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Cyberchondria and its Impact on Self-Medication and Self Care in COVID-19 Pandemic – A Cross Sectional Study

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Corona Virus Disease 2019 (COVID-19) has brought several impacts on the health of people. The infodemic which accompanied the pandemic can lead to cyberchondria, fear and anxiety accompanying excessive online search of COVID-19 related information. Most of the people try to avoid getting infected with this virus by taking adequate protective measures. Hence the aim of this study was to analyze the impact of COVID-19 related cyberchondria on self-medication and self care. An online cross-sectional semi-structured questionnaire based study was done and a total of 323 responses were obtained. Participants were segregated into two clusters based on the cyberchondria severity score which included four constructs using k-means cluster analysis considering the score obtained in each construct. The impact of cyberchondria on self care and self care among medical practitioners between the clusters were analyzed using independent t-test. Qualitative data were analyzed using descriptive statistics. This study found that 35% of the participants were categorized in the cluster with high cyberchondria score. A marked proportion of the participants who have taken self-medication for COVID-19 prophylaxis belonged to this cluster. A statistically significant difference was observed in the mean of the scores used to assess self care between the clusters (p = 0.003) whereas no significant difference was observed among registered medical practitioners (p=0.222). Anxiety related with excessive online COVID-19 information seeking behaviour had effects in terms of enhanced self care and self-medication in the respondents. Hence it is important to use internet wisely for self well being.

Keywords: Anxiety; COVID-19; Cyberchondria; Infodemic; Self-medication; Self-care.

The outbreak of Corona Virus Disease 2019(COVID-19), declared as a pandemic by the World Health Organization has imposed a significant public health concern among the world especially in the developing countries. Being detected first in December 2019 in Wuhan (Hubei, China) the outbreak has spread all over the world and is continuing as a public health emergency with spikes and lull due to a high proportion of asymptomatic cases and virulence[1].The first case of COVID-19 in India was reported on 30 January 2020 in the state of Kerala which originated from China. Currently, India has reported to have two waves of COVID-19 with the largest number of cases in Asia and the second largest in the world[2].

COVID-19 is caused by a novel Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-COV-2) which had imposed unprecedented menace to global human well-being and high uncertainty owing to the novelty of the virus and

disease especially in the earlier stage. As a result people including health-care providers were trying their best to gain more knowledge about the disease from various health information sources. Rapid and innovative advances in digital media had paved a way for seeking up to the minute health-related information on COVID-19 in online platform[3].

Within a New York minute, a prodigious amount of COVID-19 related web-based information became accessible at one's fingertips on trending issues such as daily statistics, symptoms, COVID-19 appropriate behaviours, preventive measures and available as well as budding treatment options[3]. Hence the pandemic has been accompanied by an "infodemic" - plethora of information including false or misleading ones in digital and physical environments during a disease outbreak[3,4].

At a time when the internet is flooded with information about COVID-19, it would probably add up to the people's anxiety and fear bringing about confusion and risk-taking behaviour. When people are unaware about what they need to do to safeguard their health and the health of others around them, an infodemic can amplify or lengthen outbreaks[4].

At a glance this could attribute to significant impact on the individuals especially when the world is in a complete lockdown leaving them stranded at home with the digital media being the only source of contact with the external environment. Excessive and repetitive internet usage to seek COVID-19 related information could envisage a problem termed cyberchondria, an unexplained online-search-related anxiety. Hence it may not be a good idea to search for health-related information from any random website[5,6].

On the flip side, the vast amount of online information about COVID-19 also aids in health education, which could result in increased self care measures including self-medication. Excessive online information searching can lead to unwanted worry and anxiety, to the point that people become obsessive about self-care.

Hence this study aimed to analyze the impact of anxiety related with online COVID-19 information search on self-care measures including self-medication.

