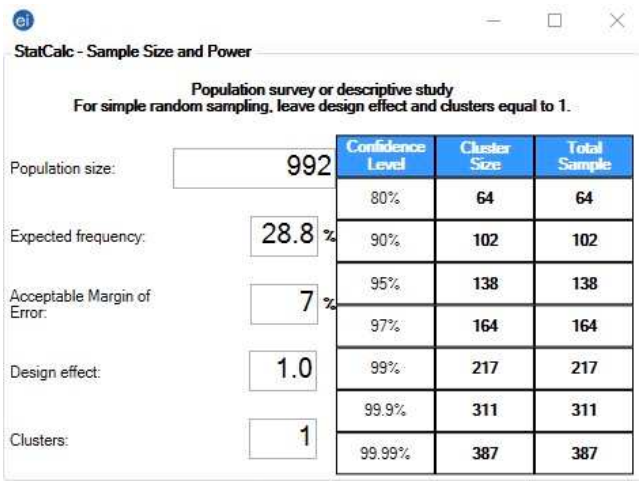

Figure 1. Sample Size Calculation.

Where,

Population size: 992 undergraduate students of MMMC Malaysia.

Expected frequency: Based on a previous research, 28.8% of the respondents reported having experienced moderate to severe symptoms of anxiety during the Covid-19 pandemic. Hence, the expected frequency was 28.8%. [53]

Acceptable margin of error: 7.0%

A sample size of 992 was used in this calculation.

According to a confidence level of 95%, a minimum sample size of 138 was needed.

The non-response rate allowed in this research was 30%. To allow for non-response, the final sample size was calculated using the following formula:

$$n_{\text{final}} = \frac{n_{\text{calculated}}}{1 - (\text{non} - \text{response rate})} = \frac{138}{1 - (0.3)} = 197.1$$

$$\text{n}_{\text{final}} = 197$$

Hence, after rounding off the value obtained, the final sample size calculated for this study was 197.

2.3. Data Sampling

Purposive sampling which is a form of non-probability sampling method was used to engage the students of Melaka Manipal Medical College (MMMC) in this study. A purposive sample was designated based on the features of the population and the purpose of this study. The inclusion criteria comprised of the (1) undergraduate medical and dental students from MMMC, (2) students of Foundation in Science from MMMC, (2) age of at least 18 years, (3) ability to understand the English language, (4) participants who have willingly agreed to take part in this study and (5) completion of all the responses in the questionnaires given including the consent form. The exclusion criteria in our study were participants who did not give consent to take part in this study as well as incomplete questionnaires and irrelevant responses. Multiple responses of the questionnaire submitted by the same participant will be discarded except for the first completed submission alone, assessed by an accurate completion of multiple attention check items.

2.4. Data Collection

Data was collected through an online survey questionnaire between 28th June 2020 to 7th July 2020 using a google form, with a consent form incorporated along with it. Social networks such as WhatsApp, Instagram and Twitter were the main platforms for the distribution of the link of the questionnaire to the contacts of the principal investigators. Upon receiving and clicking the link, the participants were auto directed to the information about the study and informed consent. Our questionnaires consisted of 5 parts; (1) Informed Consent, (2) Social-Demographic information, (3) Cyberchondria Severity Scale (CSS), (4) Short Health Anxiety Inventory (SHAI), (5) Coronavirus Anxiety Scale (CAS). Individuals agreeing to participate were asked to complete the questionnaire which inquired on social-demographic information including age, study programme, gender, nationality, ethnicity, religion, general internet connectivity and any past personal or family history of serious medical illness. Part 3 requires the participants to answer the Cyberchondria Severity Scale which consists of 12 items that are scored on a 5-point Likert-type scale ranging from "1=never" to "5=always" to assess the cyberchondria trait in the participants. [54] In part 4, the main subscale of the SHAI was used. The SHAI is an 18-item which measures health anxiety using a multiple-choice format. Questions (e.g., ''I do not worry about my health'') are scored on a 4-point Likert scale. [55] Two subscales were present in which the first 14 questions asked were regarding the health anxiety and the feared likelihood of becoming ill while the last four questions were deliberated to evaluate the mental state and the fear of negative outcomes if the illness happens. The last part included the Coronavirus Anxiety Scale (CAS). [56] The Coronavirus Anxiety scale was used to measure the anxiety related to the coronavirus, also termed as 'coronaphobia'. Participants were asked to answer 5-items of the CAS, using a 5-point frequency scale (0="not at all" to 4="nearly every day over the last 2 weeks"), on how often they feel physiologically-based symptoms of fear or anxiety when exposed to coronavirus-related thoughts or information.

