International Journal of Information Science and Management
Vol. 20, No. 3, 2022, 257-276
https://dorl.net/dor/20.1001.1.20088302.2022.20.3.15.2

Original Research

Misinfodemic and Cyberchondria Experiences among Indians During COVID-19 Pandemic

Vysakh. C
Research Scholar, DOSR in Library & Information Science, Tumkur University, Tumkur, Karnataka, India.chingathvysakh@gmail.com
ORCID iD: https://orcid.org/0000-00019976-1579

Rajendra Babu. H
Assistant Prof., DOSR in Library & Information Science, Tumkur University, Karnataka, India.
Corresponding Author: hrajendra.babu@gmail.com
ORCID iD: https://orcid.org/0000-0002-6061-3584

Received: 25 October 2021
Accepted: 26 December 2021

Abstract

The outbreak of the COVID-19 pandemic has fueled the surge of various kinds of misinformation, hoax, conspiracy theories, and rumours which have challenged the health systems all over the globe. The present study explored how Indians responded to the Misinfodemic, as a notice as well as an information sharer during the deadly pandemic. The study also elucidated the cyberchondria experiences among the Indians due to the misinfodemic. An online survey questionnaire was used to identify the respondents and to collect the needed data for the study (N=266). The result showed that the majority of the participants noticed misinformation regarding the outbreak on various internet platforms predominantly social media. The misinformation led the participants to a spectrum of mental health issues like stress, anxiety, anger, insomnia, and depression. 9.80 % of participants admitted themselves sharing misinformation regarding the outbreak and men did more compared to females (16.9% to 9.2%) (t143.006 = 1.572, p =.001). The misinfodemic resulted in increasing the health anxiety of the participants and there was no significant difference among the gender in experiencing health anxiety. The findings of the study provide functional insights for advancing communication research through misinformation correction and misperception management during these kinds of unknown (medicine and treatment) pandemic situations.

Keywords: Misinfodemic, Misinformation, Disinformation, Fake News, Social media, Cyberchondria, Health anxiety, COVID-19.

Introduction

COVID-19 is an epizootic pandemic that has become a hotbed for the spread of misinformation on the web (Memon & Carley, 2020). It has created an exceptional situation for the quick diffusion of misinformation due to a rise in internet usage and social media engagement to cope with the crisis uncertainties (Cheng & Luo, 2020). WHO Director-general commented on the situation as "we're not just fighting an epidemic; we're fighting an infodemic" (Laato, Islam, Islam & Whelan, 2020). Vraga and Bode (2020) defined misinformation as "information considered incorrect based on the best available evidence from relevant experts at the time". Disinformation on the other hand "deliberately created to harm a

person, social group, organization or country" (White, 2020). Both mis and disinformation pose a severe challenge to public health which has weakened the infodemiology and worsened the policy-making regarding the pandemic (Ghenai & Mejova, 2017; Motta, Stecula & Farhart, 2020; Laato et al., 2020).

Misinformation or falsehood spread faster than truth. Online and print media stood as more credible (Chou, Oh & Klein, 2018; Barua, Barua, Aktar, Kabir & Li, 2020; Obiała, Obiała, Manczak, Owoc & Robert, 2020). Adding to this, the social web has paved a fertile environment for spreading fake news and a recent Iranian report showed that more than 300 people died from consuming methanol after the fake news spread on social media that the substance cure the infection (Kaushik, 2020). Online health information seeking among the public has increased and many have been exposed to cyberchondria over this period (Jungmann & Witthoft, 2020). Cyberchondria is defined as "excessive or repeated online health information seeking that is associated with increasing levels of health anxiety or distress"(Starcevic & Schimmenti, 2020). The fear of infection by the virus led many to serious mental illness, which has a positive connection with the misinformation that they consumed from various sources, especially on the web. The body of literature exploring the misinformation on COVID-19 and its impact on health anxiety is less in number and especially how Indians might perceive the influence of misinformation on self and others to be explored and hence in light of the research gap, the study tried to answer the following questions.

RQ1: Which is the most cited source of misinformation by the participants on the Web?
RQ2: How did the misinformation impact the respondents?
RQ3: Did participants share misinformation? If 'Yes' what are the reasons?
RQ4: What are the preventive measures taken by the respondents to get rid of misinformation?

Hypotheses

H1: Male participants are more tend to spread misinformation on COVID-19 compared to female participants.
H2: There is a significant difference between experiencing health anxiety among genders.

Significance of the Study

The lockdown policies of the governments cut the social support network of the people in the country and as a result, netizens started to *Google* for every anxious doubt, especially concerning the symptoms that they doubling to be exposed to Covid-19. The fear of infection of the virus forced 72 Indian nationals to end their life which they tested negative posthumously which further demands an autopsy into the web searching history of the diseased (Dsouza, Quadros, Hyderabadwala & Mamun, 2020). Fake information rounded over the web and fueled health anxiety among the people over this period since the virus was unknown or little known. Previous studies reported that misinfodemic led people to serious mental illness (Bueno-Notivol, Gracia-García, Olaya, Lasheras, López-Antón & Santabárbara 2020; Jungmann & Witthoft, 2020) and as far as India is concerned, no studies have been carried out to explore the same. So it was felt to conduct the present study to elicit how Indians encountered the misinfodemic pandemic. The results of the study would help to cope-up with the misinfodemic

and health anxiety through proper misinformation correction and misperception management by the government, policymakers, and the public.

Literature Review

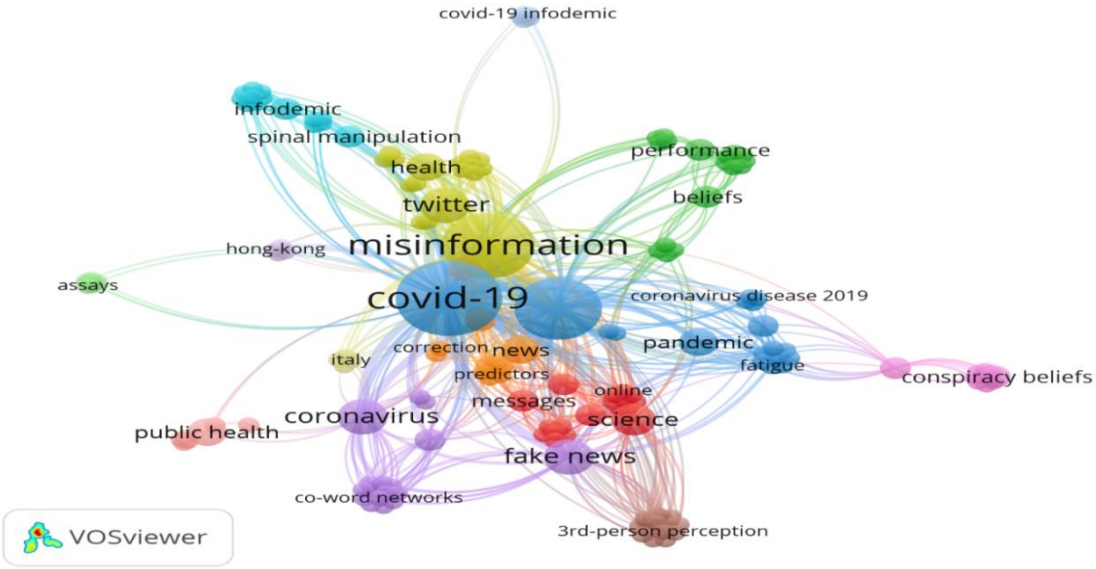
The keyword *"COVID-19 and misinformation"* was searched in the Web of Science database on 20th December 2020 and a total of 46 pieces of literature including research articles, letters, short communication, and editorials commentary were found. Cyberchondria is found as an under-researched area especially related to the pandemic and the literature is yet to pop out (Picture 1). The best-suited articles are selected and reviewed here.