MATERIALS AND METHODS

This study was conducted as an online semi-structured questionnaire based cross sectional study during June and July 2020. The participants were recruited by convenience sampling (non-randomized) method. A self selected survey through creating an e-survey link was publicized via social media platforms and the individuals were left to choose to participate in the survey. The questionnaire was made available both in English and local vernacular language (Tamil). Information about the purpose of the survey, no other known disadvantages of participation except spending their valuable time and data confidentiality were described clearly in the survey form. A total of 323 responses were obtained till 31st July 2020 and the link was closed. The response was limited to one for a participant.

The questionnaire used in this study was developed from literature and adaptations from previous studies. Before starting the study, pilot – testing and subsequent necessary modifications were done. The scale used to measure severity of cyberchondria in COVID-19 was developed from the adaptations of cyberchondria severity scale-15, English-translated German questionnaire. The scale used in this study employed only four constructs, i.e., compulsion, distress, excessiveness and reassurance. Each question had five options in likert scale (Never, Rarely, Sometimes, Frequently, and Always), and they were scored from 1 to 5. The score range per construct was 3 to 15 and the maximum score was 60[7].

The questions regarding self-medication were adopted from previous studies taking into account the newly proposed medicines having prophylactic role[8,9]. The questions for self care were generated from the notifications and advertisements of World Health Organization (WHO) and Ministry of Health and Family Welfare (MoHFW), India websites. To assess the self care among medical practitioners, this study devised additional 11 questions exclusively for the registered medical practitioners including dentists in India. A score of one was awarded to every 'yes' response. The total score was then calculated separately.

Statistical analysis

The data collected through the link were downloaded in excel sheets and analyzed using

SPSS software version 23. Basic demographic details were analyzed using descriptive statistics and expressed as percentages. The participants were segregated into two clusters based on the cyberchondria severity score obtained using k-means cluster analysis considering the score obtained in each construct. To assess the impact of cyberchondria on self care and self care among medical practitioners, the scores obtained were compared between the two clusters using independent t-test. A p value of <0.05 was considered as statistically significant.

RESULTS

Out of the 323 participants who responded to the questionnaire circulated through e-platform, 114 (35.3%) were male and 209 (64.7%) were female. The basic demographic details of the study participants are represented in Table.1

Cyberchondria Severity Scale

The cyberchondria severity scale adapted in this study had 12 items classified into four constructs namely excessiveness, compulsion, distress and reassurance. The participants were classified into two clusters based on their responses using k-means cluster analysis. The software fitted 113 (35%) participants into cluster with high score and 210 (65%) into cluster with low scores. The mean and standard deviation of the score of each construct are presented in Table 2. A statistically significant difference in the mean scores of all the constructs was observed between the two clusters.

Self-medication for COVID-19 prophylaxis

Out of the 323 participants, 128 (39.6%) had taken self-medication for COVID-19 prophylaxis. Among the 128 self-medication participants, 26 (12.8%) had taken self-medication for other illnesses too in the past and 26 (12.8%) were from medical background. Regarding the impact of cyberchondria on self-medication, 47 (36.7%) out of 128 belonged to the cluster with high cyberchondria severity score and 81 (63.3%) belonged to the cluster with low cyberchondria severity score as illustrated in Figure 1. The pattern of usage of various drugs for COVID-19

Table 1. Basic demographic details

Details		Number of participants n=323 (%)
Age	18-20 years	77 (23.8)
	21-30 years	115 (35.6)
	31-40 years	75 (23.2)
	41-50years	32 (9.9)
	51-60 years	17 (5.3)
	>60 years	7 (2.2)
Educational background	Higher Secondary	10 (3.1)
	Arts/Science	179 (55.4)
	Professional – Engineering	67 (20.7)
	Professional – Medical	63 (19.5)
	Paramedical	4 (1.2)
Employment status	Employed	150 (46.4)
	Unemployed	14 (4.3)
	Home maker	29 (9)
	Student	130 (40.2)
Residence	Urban	236 (73.1)
	Rural	87 (26.9)
Time spent in internet usage per day	<5 hours	174 (53.9)
	>5 hours	149 (46.1)
History of self-medication in the past	Yes	56 (17.3)
	No	267 (82.7)
COVID-19 Positive status of friends/relatives	Yes	80 (24.8)
	No	243 (75.2)

prophylaxis is represented in Figure 2. The reason for self-medication in this pandemic and the source of information/advice for self medication are mentioned in Table 3.