2.5. Data Processing and Data Analysis

The data collected from the Google Forms questionnaire was tabulated into Microsoft Excel and statistically analyzed by using the Epi Info™ 7 Version 7.2.4.0 application downloaded from the Centers for Disease Control and Prevention (CDC) website. For qualitative data consisting of gender, ethnicity, religion, general internet connectivity and any past personal or family history of serious medical illness, the frequency and the percentage of data was calculated respectively. For quantitative data, (cyberchondria as in the Cyberchondria Severity Scale, health anxiety as in SHAI and Coronavirus Anxiety Scale), the range, mean along with standard deviation and median along with interquartile range was calculated. The level of significance was 0.05. The statistical tests used to find the association between the independent variables and dependent variables are shown in table 1 below.

Table 1. Statistical Tests used for Data Analysis.

Independent variables	Dependent variables	Statistical Tests
Cyberchondria	Health anxiety	Correlation
Cyberchondria	Coronavirus anxiety	Correlation
Gender	Health anxiety	Unpaired t test
Ethnicity	Health anxiety	ANOVA
Religion	Health anxiety	ANOVA
General internet connectivity	Health anxiety	ANOVA
Personal history of serious medical illness	Health anxiety	Unpaired t test
Family history of serious medical illness	Health anxiety	Unpaired t test
Health anxiety	Coronavirus anxiety	Correlation

2.6. Ethical Consideration

An informed consent form with all the important and relevant details of the study was provided to all participants before they started answering the questionnaire given. The participants were given the option to participate in this study, and had the option to withdraw from the study without providing any reasons. Thus, participation in the study was purely voluntary. The participants' information was kept confidential and their particulars were not revealed to any third parties. Their anonymity and privacy were well maintained. The research was approved by the Research Ethics Committee, Faculty of Medicine, Melaka Manipal Medical College, Malaysia.

3. Results

A total of 197 undergraduate medical students of MMMC were invited to take part in the online survey questionnaire, with only 175 individuals fulfilling the study inclusion criteria and completing the questionnaire online, giving a response rate of 88.83%. Table 2 highlights the socio-demographic profiles of the participants involved in the study. Of all the 175 samples analyzed, 131 (74.86%) were females and 44 (25.14%) were males, and the mean (standard deviation) age of the participants was 22.36 ± 1.63 years. The participants were in the age group of 18-26 with 19.43% were from the age group of less than 22 while 76.00% were from the age group of 22-25 and only 4.57% from the age group of more than 25. Based on the study programme, a large proportion of the participants consisted of MMMC undergraduate students from the MBBS course (70.29%) followed by the BDS course (17.71%) and the remaining were from the students of FIS (12.00%). 97.14% of the participants who joined the study were Malaysian students and 2.86% were International students.

In terms of ethnicity, the highest responses with 35.43% were from Indian community while the second highest with 29.14% were from Malay community, followed by 21.14% from the Chinese community and others were 14.29%. For religion, 33.14% were Islam, 30.86% were Hindhu, 17.14% were Christian, 16.00% were Buddha and others were 2.86%. Besides, in terms of general internet connectivity a total of 12 participants were having poor (6.86%) connection, while 111 and 52 participants were having moderate (63.43%) and strong (29.71%) connections, respectively. 6.86% of participants had a personal history of serious medical illness while the majority of the participants with 93.14% did not. A total of 120 participants had a family history of serious medical illness with 68.57% whereas 55 participants consisted of 31.43% did not.

Table 2. Socio-demographic profile among the undergraduate students of Melaka Manipal Medical College (n=175).

Variables	n (%)
Age	
<22	34 (19.43)
22-25	133 (76.00)
>25	8 (4.57)
Mean (SD)	22.36 (1.63)
Minimum-Maximum	18-26
Gender	
Female	131 (74.86)
Male	44 (25.14)
Study programme	
MBBS	123 (70.29)
BDS	31 (17.71)
FIS	21 (12.00)
Nationality	
Malaysian	170 (97.14)
International	5 (2.86)
Ethnicity	
Indian	62 (35.43)
Malay	51 (29.14)
Chinese	37 (21.14)
Others	25 (14.29)
Religion	
Islam	58 (33.14)
Hindu	54 (30.86)
Christian	30 (17.14)
Buddha	28 (16.00)
Others	5 (2.86)
General internet connectivity	
Poor	12 (6.86)
Moderate	111 (63.43)
Strong	52 (29.71)
Personal history of serious medical illness	
Yes	12 (6.86)
No	163 (93.14)
Family history of serious medical illness	
Yes	120 (68.57)
No	55 (31.43)

Table 3. Cyberchondria, Coronavirus anxiety and Health anxiety among the undergraduate students of Melaka Manipal Medical College (n=175).

Variables	Mean (SD)	Minimum-Maximum
Cyberchondria (12-60)	28.57 (7.24)	13-47
Health anxiety (0-54)	13.95 (6.13)	1-41
Coronavirus anxiety (0-20)	0.91 (2.03)	0-15

Table 3 shows the mean and standard deviations along with the minimum to maximum value scored by the 175 participants. Among these three scales, it was found that the participants scored more than half in the Cyberchondria Severity Scale which is 28.57 (7.24) with the minimum score of 13 and maximum score of 47. The table also shows that the score of the participants for Coronavirus Anxiety Scale was very least in which the mean value is 0.91 (2.03) with minimum score of 0 to maximum score of 15. The mean scores for the health anxiety scale is less than half of the total scores which is 13.95 (6.13), with the minimum score of 1 and maximum score of 41 by the participants.