Misinformation sharing has become a serious concern especially about unknown pandemic outbreaks. There are various reasons for the activity. A previous study reported that a person's trust in online information and perceived information overload would predict unverified information sharing (Mavridiss, 2018 & Laato et al., 2020). Addionally, Islam, Laato, Talukder and Sutinen (2020) reported that self-promotion and entertainment, as well as the lack of self-regulation, were the main reasons for sharing the unverified information when they surveyed 433 Bangladesh adults. Similar to these findings, Pennycook, Mcphetres, Zhang & Rand (2020) reported that lack of thinking regarding the accuracy of the content to be shared was the major concern when 1700 U.S adults were surveyed themselves than affecting oneself, people are perceived that others are most affected by misinformation (Cheng & Luo, 2020). Kim, Ahn, Atkinson & Kahlor (2020) further clarified that there existed a difference in misinformation exposure among countries and terms of culture and situations. Apart from the scientific misinformation, religious misinformation and fake religious remedies at the other end created a huge hoax for the recovery from the infection like consuming cow urine in India, visiting churches in the US on Easter, etc. (Alimardani & Elswah, 2020). The case of racial discrimination was also reported in many countries accusing black people of being the carrier and spreader of the virus and barring them from being tested and treated (Jaiswal, LoSchiavo & Perlman, 2020).

Social media has become a notable vector for spreading misinformation and a study reported that out of the 128 anonymous respondents surveyed, 86 participants cited that they came across misinformation on social media channels (Gupta, Gasparyan, Misra, Agarwal, Zimba & Yessirkepov, 2020). Even though a huge amount of misinformation spread through popular social media channels like Facebook and Twitter, other instant messengers like Whatsapp and Telegram stood as a remarkable vector because of their features and encryption feature (Rosenberg, Syed & Rezaie, 2020; Malhotra, 2020). Another study reported that over one-quarter of the most viewed Youtube videos contained misleading information which attracted a million views over the globe (Li, Bailey, Huynh & Chan, 2020). Similarly, fake news on spinal manipulation to boost the immunity against COVID-19 became super spread on Twitter (Rosenberg et al., 2020). Apart from social media and search engines, individual fact-checkers too increased drastically in an aftermath of COVID-19, and a higher use were recorded from India, the US, and Spain (Luengo & Garcia-Marin, 2020).

The spread of misinformation about the pandemic as a part of the political agenda has been recorded in some countries (Hatcher, 2020; Malhotra, 2020). Political orientation and social dominance orientation were the major factors that predict the willingness to share misinformation on social media (Lobato, Powell, Padilla & Holbrook, 2020). Unlike political misinformation or fake news, medical misinformation quickly affects the behaviour of the

people (Donovan, 2020). The chatting of untested treatments and remedies on social media would tempt others to make it practice. For instance, an Arizona native died of consuming chloroquine which was meant for use in Aquariums by misinformed that the substance was a remedy for the virus (Chary, Overbeek, Papadimoulis, Sheroff & Burns, 2020; Krause, Freiling, Beets & Brossard, 2020).



Picture 1: Keyword co-occurrence of COVID-19 and misinformation in WoS

Materials and Methods

The study aimed to sketch the experiences of Indians during the COVID-19 pandemic times in searching for information on the web regarding the unknown virus caused by COVID-19 and to what extent the misinformation made them dismayed about their health. Because of covid restrictions and exercising social distancing protocols, the investigation chose an online questionnaire to collect the data from the informants. The descriptive survey design having a well-structured questionnaire was used for obtaining the consent of the participants to join in the survey and collecting the required data. The questionnaire was prepared using Google forms and can be accessed at https://docs.google.com/forms/d/e/1FAIpQLScDNsFxsPsJH1I_ALPU6hlPFweEiRnRN9Mxi05Frls97pJFyw/viewform?usp=sf_link. The link of the questionnaire was first subjected to the pilot study to check the practicality to answer the research questions among participants. After revision, the link of the final questionnaire was sent to the personal mail IDs of the participants as well as through WhatsApp from 1st Dec 2020 to 31st Dec 2020. The questionnaire includes 2 sections. The first section deals with information regarding the demographic features of the participants and the second section gather the experience of the participants on misinformation and cyberchondria. The questionnaire consisted of 22 questions with the 10th question addressing the misinformation noticed by the participants regarding the COVID-19 and 14th question seeking whether they admitted that they share misinformation and 17th question whether they noticed other sharing misinformation with options 'Yes' or 'No' for all the three questions respectively. The 20th question asked for measuring the participant's cyberchondria experiences and the *Cyberchondria Severity Scale (CSS*) used in a similar kind of study by Makarla, Gopichandran & Tondare (2019) was used after making a few incorporations to fit

COVID-19 variables. The collected data were analyzed by using descriptive statistics including percentage, frequency, mean, SD, correlation and hypotheses were tested by paired-sample t-test using IBM SPSS.

Results

Sample Characteristics

As seen in Table 1, there are 167 (62.78%) female and 99 (37.22%) male totalling 266 respondents. The majority of the participants (77.45%) belong to the age group of 19-29 years with a postgraduate degree (62.80%). Concerning the geographical background of the respondents, the majority of them belongs to rural (42.85%) followed by semi-urban (33.45%) and urban (23.70%).

Table 1

Sample characteristics

Sample characteristics	Female	Male	Total
Gender	167(62.78%)	99(37.22%)	266(100%)
Age			
<18 & 18	5(3%)	1(1%)	6(2.26%)
19-29	126(75.4%)	80(80.8%)	206(77.45%)
30-39	28(16.8%)	15(15.2%)	43(16.17%)
40-49	5(3%)	3(3%)	8(3%)
50-59	3(1.8%)	0(0%)	3(1.12%)
Educational status			
Below high school	0(0%)	1(1.0%)	1(0.37%)
High school	4(2.4%)	0(0.0%)	4(1.50%)
Pre-university/ Higher	1(0.6%)	3(3.0%)	4(1.50%)
Degree(Graduation)	32(19.2%)	32(32.3%)	64(24.06%)
Post-graduation(PG)	113(67.7%)	54(54.5%)	167(62.80%)
PhD(Doctoral studies)	14(8.4%)	7(7.1%)	21(7.89%)
Post-Doctoral	2(1.2%)	0(0.0%)	2(0.75%)
Others	1(0.6%)	2(2.0%)	3(1.13%)
Geographical background			
Rural	64(38.3%)	50(50.5%)	114(42.85%)
Semi urban	62(37.1%)	27(27.3%)	89(33.45%)
Urban	41(24.6%)	22(22.2%)	63(23.70%)
Total	167(62.78%)	99(37.22%)	266(100%)

Use of the internet

All except one female participant reported not using the internet. Although most of the participants used the internet, only 19.62% became users over 10 years. 37.35% of participants have been using the internet for 4 to 6 years followed by 26.79% using the internet from 7 to 9 years. 0.75% of participants identified as recent users since they became users less than 1 year. Concerning the preferred device for accessing the internet, the majority of the participants (89.43%) preferred a smartphone, followed by a laptop with 7.54%. Desktops were the least preferred among the participants voting for 3.01% for accessing the internet.