Out of the 128 participants who have taken self-medication, 88 (68.8%) had used internet to find the details of the drugs taken by them, 87 (68%) were aware that consuming these drugs could cause adverse effects and 11(8.6%) had suffered from minor adverse effects including gastritis, allergic reactions etc.

Impact of Cyberchondria on Self care (Protective Behaviour)

A statistically significant difference was observed in the mean of the score used to evaluate the self care between the clusters with high (14.42 ± 3.256) and low (13.19 ± 3.632) cyberchondria severity score with p = 0.003 (p <0.05 considered as statistically significant, Data expressed in mean ± SD). The descriptive analysis of questions used to analyze self care among general population is tabulated in Table 4. The impact of cyberchondria on hand washing frequency is depicted in Figure 3.

The questions devised to assess the self care among medical practitioners were scored accordingly and analyzed. The mean (± SD) of this score in the clusters with high and low cyberchondria scores were found to be 9.81 (± 1.328) and 9.26 (± 1.585) respectively. On comparison between the clusters using independent sample t test no statistically significant difference was observed (p=0.222). Table 5 shows the descriptive analysis of self care questions exclusive for medical practitioners.

DISCUSSION

In this era of digitalization, seeking information including health related ones on

Table 2. Constructs of Cyberchondria Severity Scale

Constructs of Cyberchondria severity scale	Cluster with high score (n=113) Mean ± SD	Cluster with low score (n=210) Mean ± SD	P Value*
Excessiveness	9.08 ± 2.368	5.68 ±2.189	<0.001
Compulsion	7.71 ± 3.122	4.57 ± 2.111	<0.001
Distress	8.36 ± 2.504	4.34 ± 1.615	<0.001
Reassurance	8.12 ± 2.587	4.61 ± 1.861	<0.001

*p value <0.05 was considered as statistically significant.

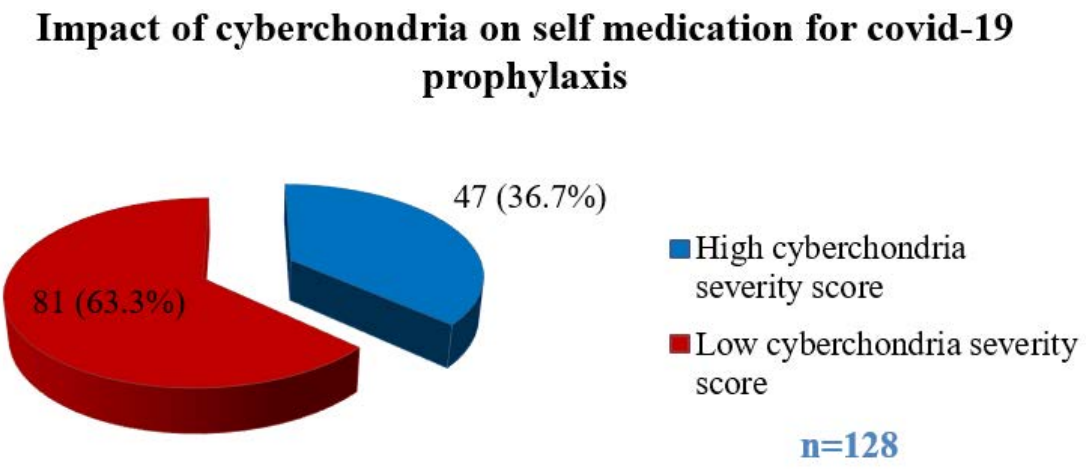

Fig. 1. Impact of cyberchondria on self medication for COVID-19 prophylaxis

e-platform have become universal. Seeking actionable information for self-protection, including identification of symptoms and home remedies could increase the awareness and preventive behaviour of the individual. As a double edged sword it can also add up to the fear and anxiety.