Table 4. Association between socio-demographic characteristics and health anxiety.

Independent variable	Short Health Anxiety Inventory Mean Score (SD)	Mean Difference (95% CI)	P value
Gender			
Female	14.32 (6.14)	1.48 (-0.62 to 3.58)	0.166
Male	12.84 (6.02)		
Ethnicity			
Malay	14.71 (6.02)		0.741
Chinese	13.32 (7.50)		
Indian	13.84 (5.46)		
Others	13.60 (5.88)		
Religion			
Islam	14.74 (5.85)		0.312
Christian	13.87 (6.23)		
Buddha	12.36 (7.54)		
Hindu	13.63 (5.27)		
Others	17.60 (8.20)		
General internet connectivity			
Strong	13.58 (5.85)		0.465
Moderate	13.90 (5.79)		
Poor	16.00 (9.77)		
Past family history of chronic illness			
Yes	14.31 (6.14)	1.14 (-3.11 to 0.82)	0.252
No	13.16 (6.07)		
Past personal history of chronic illness			
Yes	16.08 (8.02)	2.29 (-5.90 to 1.32)	0.212
No	13.79 (5.97)		

Table 4 illustrates the association between social demographics profile (gender, ethnicity, religion), general internet connectivity, past family and personal history of chronic illness with health anxiety among MMMC undergraduates' students. According to our study, there was no significant association between all the variables with the health anxiety.

For gender, females have higher short health anxiety inventory (SHAI) mean score which is 14.32 (SD=6.14) compared to males with a mean score of 12.84 (SD=6.02) The mean difference is 1.48 and 95% CI ranges from -0.62 to 3.58. Noted that the p-value was 0.166 thus no significant association between gender and health anxiety.

Next for ethnicity and religion, Malay community (SHAI mean score=14.71; SD=6.02) and Others religion (SHAI mean score=17.60; SD=8.20) found to have higher SHAI mean score compared to remaining ethnicity and religion in our study, however the data is not significant, p value =0.741 and p value=0.312 respectively. In conclusion there is no significant association between ethnicity and religion with health anxiety.

For general internet connectivity, students with poor connectivity have a higher SHAI mean score of 16.00 (SD=9.77) compared to moderate and strong connection, nevertheless the association between general internet connectivity and health anxiety was insignificant. (P-value =0.465). Furthermore, past family and personal history of chronic illness are also statistically insignificant associated with health anxiety with p values of 0.252 and 0.212 respectively.

However students with positive past family and personal history of chronic illness have higher SHAI mean score of 14.31 (SD=6.14; mean difference=1.14; 95% CI from -3.11 to 0.82), 16.08 (SD=8.02; mean difference=2.29; 95% CI from -5.90 to 1.32) respectively.

Table 5. Association between cyberchondria, health anxiety and coronavirus anxiety.

	Health anxiety (r)	Coronavirus anxiety (r)
Cyberchondria	0.412***	0.173*
Health anxiety	-	0.346***

*P<0.05, **P<0.01, ***P<0.001

Table 5 shows the correlation between cyberchondria with health anxiety and coronavirus anxiety, and also health anxiety with coronavirus anxiety. The association between cyberchondria and health anxiety was positive and low, with r value of 0.412. The association was significant (P value: < 0.001). The association between cyberchondria and coronavirus anxiety was positive as well, but the magnitude of correlation was little if any, with r value of 0.173. This association was significant as well (P value <0.05). The association between health anxiety and coronavirus anxiety was positive, low and significant with r value of 0.346 and P value <0.001. Figures 2, 3 and 4 shown below highlight the correlation between cyberchondria with health anxiety and coronavirus anxiety, and also health anxiety with coronavirus anxiety.