Table 2

Use of the internet

Use of internet	Female	Male	Total
Yes	166(99.45)	99(100%)	265(99.62%)
No	1(.6%)	0(0%)	1(0.38%)
Period of use of internet			
<1 Year	1(.6%)	1(1%)	2(0.75%)
1-3 Years	25(15%)	16(16.2%)	41(15.49%)
4-6 Years	65(38.95)	34(34.3%)	99(37.35%)
7-9 Years	41(24.6%)	30(30.3%)	71(26.79%)
Over 10 Years	34(20.4%)	18(18.2%)	52(19.62%)
Preferred device			
Smartphone	149(69.2%)	88(88.9%)	237(89.43%)
Laptop	13(7.8%)	7(7.1%)	20(7.54%)
Desktop	4(2.4%)	4(4%)	8(3.01%)
Total	**166**	**99**	**265**

Average time spent and hyper-use on specific sites

We attempted to gauge the variation in the average time spent before and during the pandemic. It is evident that during the pandemic, the time spent on the internet has increased (Figure 1). 9.10% of participants spent 7 to 9 hours on the internet before the pandemic and the same has been hiked to 20.80% during the pandemic. It is also revealed that the number of respondents who spent more than 10 hours increased from 0.80% to 6.80% (difference 6% i.e. from N=2 to N=18) before and during the pandemic. The result of a paired-sample t-test also confirmed the difference in the average time spent on the internet before and during the outbreak (p=0, t= -14.50). Further, we attempted to find out on which platforms the participants hooked more and the result is demonstrated in Figure 2. Interestingly, social media proved to be the most loved platform for spending time among the respondents before and during the pandemic. 63.40% of the participants liked to spend time on social media sites before the pandemic, while 43% during the lockdown and 42.60% during the pandemic. The deficiency could be visible in other platforms especially gaming, streaming movies, and health-related sites during the lockdown.

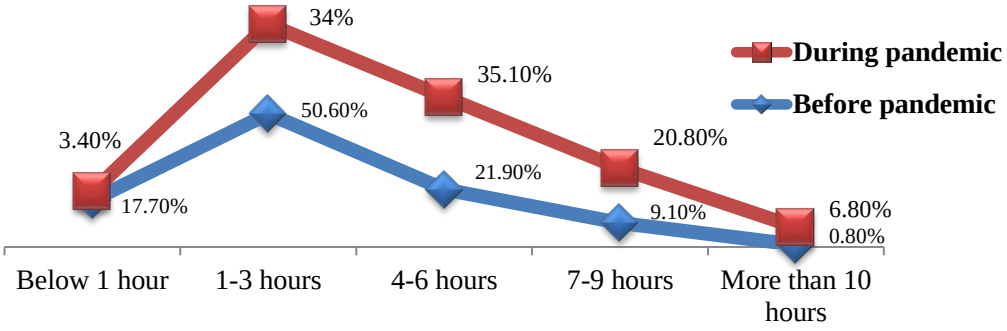


Figure 1: Average time spend on internet before and during the pandemic

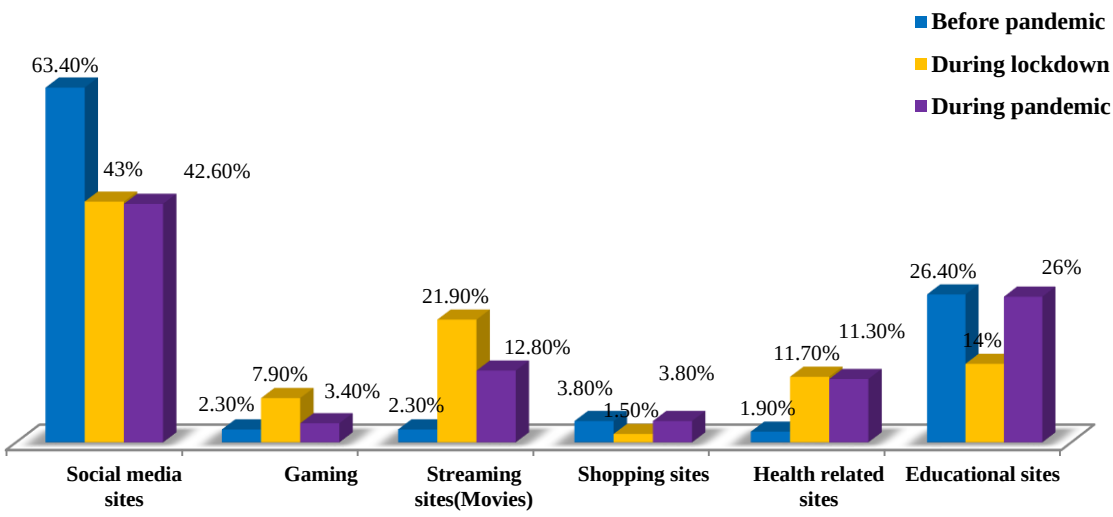


Figure 2: Hyper-use on specific sites

Misinformation and source of misinformation

(NB:- 53 of 266 participants did not search for any information on the web and the analysis was done on 213 participants).

According to Figure 3, out of 213 participants who sought medical information on the web, 72% noticed misinformation regarding the outbreak. 65.25% of respondents confirmed that they have noticed others sharing unauthentic information regarding the pandemic followed 41.78% noticed others sharing a second person's experiences on COVID that was fake and 24.41% informants noticed others sharing their own experiences that were unreal about the pandemic (Figure 4).