This study analyzed the anxiety related with the online COVID-19 information seeking behaviour using k-means cluster analysis, since the cyberchondria severity scale is yet to be validated in India with standard cut-off scores. The prevalence of COVID-19 related cyberchondria was found to be 35% which was less than the prevalence of general cyberchondria (56%) reported by a similar study done in Chennai[10].

The COVID-19 related cyberchondria severity scale adapted in this study employed

Table 3. Reason and advice for Self-medication

Self-medication for COVID-19 prophylaxis		Number of participants n=128, (%)
Reason for Self-medication	COVID-19 spread and mortality	48 (37.5)
	Fear of visiting hospitals	24 (18.75)
	Time saving	10 (7.8)
	Lack of easy access to hospitals	10 (7.8)
	Easy availability of drugs in local pharmacies	8 (6.2)
	Trust in online information	10 (7.8)
	Being familiar with the drugs	49 (38.3)
Advice obtained from(Source)	Medical shop person	26 (20.3)
	Other medical person (staff nurses etc.)	34 26.6)
	Family members	58 (45.3)
	Friends	21 (16.4)
	TV, Newspaper	14 (10.9)
	Social Media	12 (9.4)
	Internet Medical websites	15 (11.7)

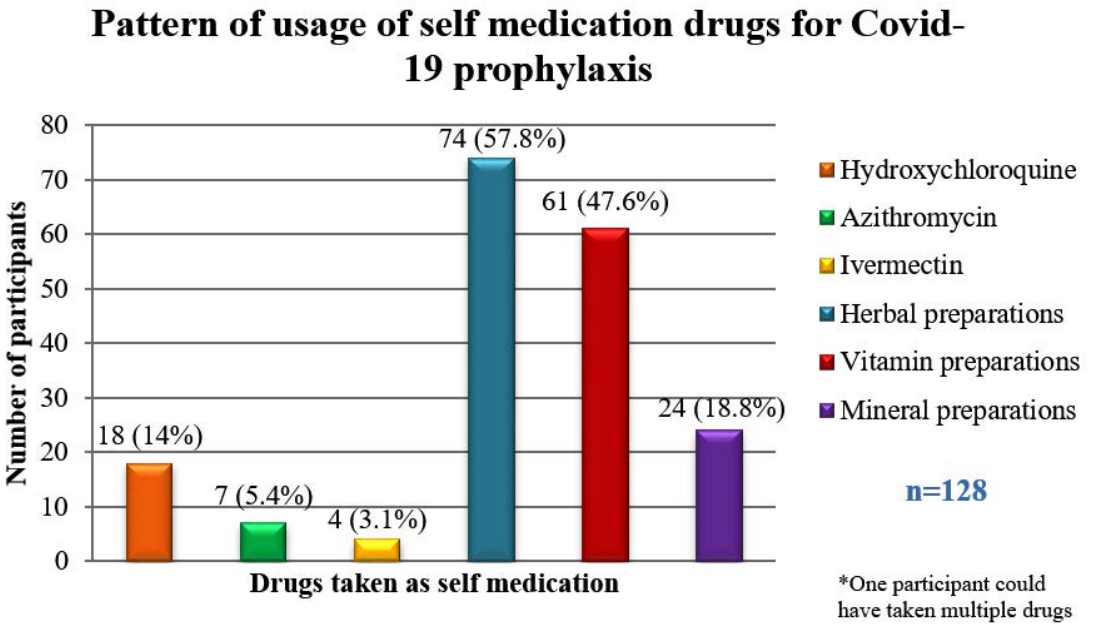

Fig. 2. Pattern of usage of self-medication drugs for COVID-19 prophylaxis

4 constructs namely compulsion, distress, excessiveness and reassurance [Table 2]. The construct mainly affected in this study was excessiveness which implies that multiple and repeated health related research can lead to escalating search behavior. This excessive online search behaviour can affect the daily activities of the individuals which are reflected by the compulsion construct. This could pave a way for a negative impact on the social, professional, and academic lives of people. Such impact was least observed in this study. Similarly excessive online information seeking behavior can have negative emotional consequences. This emotional influence