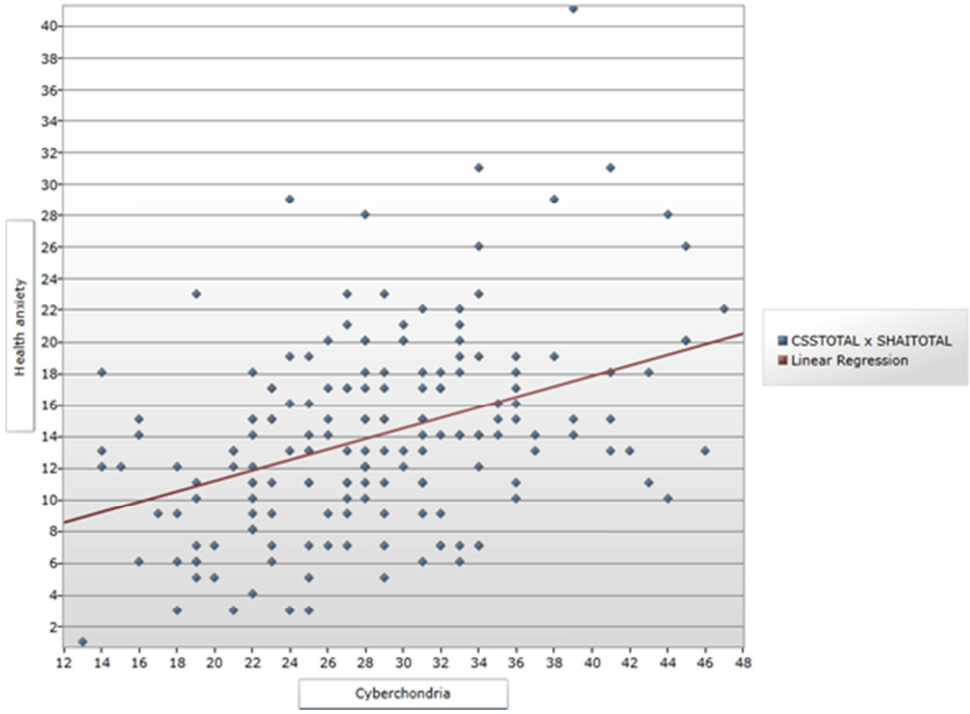

Figure 2. Association between cyberchondria and health anxiety.

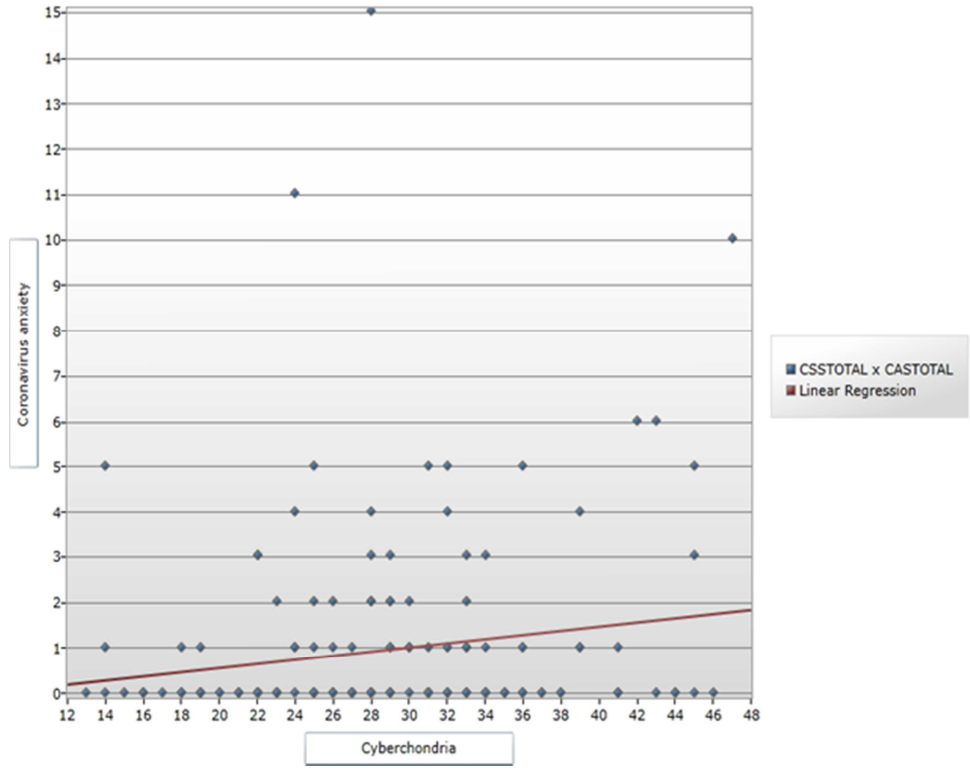

Figure 3. Association between cyberchondria and coronavirus anxiety.