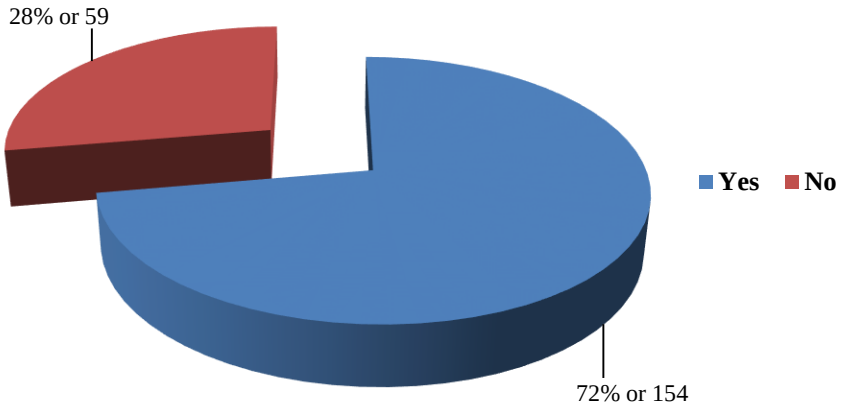


Figure 3: Notices of misinformation

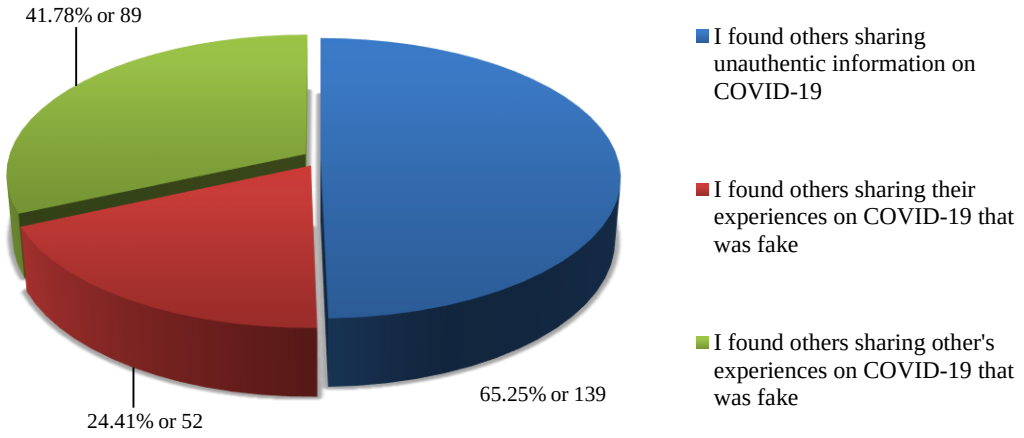


Figure 4: Kind of misinformation noticed

Misinformation regarding the pandemic

It was analyzed for the misinformation in detail. Ten major pieces of misinformation related aspects were posed and the participants responded by answering 'Yes' or 'No'. The results are given in Table 3. The data in the table show that, 44.7% of participants noticed misinformation regarding prayers, god bless and forwarding requests, protection advice, cure and therapy for the virus on the web by replying 'Yes' to each option. 44.4% of participants noticed misinformation regarding infection rates followed by 42.5% voted for local vaccines. A good number of participants (48.9%) did not notice false information regarding virus morphing and the death toll (45.9%).

Table 3
Misinformation regarding the pandemic

Misinformation	*N=213*	
	Yes	No
Death toll	91 (34.2%)	122 (45.9%)
Infection rates	118 (44.4%)	95 (35.7%)
Prayers, God bless, and forwarding requests	119 (44.7%)	94 (35.3%)
Protection advice	119 (44.7%)	94 (35.3%)
Comparison with other viruses	100 (37.6%)	113 (42.5%)
Disease description	99 (37.2%)	114 (42.9%)
Virus morphing	83 (31.2%)	130 (48.9%)
Cure and therapy	119 (44.7%)	94 (35.3%)
Local vaccines	113 (42.5%)	100 (37.6%)
Local cure case studies	105 (39.5%)	108 (40.6%)

Source of misinformation

An attempt was made to find out the hot platform where the misinformation is unfolding largely (RQ1). The data analysis shows that the majority of participants (57.9%) cited social media as the fertile platform for spreading misinformation followed by search engines with 9.40% and individual fact-checkers with 4.90%. The average time spent on social platforms during the pandemic was also found very high and in turn, the chance of witnessing misinformation attributed to being high. The government information portal also stood as a

source of misinformation as 4.10% of the participants noticed misinformation on them as well. Surprisingly, no participants came across fake information on NGO websites and only 1.10% of participants found misinformation on the COVID database which proved to be the most trustworthy source.

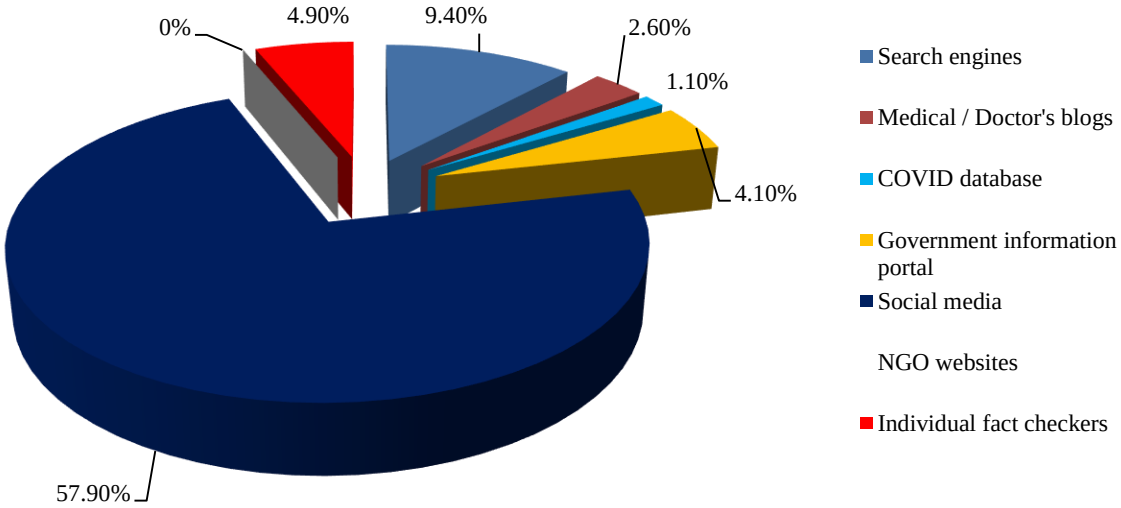


Figure 5: Source of misinformation

Misinformation on social media platforms

The spreading pattern of the misinformation in each platform is different (Cinelli et al., 2020) and we measured which platform provides more information and misinformation by taking the top 10 social media platforms in India according to Digital TK (2020) ranking. The responses were measured on a Likert scale with a value of 1 representing *Highly useful information* to a value of 5 as *Highly misinformation.* The result showed that Snapchat got the highest mean with 3.17, which is near to the value of moderate misinformation followed by Pinterest, and Quora with 3.08 and 3.03 mean respectively. YouTube got the least mean with 2.46 and thus the lowest mean value depicts a positive response i.e. information is more useful and credible. Therefore, it is perspicuous that Snapchat and Pinterest are the major platforms reported to contain the misinformation more and YouTube and Blogs are the least ones (Table 4).

Table 4
Misinformation on social media platforms

Social media platforms	Mean	SD
Snapchat	3.17	.74
Pinterest	3.08	.75
Quora	3.03	.80
WhatsApp	2.94	1.20
Telegram	2.90	.77
Instagram	2.83	.95
Facebook	2.78	1.07
Twitter	2.75	.87
Blogs	2.67	.89
YouTube	2.46	1.08

Impact of misinformation on the participants

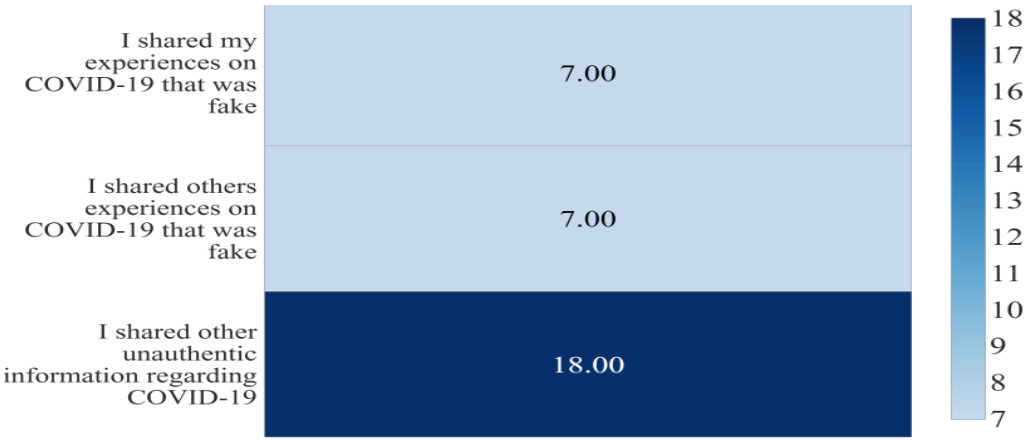
The second research question was 'How did the misinformation impact the respondents?' and to answer this, responses from the participants which was measured in 3 points Likert scale ranging from *Agree to Disagree* and their corresponding options to ascertain whether the participants were exposed to any health concerns after consuming the misinformation were subjected to the correlation test. The result of the test is demonstrated in Table 5. The result reported a positive correlation between the items especially a strong association between insomnia and denial (r=.713), insomnia and fright (r=.659), denial and fright (r=.612), fright and panic(r=.636). A weak positive correlation was also reported with many items like anxiety with anger(r=.233) and anxiety with denial(r=.235) (P-value is less than .05 in all the cases, which is significant).