Table 4. Question wise analysis of Self care among general population

No	Question	Yes n=323, (%)
1.	Started wearing masks (N95/other masks) while going out	295 (91.3)
2.	Started wearing gloves while going to work/shopping	135 (41.8)
3.	Started disinfecting the vehicles they use	180 (55.7)
4.	Started mopping their home & disinfecting the handles of doors/windows regularly	260 (80.5)
5.	Started cleaning their personal belongings (mobile phones/ specs/ purses) with sanitizer/ cleanser	231 (71.5)
6.	Washed milk packets/water cans/ vegetables well before taking into home	261 (80.8)
7.	Consciously avoided touching their face, eyes and nose frequently	273 (84.5)
8.	Started using elbows/ legs/ a piece of paper while using lift or opening doors	198 (61.3)
9.	Practiced home care preventive/ curative measures against COVID-19 which they got through online search/social media.	222 (68.7)
10.	Changed their diet to boost immune system to fight COVID-19 infection (eg take plenty of water, included lemon, amla, spices etc.,)	263 (81.4)
11.	Started doing physical exercise/ yoga at home to protect from COVID-19 infection in past four months (either newly or added new exercises/aasanas)	180 (55.7)
12.	Temporarily stopped going out for a walk/ jog in public places due to fear of COVID-19	250 (77.4)
13.	Strengthened contact with family members & friends to overcome the stress & anxiety regarding COVID-19 infection	261 (80.8)
14.	Had deliberately cancelled or postponed a social event(meeting friends, eating out, attending functions & wedding etc.,)	270 (83.6)
15.	Reduced using public transport	299 (92.6)
16.	Avoided going to shops/increased home delivery	260 (80.5)
17.	Stopped visiting salon/beauty parlour	282 (87.3)
18.	Stayed at home & for study/work	279 (86.4)

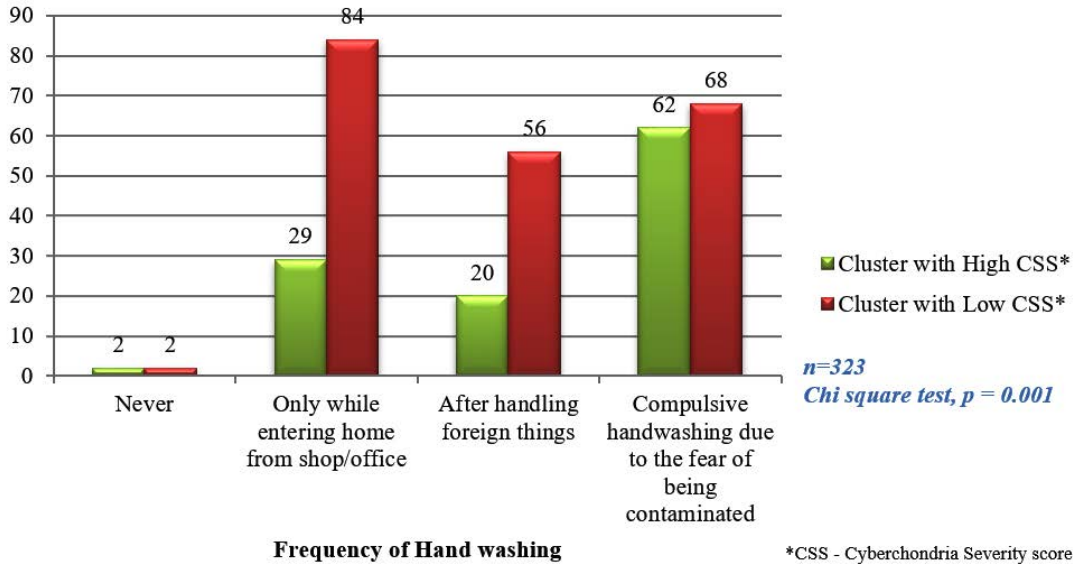

Fig. 3. Impact on Cyberchondria on Frequency of Hand washing

Table 5. Question wise analysis of Self care among Registered Medical Practitioners