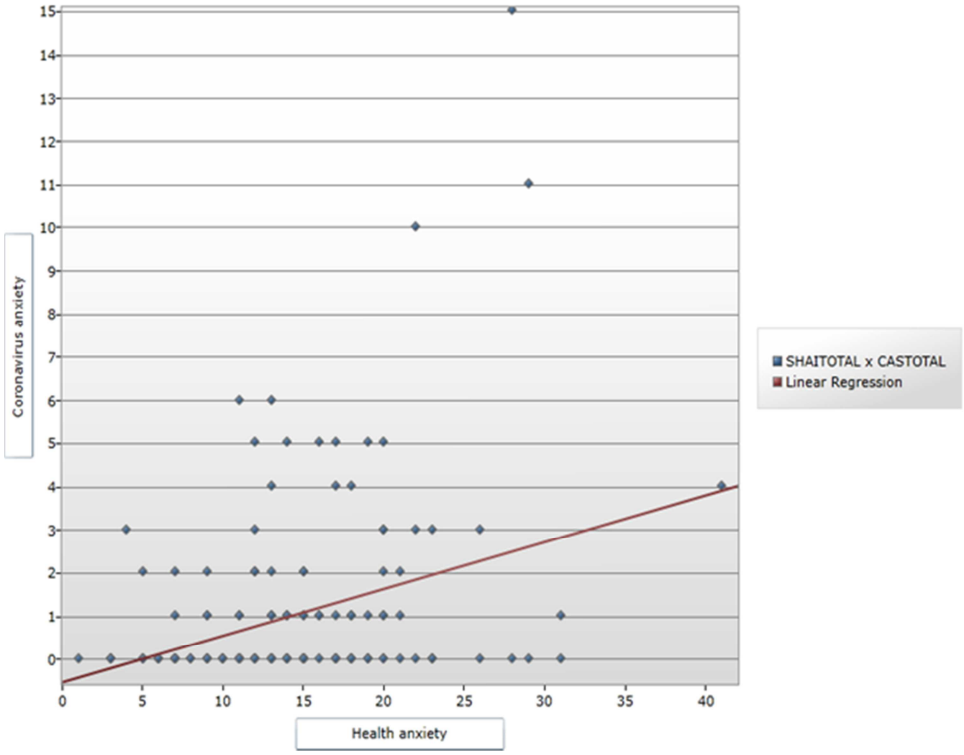

Figure 4. Association between health anxiety and coronavirus anxiety.

4. Discussion

This cross-sectional study was conducted among undergraduate medical and dental students of a private medical college, Melaka Manipal Medical College (MMMC), Melaka campus and Muar campus, Malaysia. This study was carried out to determine the association of cyberchondria with health anxiety related to the Covid-19 pandemic among the MMMC students. Another objective of this study was to determine the prevalence of health anxiety as well as the association of gender, religion, ethnicity, general internet connectivity, past personal and family history of serious medical illness with health anxiety related to the Covid-19 pandemic among the participants.

According to our research findings, the mean total score for Short Health Anxiety Inventory (SHAI) scale among the undergraduate students participating in our study was lower compared to a cross sectional study conducted among the general population in Germany. [57] Both studies were carried out during the current Covid-19 pandemic. This showed that the levels of health anxiety among the students in this study were not very high. The lower health anxiety levels in this study may be due to the medical awareness, knowledge and precautions related to Covid 19 disease among the undergraduate medical and dental students.

Other than that, we found that the mean total score for the Cyberchondria Severity Scale (CSS) was higher compared to a cross sectional study carried out among the general population in Germany. [57] This dissimilarity may have been due to a wider range of age groups which consisted of 18 to 61-year-old participants who took part in the previous study in comparison to our study. All the participants in our study ranged between 18 to 25 years of age, and hence a better understanding regarding the applications of modern technologies could explain the differences in the scores.

Technological advancements and innovations have enhanced our lives in many ways with easy accessibility of the Internet but it has also made us too dependent on the same. This could lead to the likelihood of cyberchondria and thus the development of health anxiety. From our research, we found out that there were significant associations between cyberchondria with health anxiety and coronavirus anxiety, as well as health anxiety with coronavirus anxiety. This could also strengthen the conclusion that frequent social network exposure could lead to increased anxiety. [58]

Our study has shown that the association between cyberchondria and health anxiety was significant with a positive and low correlation. In comparison with a previous cross-sectional study carried out among the second-year students of health science faculties of Ege University in Turkey, there was a significant, positive and moderate correlation between the cyberchondria and the health anxiety scales. [59] The difference between both the study times may explain the difference in correlation due to more reliable sources that were easily accessible and are widely available

nowadays. Aside from that, government initiatives in creating a website in order to update and educate the citizens these days regarding the health issues within the country also could explain the differences in correlation.

In this research, the significant association between cyberchondria and coronavirus anxiety was positive as well, but the magnitude of correlation was little if any. In comparison, the significant association between cyberchondria and coronavirus anxiety observed in a cross-sectional study conducted among the general population in Germany was found to have a low, positive correlation. [57] This might be due to the differences in the study population, as our study consisted of college students who may be using the Internet mainly for educational purposes. Apart from that, the association between health anxiety and coronavirus anxiety in our study was found to be positive, low and significant. A similar result was found in a cross-sectional study carried out among the general population in Germany in which the association was significant with positive and low correlation as well. [57]

In our study, we found that there were no significant associations between the sociodemographic profile (gender, ethnicity, religion), general internet connectivity, past family and personal history of chronic illness with the health anxiety among the undergraduates' students of MMMC. In a cross-sectional study carried out among university health students in Turkey, a statistically insignificant relationship was also found between the students' gender and health anxiety.[59] However, in our present study, the SHAI mean score for females was found to be higher compared to the males. A cross sectional study on gender differences among the undergraduate students in Canada found that women reported significantly higher levels of global health anxiety, reassurance-seeking and worry relative to men.[60] This might explain the higher SHAI mean score for the female gender in our study.