Table 5
Impact of misinformation on the participants

	Scary	Stress	Anxiety	Depression	Insomnia	Denial	Anger	Fright	Panic
Scary	1	.588**	.486**	.479**	.440**	.345**	.277**	.493**	.537**
Stress		1	.547**	.365**	.438**	.412**	.252**	.439**	.410**
Anxiety			1	.360**	.323**	.235**	.233**	.332**	.331**
Depression				1	.565**	.396**	.248**	.559**	.459**
Insomnia					1	**.713****	.422**	**.659****	.504**
Denial						1	.471**	**.612****	.482**
Anger							1	.483**	.447**
Fright								1	**.636****
Panic									1
** Correlation is significant at the 0.01 level (2-tailed).									

Participants as a sharer of misinformation and major reasons for sharing

It was understood that participants had noticed misinformation regarding the pandemic on various web platforms. It was sought whether they had spread any misinformation to find out the answer for the third research question (RQ3). The result depicted in the Heat map 1/ Figure 6 shows that out of the 265 participants, 26 or 9.80% had shared misinformation. Further, the result demonstrated that male participants were more likely to share the misinformation than female respondents (16.9% to 9.2%) ($t_{143.006}$ = 1.572, p =.001, i.e. <05) (H1 accepted). Out of 26, 7 participants shared fake information regarding their own experiences and others' experiences on COVID-19 followed by 69.2% of participants who shared other unauthentic information about the pandemic.



Heat map1/Figure 6: Sharing of misinformation/kind of misinformation

Rationale for sharing misinformation

Eight major reasons which were modified for localization purposes from a similar kind of study conducted by Chen, Sin, Theng & Lee (2015), were asked to respond with specific 'Yes' or 'No' options (Table 6). Most of the participants (65.4%) cited the reason as they shared information related to COVID-19 that *"seems accurate at the time of sharing"*, and later found was *"made up one"* and shared information without *"checking facts from trusted sources"* by responding 'Yes'. More than half of the participants (57.7%) admitted because of the *"lack of time to check the authenticity of the information"* that they spread. A few participants shared fake information since they wanted to *"promote themselves by seeking the attention of others"* (7 or 26.9%) and as a matter of *"making fun out of the sharing activity"* (4 or 15.4%). The result from the independent sample t-test showed except two reasons viz. shared information related to COVID-19 without *"checking facts from trusted sources"* (p=004 i.e.<05) and *"No time to check the authenticity of the information"* (p=033 i.e.<05), no other significant differences were observed among the genders concerning the reasons in sharing the misinformation.

Table 6
Reasons for sharing misinformation

Reasons for sharing	*N=26*		Mean		Mean difference	T-Test	
	Yes	No	Women	Men		t	p
Shared information related to COVID- 19 that later found out as a hoax.	13 (50%)	13 (50%)	1.33	1.64	-0.31	-1.58	.808
Shared information related to COVID-19 seems accurate at that time and later found was made up one.	17 (65.4%)	9 (34.6%)	1.33	1.35	-0.02	-.122	.808
Shared information related to COVID-19 that was exaggerated but was not aware.	12 (46.2%)	14 (53.8%)	1.41	1.64	-0.23	-1.13	.572
Shared information related to COVID-19 without checking facts from trusted sources.	17 (65.4%)	9 (34.6%)	1.16	1.50	-0.34	-1.86	.004
Shared misinformation related to COVID-19 just for fun.	4 (15.4%)	22 (84.6%)	1.83	1.85	-0.02	-.161	.750

Reasons for sharing	*N=26*		Mean		Mean difference	T-Test	
	Yes	No	Women	Men		t	p
Shared misinformation related to COVID-19 intentionally.	11 (42.3%)	15 (57.7%)	1.50	1.64	-0.14	-.714	.331
Wanted to be the first one among others to share (Self-promotion)	7 (26.9%)	19 (73.1%)	1.75	1.71	0.04	.197	.696
No time to check the authenticity of the information	15 (57.7%)	11 (42.3%)	1.16	1.64	-0.48	-2.73	.033

Preventive actions against misinformation

To get rid of the menace of misinformation, what measures have been taken by the participants were sought (RQ4). 77% of the participants disclosed the most applied technique as *"insisting their family/ relatives check the authenticity of the information before sharing"* it by citing 'Yes' followed by 70% participants *"reprimanding the same to their friends".* 66.2% of respondents relied on *"TV news channels, newspapers, and other credible sources to check the authenticity"* of the message, while 63.4% tried to *"make people aware of fake news as a preventive effort"*. 26.3% of participants *"blocked accounts that sent fake news"* and 22.5% *"reported the account/source"* which constantly sends fake news in social media/other internet sources to them. Further, an independent sample t-test was run to check the gender difference in adopting preventive actions and the result showed that there were no significant distinctions except 2 of the 11 items viz *"advising the sender of the fake news to stop sharing"* (p=018, i.e. <05) and *"blocking accounts that sent fake news"* (p=000, i.e. <05) were observed among female and male respondents respectively (Table 7).

Table 7

Preventive actions/ measures against misinformation

			Mean			*N=213*	
Preventive actions against misinformation	Yes	No	Women	Men	Mean difference	t	p
Created awareness by sharing authentic news online	115 (54%)	98 (46%)	1.43	1.50	-0.07	-1.07	.211
Advised the sender of the fake news to stop sharing it	125 (58.7%)	88 (41.3%)	1.36	1.48	-0.12	-1.61	.018
Tried to make people aware of fake news	135 (63.4%)	78 (36.6%)	1.34	1.39	-0.05	-.757	.153
Advised the sender of fake news to cross-check its authenticity before sharing	128 (60.1%)	85 (39.9%)	1.41	1.37	0.04	.607	.213
Educated the sender of the fake news on ways to authenticate it	84 (39.4%)	129 (60.6%)	1.60	1.61	-0.01	-.210	.671
Informed the sender not to forward fake news	126 (47.4%)	87 (32.7%)	1.40	1.41	-0.01	-.028	.955
Reported the account/source which constantly sends fake news in social media/other internet sources	48 (22.5%)	165 (77.5%)	1.77	1.77	0	.099	.844
Blocked accounts that sent fake news	56 (26.3%)	157 (73.7%)	1.78	1.66	0.12	1.92	.000
Relied on TV news channels, newspapers, and other credible sources to check the authenticity of the message before sharing it	141 (66.2%)	72 (33.8%)	1.36	1.30	0.06	.905	.063