Question	Yes n=55 (%)
Mandated that all patients visiting the clinic should wear face mask and practice hand hygiene before entering the clinic	55 (100)
Started using face shield/goggles while seeing patients	46 (83.6)
Started using N95/FFP1/FFP2 masks while seeing patients	51 (92.7)
Started using gloves while seeing patients	44 (80)
Took a shower, changed the clothes and washed them separately while arriving home.	51 (92.7)
Isolated themselves at home/some other places	36 (65.5)
Insisted all paramedical staff to follow strict personal protective measures.	53 (96.4)
Mandated strict disinfection of the hospital/ clinic premises	51 (92.7)
Restricted the number of attenders accompanying patients	55 (100)
Limited the practice time or practice places	47 (85.5)
Took a temporary break in practice	29 (52.8)

was estimated with the distress construct, a more subjective one and the second most affected in this study. These findings were partly in accordance with the study done among IT employees in Chennai in 2018, which reported that distress and compulsion were least affected. A cyberchondriac individual with fear and anxiety about the conditions they have read online tend to seek reassurance either by discussing it with others or by consulting doctors as represented in the reassurance construct. This can even occur with diseases that exist in mankind for a long period. So it is not surprising that the participants of this study have searched the web about the deadly novel disease emerged in the digital era. Excessive online search behaviour especially during the first wave when everything was uncertain and the whole world was at stance could have added more fear and anxiety about COVID-19 with no specific proven treatment or vaccine options available at that time[6,7,10].

In order to avoid anxiety and distress, it is important to seek information only from trusted sources and minimize overloading the brain by watching, reading or listening to news about COVID-19 continuously. Besides, during pandemic, without any adequate social support and access to doctors as a result of lockdowns and self-isolation, people might struggle to cope with the constant news of the spread and effects of COVID-19 on news-media, social-media, internet which force them to take protective measures on their own (Self care) including use of medicines (Self-medication).

Self-medication is defined as "medication taken on patient's own initiative or on the advice of pharmacist or any other lay person". This includes the use of non-prescription drugs and a range of different alternative medicines such as herbal remedies, food supplements and traditional products[11]. This study found that 39.6% of the participants have practiced self-medication for prophylaxis of COVID-19. A study conducted in Chennai (2014) reported 39.1% of the subjects practiced self-medication with antibiotics and another one (2016) reported 51.7% whereas the one conducted in Pondicherry had shown a prevalence of 11.9% to allopathic medication[12-14].This study observed that maximum participants had taken herbal preparations [Figure 2]. This could be due to the belief that herbal preparations are generally derived from natural sources and are relatively safe, effective and superior to synthetic preparations[15].

The main reasons quoted for practicing self-medication during this pandemic were familiarity with the drugs(38.3%), fear of COVID-19 spread and rising mortality (37.5%) and fear of acquiring COVID-19 by contact with infected patients or contaminated objects by visiting hospitals(18.75%). Because of the fear and desperation of protecting self, the participants had fallen as prey to medicines claiming benefits against COVID-19, unproven scientifically[16][Table 3].

A major percentage of the participants (45.3%) have got advice from their family members to practice self-medication followed by

paramedical persons including staff nurses and pharmacists [Table 3]. This was not in accordance with the previous study done in Chennai, which reported that the major source of information was from pharmacists (58%)[13]. Interestingly 11.7% in this study had trusted internet medical websites and 9.4% had trusted social media for self-medication. After getting the advice in some form, 68.8% have also used internet to find the details of the drugs. This implies the impact of digitalization on protective behaviour especially self-medication. Hence it is vital to search information from reliable sources like standard medical websites.