There is no significant association between religion and health anxiety, as well as between the ethnicity and health anxiety. This might be due to the equal exposure of factors such as health education by the Ministry of Health (MOH), as Malaysia is a multicultural and multiracial country, and many ethnicities live together in the same community. All the updates and precautions were given via Short Message Service (SMS) to all the residents of Malaysia; hence they rely upon one source. Thus, this explains the non-significant association.

In our study, past family and personal history of serious medical illness did not show any significant association with health anxiety as both these factors depend on one's experience regarding the disease which they may see or experience. Moreover, MMMC students may have had better knowledge regarding the disease due to the proper education and exposure, which might influence their view about the disease and alter their perception for the disease wholly. Thus, this prevents unnecessary anxiety which may in turn explain the results. A cross sectional study which was conducted in Canada among the university psychology students and the Canadian community with ill parents found that when examined simultaneously, attachment anxiety, attachment avoidance, death of the parent, and beliefs about the likelihood of illness and difficulty coping with diseases were all statistically significant predictors of health anxiety. [61] Thus, it appears that both attachment dimensions and specific health beliefs alongside the death of an ill parent are related with increased health anxiety among emerging adults who have had a parent diagnosed with a serious medical disease. [61]

There were some limitations in our study. As our study was a cross-sectional study, there were some limitations in explaining the causation. This study was also not representative of the general population since our participants were only from Melaka Manipal Medical College, Malaysia. In addition, it is also possible that participants had a higher score for cyberchondria due to their higher affinity for the Internet and for online activities. Another limitation in our study was the duration of our study which was only for 6 weeks and hence we could not assess the anxiety level of the participants either in the beginning of the pandemic when the cases were rising or in the future either. Educational programs scheduled by mental health professionals are advised to educate and promote healthy behaviours. People should also be advised to lower their exposure to negative news. It is also recommended to strengthen the accessibility of health services for the people during this pandemic. Patients and their families, medical personnel and healthcare professionals are also often exposed to mental health issues and problems, and so it is recommended that this study be conducted among them.

5. Conclusion

In conclusion, our study shows that there was positive association between cyberchondria and health anxiety as well as between health anxiety and coronavirus anxiety among our participants. Yet, we found that there was no association between sociodemographic profile and health anxiety in our study. The mental health of college students especially in the context of health anxiety due to the effect of seeking health-related information on the internet should be given equal attention as the students are well affected when confronted with public health emergencies, and they require assistance

and support from society, families and colleges. Hence, education via the media ads, campaign or incorporation into the curriculum regarding the health anxiety and factors causing it is an ideal method to reach out to the students in the midst of this Covid-19 pandemic.

Acknowledgements

The completion of this study could not have been accomplished without the guidance and support from our amazing lecturers, Professor Dr. Adinegara Lutfi Abas (Dean of Faculty of Medicine & Head of department of Community Medicine), Professor Dr. Htoo Htoo Kyaw Soe (Department of Community Medicine, MMMC), Associate Professor Dr. Sujata Khobragade (Department of Community Medicine, MMMC) and Assistant Prof. Dr. Mila Nu Nu Htay (Department of Community Medicine, MMMC) throughout the study. Furthermore, we would like to express our sincere gratitude and appreciation towards all the respondents who willingly took part in our study. We would also like to thank the Research Ethics Committee, Faculty of Medicine, Melaka Manipal Medical College (MMMC), Malaysia for approving our research. Last but not least, we would like to take this opportunity to express our utmost and heartfelt respect to all the frontliners and healthcare workers for the dedications and sacrifices in the battle against Covid 19 disease.

Appendix

Association of Cyberchondria with Health Anxiety During Covid-19 Pandemic Among Undergraduate Students, – A Cross Sectional Study.

Principal Investigator's name: Mohamad Haris Fadillah bin Azmil, Donna Lisa Julius, Nur Diyana binti Muhammad Azhar, Nur'Aliaa Shairah binti Muhammad Shukri, MBBS Students, Melaka Manipal Medical College

You are being invited to participate in a research project which aims to determine the association of cyberchondria with health anxiety related to the Covid-19 pandemic among MMMC students. It will ask for basic information without breaking anonymity. You will be asked about resilience and well-being and your anonymity will be ensured. The survey is comprised of a self-administered online questionnaire and this will take about 10-15 minutes. There are no known risks involved with this study research. Participation is completely voluntary and there will be no penalty or loss of benefits if you choose not to take part in this research study or to withdraw. Your responses will be kept completely confidential. Results of the study will be reported as a total picture and not individually. Your participation will be greatly appreciated.