			Mean			*N=213*	
Preventive actions against misinformation	Yes	No	Women	Men	Mean difference	t	p
Checked and asked friends to check the authenticity of the information before sharing	149 (70%)	64 (30%)	1.30	1.30	0	-.019	.970
Insisted family/relatives to check the authenticity of the information before sharing	164 (77%)	49 (23%)	1.22	1.24	-0.02	-.301	.550

Cyberchondria experiences

Studies exploring the cyberchondria experiences of people especially during a pandemic are meagre and thus, we decided to explore how the misinformation on COVID-19, a much-unknown disease to the entire world impacted the health worries of Indians. Six Major Cyberchondria experiences were modified/localized for this purpose, measured for frequency, and subjected to an Independent Sample T-test to know which gender was more anxious. The result according to Table 8 shows that more than half of the participants (54.5%) searched on the internet for the symptom that they doubted to expose and the same searching result disturbed 34.7% of participants in their working and entertainment activities as well. 51.2% of participants opined that they were more attached to the assessment of the doctor rather than their online search results. 38% of the respondents cited that they felt more anxious and stressed because of the information-seeking results obtained from online sources. Further, the result of the independent sample t-test showed that there was no significant difference among the genders in experiencing health anxiety since the p-value for all the items is higher than the alpha value (p>.05) (H2 not accepted).

Table 8
Experiencing Cyberchondria

			Mean		Mean difference	*N=213*	
Cyberchondria experiences	Yes	No	Women	Men		t	p
I noticed an unexplained bodily symptom and I searched for it on the internet	116 (54.5%)	97 (45.5%)	1.46	1.44	0.02	.224	.647
The internet search for information about symptoms or probable disease disturbed me (Work, studies and other activities)	74 (34.7%)	139 (65.3%)	1.63	1.67	-0.04	-.539	.271
The internet search for information about symptoms or suspected diseases disrupted my entertainment activities	74 (34.7%)	139 (65.3%)	1.66	1.62	0.04	.636	.221
I attached more importance to my doctors' assessment than my online research	109 (51.2%)	104 (48.8%)	1.49	1.48	0.01	.147	.767
I did discuss the results of my online research with my family doctor	72 (33.8%)	141 (66.2%)	1.67	1.63	0.04	.575	.266
After looking for information about symptoms or suspected disease, I felt more anxious and stressed than before	81 (38%)	132 (62%)	1.60	1.65	-0.05	-.739	.129

Impact of misinformation on health anxiety

We checked for how the misinformation affected the health anxiety of the participants by citing whether it has increased or had no impact or decreased their health anxiety. The result demonstrated in Figure 7 is that 42.70% of the respondents opined that their health anxiety has increased because of the misinformation regarding the pandemic, which they have either noticed or consumed or even shared. 55.90% of participants cited that they had no impact and ironically a few participants (1.40%) responded that misinformation had decreased their anxiety.

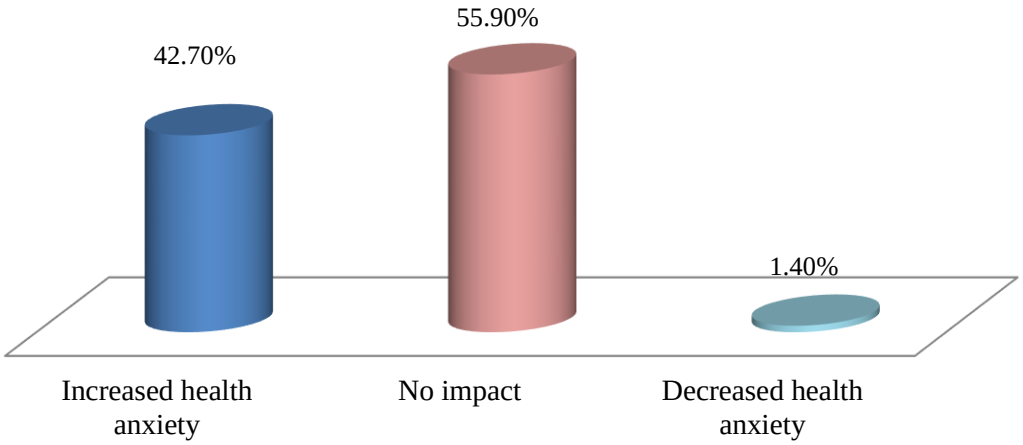


Figure 7: Impact of misinformation on health anxiety/cyberchondria

Discussion

The study investigated the Indians experiences during the pandemic with regards to the misinformation and its aftermath effects on health by surveying 266 participants online across the country. The results indicate that most of the participants encountered misinformation regarding the unknown pandemic on the internet sources and the misinformation has been escalated the health anxiety of the participants. Many previous studies reported that higher anxiety would lead to increased acting on suicidal thoughts which should be taken into consideration with a serious note (Roy, Singh, Mishra, Chinnadurai, Mitra & Bakshi, 2020; Nepon, Belik, Bolton, & Sareen, 2010; Sareen et al., 2005). The misinformation led the participants to a post-traumatic syndrome characterized by increased stress, anxiety, insomnia, denial, panic, and depression. Xiong, Lipsitz, Nasri, Lui, Gill & Phan (2020) reported that the public from Denmark, Spain, the USA, China, Italy, Iran, Nepal, and Turkey were too exposed to these symptoms/ illnesses at a higher rate. Social media is found as the major conduit of misinformation regarding the breakout and at the same time, social media is reported as the most preferred medium for sharing information (Ma, Lee & Goh, 2014) as well as misinformation (Bode & Vraga, 2020; Allcott, Gentzkow & Yu, 2019; Jayaseelan, Brindha & Waran, 2020). Adding to this, systems to monitor confidential and encrypted platforms like Telegram and WhatsApp amid pandemic to be resuscitated since fake information is ratcheting up on these platforms.

A good number of participants admitted themselves sharing fake or misinformation regarding the pandemic due to many reasons including intentional spreading/disinformation which pose a serious concern. Previous literature reported that lack of self-regulation is the

main reason for intentional misinformation spreading (Islam et al., 2020). A good number of participants also shared misinformation without checking the truth online which concurs with the finding of Pennycook et al. (2020) who reported that US adults were lax in thinking regarding the accuracy of the contents to be shared online. The chance for underreporting the misinformation sharing by the participants can not be neglected as underlined in a previous study carried out by Chen et al. (2015). The study reported that the chance of participants to share the misinformation in the future could be also very high. Corresponding to previous studies, our study also found that men were spreading more misinformation compared to their female counterparts and so the first hypothesis (H1: Male participants are more tend to spread misinformation on COVID-19 compared to female participants) was accepted. In light of these results, it is worth saying that proper digital literacy needs to be imparted to the adults and the school curriculum needs a revision so that the pupils can have adequate internet etiquette/ netiquette. Concerning the preventive actions against the misinformation, it was found that the majority of the participants had taken actions and no significant difference was reported among the participants except for 2 items (Item no 2 & 8) and ironically another study reported that females are more cautious about the misinformation than male (Lim & Kwon, 2010). Contrary to the expectation, hypothesis 2 (There is a significant difference between experiencing health anxiety among genders) was not accepted, depicting that male and female respondents had no difference in exposing cyberchondria due to misinfodemic which clash with the study findings of Hou, Bi, Jiao, Luo & Song (2020), Delmastro & Zamariola (2020) and (Eqbal, Afnan & Walaa, 2020) and they reported that females were more vulnerable than males.