It is quiet well that 87 (68%) were aware that consuming these drugs could cause adverse effects even though only 11(8.6%) had suffered from minor adverse effects including gastritis, allergic reactions etc. To minimize the adverse effects related to self-medication, it is necessary to enhance the awareness about the risk of encountering adverse effects related to drugs and other potential disadvantages of self medication[16,17].

Self-care may appear frivolous or selfish during stressful times. Committing to self-care, on the other hand, will ensure that one's ability to meet the challenges of this period is preserved. According to the findings of this study, the majority of the study population had practiced self care measures like wearing a face mask, avoiding touching face, disinfecting the things used by them as well as their home and switching over to healthy diet. Similarly, a significant number of people had avoided attending social events, using public transport, visiting saloons, shopping and going out for a walk or jog in fear of acquiring COVID-19 infection [Table 4].

COVID-19 is a pandemic that would last for a few more years with spikes and lull then. Hence it may not be possible to avoid contact with a COVID positive individual at all time. In a country like India with the silent majority of population belonging to the middle class and below poverty line, it is impossible to avoid public transport for quiet a long time[18]. Meanwhile people might have to visit salons/parlours and get back to their work or study places once the cases are in lull phase. Hence it is necessary to educate the people about practicing COVID appropriate behavior including wearing masks correctly, frequent hand washing and social distancing instead of avoiding stepping out of home for essential activities due to fear and anxiety. These self care practices might appear as a new normal but it is a temporary normal.

Hand washing with soap or an alcohol-based sanitizer has been widely promoted by health agencies and authorities from the beginning of the pandemic as a preventive measure against COVID-19 and practically almost all people are following this recommendation.It is satisfactory to observe that most of the participants in this study had practiced hand washing. It is also observed that a significant number of participants belonging to the cluster with higher cyberchondria severity score had admitted to compulsively wash their hands due to the fear of being contaminated and this was found to be statistically significant with $p = 0.001$ by Chi square test [Figure 3]. This behavior is worrisome and indicates that cyberchondria is positively related with health anxiety and obsessive compulsive symptoms as shown in other studies[19,20].

A statistically significant difference observed in the mean of the score used to evaluate the self care between the clusters with high and low cyberchondria severity score ($p = 0.003$) might be attributed to the fact that the anxiety and fear could had an direct impact on the self care making the participants more conscious of avoiding an encounter with COVID-19[19].

Taking the registered medical practitioners (RMPs) into account, this study didn't observe any difference between the cyberchondria clusters. Almost 100% of the RMPs have made the patients to fear face masks and practice hand hygiene before entering their clinic/hospitals and had also restricted the accompanying persons[Table 5]. COVID appropriate behaviour and vaccination against COVID-19 are the two most powerful warriors to contain the spread of this baleful disease[21].

Around 65.5% of the RMPs isolated themselves at home/ some other places. 52.8% took a temporary break in their practice and 85.5% limited their practice time and places as a measure to safe guard themselves from COVID-19 [Table 5]. This pandemic has put pressure on all the sectors and almost an unimaginable additional pressure on the health sector where the health care workers who were already stressed out due to the fear and anxiety are working in frontline to save numerous

lives. Hence when things become more pressured, it is more important to pay attention to the self wellbeing as everyone is running a marathon and not a sprint certainly to help the entire community through the COVID-19 pandemic[22,23].

This study is the first one done to look at the impact of cyberchondria on self-medication and self care. The strength of this study is that it analyzed the self care measures among medical professionals in addition to the general self care measures. The sampling technique and the use of the cyberchondria severity scale not validated in Indian population are the limitations.

CONCLUSION

This study concludes that the anxiety related with excessive online COVID-19 information seeking behaviour had effects in terms of enhanced self care and self-medication in the respondents. A considerable proportion of the self-medication users had also encountered adverse effects.The greatest challenge an internet user faces is information overload. A famous American writer said 'It is not information overload. It's filter failure'. So each and every netizen should know how to use internet wisely for self wellbeing and emotional resilience.

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Conflict of interest

No conflicts of interest.

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