Consent

A. I consent to take part in the study as titled above of my own free will. I will understand that I have the freedom to choose not to participate in the study. No reward or inducement has been offered to me to participate as a volunteer in the study.

B. I do not want to participate in this survey.

Roll number:

Thank you so much for your participation.

Part I: Social-Demographic information

1. Age (years)
2. Study programme
   a) MBBS
   b) BDS
   c) FIS
3. Gender
   a) Male
   b) Female
4. Nationality
   a) Malaysian
   b) International students

5. Ethnicity
   a) Malay
   b) Chinese
   c) Indian
   d) Others
6. Religion
   a) Islam
   b) Christian
   c) Buddha
   d) Others
7. General internet connectivity
   a) Poor
   b) Moderate
   c) Strong
8. Any past history of serious medical illness ? (e.g. Cancer, Heart Diseases, Tuberculosis, Asthma, Pneumonia, Diabetes Mellitus, Hypertension, Kidney Disease, etc)
   a) Yes
   b) No
9. Any family history of serious medical illness ? (e.g. Cancer, Heart Diseases, Tuberculosis, Asthma, Pneumonia, Diabetes Mellitus, Hypertension, Kidney Disease, etc)
   a) Yes
   b) No

Part II: Cyberchondria Severity Scale-12 (CSS-12)

1. If I notice an unexplained bodily sensation I will search for it on the internet.
   a) Never
   b) Rarely
   c) Sometimes
   d) Often
   e) Always
2. Researching symptoms or perceived medical conditions online distracts me from reading news/sports/entertainment articles online.
   a) Never
   b) Rarely
   c) Sometimes
   d) Often
   e) Always
3. I read different web pages about the same perceived condition.
   a) Never
   b) Rarely

c) Sometimes

d) Often

e) Always

4. I start to panic when I read online that a symptom that I have is found in a rare/serious condition.

a) Never

b) Rarely

c) Sometimes

d) Often

e) Always

5. Researching symptoms or perceived medical conditions online leads me to consult with my GP.

a) Never

b) Rarely

c) Sometimes

d) Often

e) Always

6. I enter the same symptoms into a web search on more than one occasion.

a) Never

b) Rarely

c) Sometimes

d) Often

e) Always

7. Researching symptoms or perceived medical conditions online interrupts my work (e.g. writing emails, working on word documents or spreadsheets).

a) Never

b) Rarely

c) Sometimes

d) Often

e) Always

8. I think I am fine until I read about a serious condition online.

a) Never

b) Rarely

c) Sometimes

d) Often

e) Always

9. I feel more anxious or distressed after researching symptoms or perceived medical conditions online.

a) Never

b) Rarely

c) Sometimes

d) Often

e) Always

10. Researching symptoms or perceived medical conditions online interrupts my offline social activities (e.g. reduces time spent with friends/family).

a) Never

b) Rarely

c) Sometimes

d) Often

e) Always

11. I suggest to my GP/ medical professional that I may need a diagnostic procedure that I read about online (e.g. a biopsy /a specific blood test).

a) Never

b) Rarely

c) Sometimes

d) Often

e) Always

12. Researching symptoms or perceived medical conditions online leads me to consult with other medical specialists (e.g. consultants).

a) Never

b) Rarely

c) Sometimes

d) Often

e) Always

Part III: Short Health Anxiety Inventory

Each question in this section consists of a group of four statements. Please read each group of statements carefully and then select the one which best describes your feelings, OVER THE PAST WEEK. Identify the statement by ticking the letter next to it i.e. if you think that statement (a) is correct, tick statement (a); it may be that more than one statement applies, in which case, please tick any that are applicable.

1. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) I do not worry about my health.

b) I occasionally worry about my health.

c) I spend much of my time worrying about my health.

d) I spend most of my time worrying about my health.

2. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) I notice aches/pains less than most other people (of my age).

b) I notice aches/pains as much as most other people (of my age).

c) I notice aches/pains more than most other people (of my age).

d) I am aware of aches/pains in my body all the time.

3. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) As a rule I am not aware of bodily sensations or changes.

b) Sometimes I am aware of bodily sensations or changes.

c) I am often aware of bodily sensations or changes.

d) I am constantly aware of bodily sensations or changes.

4. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) Resisting thoughts of illness is never a problem.

b) Most of the time I can resist thoughts of illness.

c) I try to resist thoughts of illness but am often unable to do so.

d) Thoughts of illness are so strong that I no longer even try to resist them.

5. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) As a rule I am not afraid that I have a serious illness.

b) I am sometimes afraid that I have a serious illness.

c) I am often afraid that I have a serious illness.

d) I am always afraid that I have a serious illness.

6. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) I do not have images (mental pictures) of myself being ill.

b) I occasionally have images of myself being ill.

c) I frequently have images of myself being ill.

d) I constantly have images of myself being ill.

7. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) I do not have any difficulty taking my mind off thoughts about my health.

b) I sometimes have difficulty taking my mind off thoughts about my health.

c) I often have difficulty in taking my mind off thoughts about my health.

d) Nothing can take my mind off thoughts about my health.

8. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) I am lastingly relieved if my doctor tells me there is nothing wrong.

b) I am initially relieved but the worries sometimes return later.

c) I am initially relieved but the worries always return later.

d) I am not relieved if my doctor tells me there is nothing wrong.

9. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) If I hear about an illness I never think I have it myself.

b) If I hear about an illness I sometimes think I have it myself.

c) If I hear about an illness I often think I have it myself.

d) If I hear about an illness I always think I have it myself.

10. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) If I have a bodily sensation or change I rarely wonder what it means.

b) If I have a bodily sensation or change I often wonder what it means.

c) If I have a bodily sensation or change I always wonder what it means.

d) If I have a bodily sensation or change I must know what it means.

11. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) I usually feel at very low risk of developing a serious illness.

b) I usually feel at fairly low risk of developing a serious illness.

c) I usually feel at moderate low risk of developing a serious illness.

d) I usually feel at very high risk of developing a serious illness.

12. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) I never think I have a serious illness.

b) I sometimes think I have a serious illness.

c) I often think I have a serious illness.

d) I usually think I have a serious illness.

13. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) If I notice an unexplained bodily sensation I don't find it difficult to think about other things.

b) If I notice an unexplained bodily sensation I sometimes find it difficult to think about other things.

c) If I notice an unexplained bodily sensation I often find it difficult to think about other things.

d) If I notice an unexplained bodily sensation I always find it difficult to think about other things.

14. Which of these statements best describes your feelings, OVER THE PAST WEEK? You can tick more than one statement.

a) My family/friends would say I do not worry enough about my health.

b) My family/friends would say I have enough attitude to my health.

c) My family/friends would say I worry too much about my health.

d) My family/friends would say I am a hypochondriac.

For the following questions, please think about what it might be like if you had a serious illness of a type which particularly concerns you (such as heart disease, cancer, multiple sclerosis and so on).

Obviously, you cannot know for definite what it would be like; please give your best estimate of what you think might happen, basing your estimate on what you know about yourself and serious illness in general.

15. Please give your best estimate of what you think might happen, basing your estimate on what you know about yourself and serious illness in general.

a) If I had a serious illness, I would still be able to enjoy things in my life quite a lot.

b) If I had a serious illness, I would still be able to enjoy things in my life a little.

c) If I had a serious illness, I would be almost completely unable to enjoy things in my life.

d) If I had a serious illness, I would be completely unable to enjoy life at all.

16. Please give your best estimate of what you think might happen, basing your estimate on what you know about yourself and serious illness in general.

a) If I developed a serious illness there is a good chance that modern medicine would be able to cure me.

b) If I developed a serious illness there is a moderate chance that modern medicine would be able to cure me.

c) If I developed a serious illness there is a very small chance that modern medicine would be able to cure me.

d) If I developed a serious illness there is no chance that modern medicine would be able to cure me.

17. Please give your best estimate of what you think might happen, basing your estimate on what you know about yourself and serious illness in general.

a) A serious illness would ruin some aspects of my life.

b) A serious illness would ruin many aspects of my life.

c) A serious illness would ruin almost every aspect of my life.

d) A serious illness would ruin every aspect of my life.

18. Please give your best estimate of what you think might happen, basing your estimate on what you know about yourself and serious illness in general.

a) If I had a serious illness, I would not feel that I had lost my dignity.

b) If I had a serious illness, I would feel that I had lost a little of my dignity.

c) If I had a serious illness, I would feel that I had lost quite a lot of my dignity.

d) If I had a serious illness I would feel that I had totally lost my dignity.

Part IV: Coronavirus Anxiety Scale (CAS)

The following questions related to how often have you experienced the following activities over the last 2 weeks.

1. I felt dizzy, lightheaded, or faint, when I read or listened to news about the coronavirus.

a) Not at all

b) Rare, less than a day or two

c) Several days

d) More than 7 days

e) Nearly every day over the last 2 weeks

2. I had trouble falling or staying asleep because I was thinking about the coronavirus.

a) Not at all

b) Rare, less than a day or two

c) Several days

d) More than 7 days

e) Nearly every day over the last 2 weeks

3. I felt paralyzed or frozen when I thought about or was exposed to information about the coronavirus.

a) Not at all

b) Rare, less than a day or two

c) Several days

d) More than 7 days

e) Nearly every day over the last 2 weeks

4. I lost interest in eating when I thought about or was exposed to information about the coronavirus.

a) Not at all

b) Rare, less than a day or two

c) Several days

d) More than 7 days

e) Nearly every day over the last 2 weeks

5. I felt nauseous or had stomach problems when I thought about or was exposed to information about the coronavirus.

a) Not at all

b) Rare, less than a day or two

c) Several days

d) More than 7 days

e) Nearly every day over the last 2 weeks

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