Conclusion

The outcomes of the present study provide insights for advancing the communication strategies, especially on online platforms during public/health outbreak situations. A new promising theory regarding misinformation management can be reinforced and rejuvenated and government rules for disaster management during pandemics can be revived. The proclivity of social media for spreading misinformation is overt and how this could be used as a primary medium for communicating useful information during critical situations can be validated. Way to go….

Suggestions

1. Netizens are advised to refer to authentic sources like the COVID-19 database like WHO or government information portals for information regarding the pandemic.
2. Netizens should check the authenticity of the content before consuming or sharing. It is advised to make use of fact-checking platforms like Snopes.com, CheckYourFact.com, and FactCheck.org for this purpose.
3. Government and health agencies may promote text messaging and SMS instead of social platforms to debunk rumours and fake news.
4. The government may revive or intensify telepsychiatric consultation and toll-free number services for mental rehabilitation of the sufferer since the study reported increasing anxiety and other mental concerns among the participants.
5. Library professionals can bring out novel techniques like fake news detectors to aid the information seekers to get relevant information.

Limitations and Future Directions

This study has some limitations which can be addressed in future research. Firstly, it is conducted with a limited sample collected over a month and an extended study may provide more insights into the matter. The researcher did recommend tips to get rid of the misinfodemic menace but there needs a concrete mechanism or prototype like a *'Fake news detector'* to give a panacea and that opens a new avenue for further research. The study is limited to India and a future investigation is directed to compare the misinfodemic and cyberchondria experiences among people of different countries. Attempts may be made to correlate internet addiction and misinfodemic and cyberchondria since internet traffic recorded a huge surge during the pandemic (Narayan Subudhi & Palai, 2020). The present study is about *misinformation* about the pandemic and a separate study is possible by exploring the *disinformation* experiences among the people.

Acknowledgement

The authors would like to thank the participants for cooperating with the survey.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest

Authors declare that they have no conflict of interest

References

Alimardani, M. & Elswah, M. (2020). Online temptations: COVID-19 and religious misinformation in the MENA region. *Social Media and Society,* 6(3), 4-7. https://doi.org/10.1177/2056305120948251

Allcott, H., Gentzkow, M. & Yu, C. (2019). Trends in the diffusion of misinformation on social media. *Research and Politics*, 6(2). https://doi.org/10.1177/2053168019848554

Barua, Z., Barua, S., Aktar, S., Kabir, N. & Li, M. (2020). Effects of misinformation on COVID-19 individual responses and recommendations for resilience of disastrous consequences of misinformation. *Progress in Disaster Science*, 8, 100119. https://doi.org/10.1016/j.pdisas.2020.100119

Bode, L. & Vraga, E. K. (2018). See something, say something: correction of global health misinformation on social media. *Health Communication,* 33(9), 1131–1140. https://doi.org/10.1080/10410236.2017.1331312

Bueno-Notivol, J., Gracia-García, P., Olaya, B., Lasheras, I., López-Antón, R. & Santabárbara, J. (2020). Prevalence of depression during the COVID-19 outbreak: A meta-analysis of community-based studies. *International Journal of Clinical and Health Psychology*. https://doi.org/10.1016/j.ijchp.2020.07.007

Chary, M. A., Overbeek, D. L., Papadimoulis, A., Sheroff, A. & Burns, M. M. (2020). Geospatial correlation between COVID-19 health misinformation and poisoning with household cleaners in the Greater Boston Area. *Clinical Toxicology,* 59(4), 320-325. https://doi.org/10.1080/15563650.2020.1811297

Chen, X., Sin, S. C. J., Theng, Y. L. & Lee, C. S. (2015). Why students share misinformation

on social media: Motivation, gender, and study-level differences. *Journal of Academic Librarianship*, 41(5), 583-592. https://doi.org/10.1016/j.acalib.2015.07.003

Cheng, Y. & Luo, Y. (2020). The presumed influence of digital misinformation: Examining US public's support for governmental restrictions versus corrective action in the COVID-19 pandemic. *Online Information Review*. 45(4), 834-852. https://doi.org/10.1108/OIR-08-2020-0386

Chou, W. S., Oh, A., & Klein, W. M. P. (2018). Addressing health-related misinformation on social media. *Journal of the American Medical Association(JAMA)*, 320(23), 2417–2418. https://doi.org/10.1001/jama.2018.16865

Cinelli, M., Quattrociocchi, W., Galeazzi, A., Valensise, C. M., Brugnoli, E., Schmidt, A. L., Zola, P., Zollo, F. & Scala, A. (2020). The COVID-19 social media infodemic. *Scientific Reports*, 10, 16598. https://doi.org/10.1038/s41598-020-73510-5

Delmastro, M. & Zamariola, G. (2020). Depressive symptoms in response to COVID-19 and lockdown: A cross-sectional study on the Italian population. *Scientific Reports*, 10, 22457. https://doi.org/10.1038/s41598-020-79850-6

Digital TK. (2020). *Top 10 most popular social networking sites in India*. retrieved from https://digitaltk.com/top-10-most-popular-social-networking-sites-in-india/

Donovan, J. (2020). Concrete Recommendations for cutting through misinformation during the COVID-19 pandemic. *American Journal of Public Health*, 110(S3), S286–S287. https://doi.org/10.2105/AJPH.2020.305922

Dsouza, D. D., Quadros, S., Hyderabadwala, Z. J. & Mamun, M. A. (2020). Aggregated COVID-19 suicide incidences in India: Fear of COVID-19 infection is the prominent causative factor. *Psychiatry Research*, 290, 113145. https://doi.org/10.1016/j.psychres.2020.113145

Eqbal, R., Afnan, R. & Walaa, R. (2020). The role of social media in spreading panic among primary and secondary school students during the COVID-19 pandemic: An online questionnaire study from the Gaza Strip, Palestine. *Heliyon*, 6(12). e05807. https://doi.org/10.1016/j.heliyon.2020.e05807

Ghenai, A. & Mejova, Y. (2017). Catching zika fever: Application of crowdsourcing and machine learning for tracking health misinformation on Twitter. *Proceedings - 2017 IEEE International Conference on Healthcare Informatics, ICHI 2017*, 518. https://doi.org/10.1109/ICHI.2017.58

Gupta, L., Gasparyan, A. Y., Misra, D. P., Agarwal, V., Zimba, O. & Yessirkepov, M. (2020). Information and misinformation on COVID-19: A cross-sectional survey study. *Journal of Korean Medical Science*, 35(27), 1–11. https://doi.org/10.3346/JKMS.2020.35.E256

Hatcher, W. (2020). A failure of political communication not a failure of bureaucracy: The danger of presidential misinformation during the COVID-19 pandemic. *American Review of Public Administration*, 50(6–7), 614–620. https://doi.org/10.1177/0275074020941734

Hou, F., Bi, F., Jiao, R., Luo, D. & Song, K. (2020). Gender differences of depression and anxiety among social media users during the COVID-19 outbreak in China:a cross-sectional study. *BMC Public Health*, 20, 1648. https://doi.org/10.1186/s12889-020-09738-7

Islam, A. K. M. N., Laato, S., Talukder, S. & Sutinen, E. (2020). Technological forecasting &

social change misinformation sharing and social media fatigue during COVID-19 : An affordance and cognitive load perspective. *Technological Forecasting & Social Change*, 159, 120201. https://doi.org/10.1016/j.techfore.2020.120201

Jaiswal, J., LoSchiavo, C. & Perlman, D. C. (2020). Disinformation, misinformation and inequality-driven mistrust in the time of COVID-19: Lessons unlearned from AIDS denialism. *AIDS and Behavior*, 24(10), 2776–2780. https://doi.org/10.1007/s10461-020-02925-y

Jayaseelan, R., Brindha, D. & Waran, K. (2020). Social media reigned by information or misinformation about COVID-19: A phenomenological study. *SSRN Electronic Journal*. https://dx.doi.org/10.2139/ssrn.3596058

Jungmann, S. M. & Witthoft, M. (2020). Health anxiety, cyberchondria, and coping in the current COVID-19 pandemic: Which factors are related to coronavirus anxiety? *Journal of Anxiety Disorders*, 73, 102239. https://doi.org/10.1016/j.janxdis.2020.102239

Kaushik, M. (2020). Over 300 dead, 1000 ill in Iran after consuming industrial alcohol in belief it cures coronavirus. Retrived from https://b2n.ir/w54128

Kim, H. K., Ahn, J., Atkinson, L. & Kahlor, L. A. (2020). Effects of COVID-19 misinformation on information seeking, avoidance, and processing: A multicountry comparative study. *Science Communication*, 42(5), 586–615. https://doi.org/10.1177/1075547020959670

Krause, N. M., Freiling, I., Beets, B. & Brossard, D. (2020). Fact-checking as risk communication: The multi-layered risk of misinformation in times of COVID-19. *Journal of Risk Research*, 23(7-8), 1052-1059. https://doi.org/10.1080/13669877.2020.1756385

Laato, S., Islam, A. K. M. N., Islam, M. N. & Whelan, E. (2020). What drives unverified information sharing and cyberchondria during the COVID-19 pandemic? *European Journal of Information Systems*, 29(3), 288–305. https://doi.org/10.1080/0960085X.2020.1770632

Li, H. O. Y., Bailey, A., Huynh, D. & Chan, J. (2020). YouTube as a source of information on COVID-19: A pandemic of misinformation? *BMJ Global Health*, 5(5), e002604. https://doi.org/10.1136/bmjgh-2020-002604

Lim, S. & Kwon, N. (2010). Gender differences in information behavior concerning Wikipedia, an unorthodox information source? *Library and Information Science Research*, 32(3), 212–220. https://doi.org/10.1016/j.lisr.2010.01.003

Lobato, E. J. C., Powell, M., Padilla, L. M. K. & Holbrook, C. (2020). Factors predicting willingness to share COVID-19 misinformation. *Frontiers in Psychology*, 11, 566108. https://doi.org/10.3389/fpsyg.2020.566108

Luengo, M. & Garcia-Marin, D. (2020). The performance of truth: politicians, fact-checking journalism, and the struggle to tackle COVID-19 misinformation. *American Journal of Cultural Sociology*, 8(3), 405–427. https://doi.org/10.1057/s41290-020-00115-w

Ma, L., Lee, C. S. & Goh, D. H. L. (2014). Understanding news sharing in social media: An explanation from the diffusion of innovations theory. *Online Information Review*, 38(5), 598–615. https://doi.org/10.1108/OIR-10-2013-0239

Makarla, S., Gopichandran, V. & Tondare, D. (2019). Prevalence and correlates of cyberchondria among professionals working in the information technology sector in Chennai, India: A cross-sectional study. *Journal of Postgraduate Medicine*, 65(2), 87–92.

https://doi.org/10.4103/jpgm.JPGM_293_18

Malhotra, P. (2020). A relationship-centered and culturally informed approach to studying misinformation on COVID-19. *Social Media and Society*, 6(3). https://doi.org/10.1177/2056305120948224

Mavridis, G. (2018). *Fake news and social media how Greek users identify and curb misinformation online*. Retrieved from https://b2n.ir/u92827

Memon, S. A. & Carley, K. M. (2020). Characterizing COVID-19 misinformation communities using a novel twitter dataset. *arXiv preprint arXiv:2008.00791*

Motta, M., Stecula, D. & Farhart, C. (2020). How right-leaning media coverage of Covid-19 facilitated the spread of misinformation in the early stages of the pandemic in the U.S. *Canadian Journal of Political Science*, 53(2), 335–342. https://doi.org/10.1017/S0008423920000396

Narayan Subudhi, R. & Palai, D. (2020). Impact of Internet use during COVID lockdown. Horizon *Journal of Humanities and Social Sciences Research*, 2 (S), 59–66. https://doi.org/10.37534/bp.jhssr.2020.v2.ns.id1072.p59

Nepon, J., Belik, S. L., Bolton, J. & Sareen, J. (2010). The relationship between anxiety disorders and suicide attempts: Findings from the national epidemiologic survey on alcohol and related conditions. *Depression and Anxiety*. 27(9), 791-798. https://doi.org/10.1002/da.20674

Obiała, J., Obiała, K., Manczak, M., Owoc, J. & Robert, O. (2020). COVID-19 misinformation: Accuracy of articles about coronavirus prevention mostly shared on social media. *Health Policy and Technology*, 10(1), 182-186. https://doi.org/10.1016/j.hlpt.2020.10.007

Pennycook, G., Mcphetres, J., Zhang, Y. & Rand, D. G. (2020). Fighting COVID-19 misinformation on social media: Experimental evidence for a scalable accuracy nudge intervention. *Psychological Science*, 31(7), 770–780. https://doi.org/10.1177/095679762093905

Rosenberg, H., Syed, S. & Rezaie, S. (2020). The Twitter pandemic: The critical role of Twitter in the dissemination of medical information and misinformation during the COVID-19 pandemic. *Canadian Journal of Emergency Medicine*, 22(4), 418–421. https://doi.org/10.1017/cem.2020.361

Roy, A., Singh, A. K., Mishra, S., Chinnadurai, A., Mitra, A. & Bakshi, O. (2020). Mental health implications of COVID-19 pandemic and its response in India. *International Journal of Social Psychiatry*, 67(5), 587-600. https://doi.org/10.1177/0020764020950769

Sareen, J., Cox, B. J., Afifi, T. O., de Graaf, R., Asmundson, G. J. G., ten Have, M. & Stein, M. B. (2005). Anxiety disorders and risk for suicidal ideation and suicide attempts. *Archives of General Psychiatry*, 62(11), 1249-1257. https://doi.org/10.1001/archpsyc.62.11.1249

Starcevic, V. & Schimmenti, A. (2020). Cyberchondria in the time of the COVID-19 pandemic. *Human Behavior and Emerging Technologies*, 3(1), 53-62. https://doi.org/10.1002/hbe2.233

Vraga, E. K. & Bode, L. (2020). Defining misinformation and understanding its bounded nature: using expertise and evidence for describing misinformation. *Political Communication*, 37(1), 136–144. https://doi.org/10.1080/10584609.2020.1716500

White, A. (2017). Fake news: Facebook and matters of fact in the post-truth era. ethics in the

news: ejn report on challenges for journalism in the post-truth era içinde (14-17). Londra: *Ethical Journalism Network*. Retrieved from https://ethicaljournalismnetwork.org/fake-news

Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M. W., Gill, H. & Phan, L. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of Affective Disorders, January*. https://doi.org/10.1016/j.jad.2020.08.001