Original Article

Impact of social media misinformation on its users regarding vaccination, prevention, and treatment of COVID-19

Akasha Masud[1], Bushra Mushtaq[2], Anum Abdullah[3], Hafiza Arooj Waqar[4], Hina Shahid[5], Najjam-us-Sehar[6], Soha Mobeen[7], Rabia Riaz[8], Diva Bibi[9]

[1,2,4-9] Final year MBBS Student, Rawalpindi Medical University, Rawalpindi.

[3] Senior Demonstrator, Department of Community Medicine, Rawalpindi Medical University, Rawalpindi.

Author's Contribution

[1,3] *Conception of study*
[3] *Experimentation/Study conduction*
[1,2,3] *Analysis/Interpretation/Discussion*
[1,2,3,4,5] *Manuscript Writing*
[2,4,5] *Critical Review*
[1,2,3,4,5,6] *Facilitation and Material analysis*

Corresponding Author

Ms. Akasha Masud,
Final year MBBS Student,
Rawalpindi Medical University,
Rawalpindi
Email: amasudcheema@gmail.com

Article Processing

Received: 05/12/2021
Accepted: 12/08/2022

Cite this Article: *Masud, A., Mushtaq, B., Abdullah, A., Waqar, H.A., Shahid, H., Sehar, N.U., Mobeen, S., Riaz, R., Bibi, D. Impact of Social Media Misinformation on its Users Regarding Vaccination, Prevention, and Treatment of COVID-19. Student Supplement of Journal of Rawalpindi Medical College. 15 Dec. 2022; 26(1): 51-58.*

Conflict of Interest: *Nil*
Funding Source: *Nil*

Access Online:

Abstract

Background: COVID-19 is a mild to severe respiratory illness caused by a coronavirus characterized mainly by fever, cough, and shortness of breath and may progress to pneumonia and respiratory failure. It has been observed that social media users were influenced by the misinformation spread through it.
Objective: To determine the effect of misinformation on social media regarding vaccination, prevention, and treatment of COVID-19, among inhabitants of Rawalpindi and Islamabad.
Materials and Methods: A descriptive cross-sectional study was carried out among 406 participants who were active social media users for at least 6 months prior to the start of the study i.e., November 2020 to April 2021. They were included in the study by convenience sampling. The study was conducted by students of Rawalpindi Medical University in specific areas of Rawalpindi and Islamabad. A structured questionnaire was filled by the participants in which they were asked about age, marital status, education, views on the utility of information found on social media about COVID-19, and whether they crosschecked information collected through social media about COVID-19. Information was also collected regarding the use of masks, social distancing, and vaccination status. Data were entered and analyzed through SPSS version 25.
Results: Out of 406 people, 350 (86.2%) were active social media users and 56 (13.8%) were using social media occasionally. 322 (79.3%) were vaccinated against COVID-19 and 84 (20.7%) were not vaccinated. 317 (78.1%) heard false news on social media regarding COVID-19 and 296 (72.9%) obtained misinformation regarding the SARS-Cov-2 virus. About 199 participants (49%) cross-checked the information that they received from social media. The number of people who practiced social distancing wore a mask and, read tweets about COVID-19 on social media was 164 (40.4%), 312 (76.8%), and 282 (69.5%) respectively.
Conclusion: The majority of people got vaccinated against COVID-19. The study population was more aware, and most of them could differentiate between actual and false news on social media by verifying it. The reach of misinformation about COVID-19 was found to be extensive among social media users.

Keywords: Social media findings, COVID-19, misinformation.

Introduction

COVID-19 was reported first time in the Chinese region of Wuhan in late December 2019. It presented pneumonia of unknown origin.[1] In Pakistan, the first case was reported on 26th February 2020.[2] Misinformation is a claimed fact that is not true because there is no sufficient scientific evidence.[3] Media systems in democracies are vulnerable to misinformation naturally.[4] Social media has created a system of information containing a blend of true and false information.[5] Spread of misinformation has been rapid on social media about various health issues in the past related to anti-vaccination movements, Ebola, yellow fever, and Zika.[5,6,7]

COVID-19 has been stated as a pandemic worldwide by WHO.[8] It is reported by WHO that almost 6000 people worldwide were hospitalized due to COVID-19-related misinformation on social media.[9] Another study highlighted that 46% of UK adults were misinformed about COVID-19 online.[10]

Misinformation has been able to cause overcrowding in public places in Italy.[11] Hatred about a Tablighi Jamaat for spreading Covid-19 in India was seen after a series of tweets containing modified information.[7] Various tweets in Iran contained misinformation that certain herbal products treated COVID-19.[12]

In Pakistan, people have been exposed to various conspiracy theories considering COVID-19 a biological warfare weapon.[12] Senaa Makki is proposed as a natural treatment in Pakistan due to misinformation.[13] Anti-vaccine movement in Pakistan, for the COVID-19 vaccine, started on social media platforms misinforming the public.[14] The majority of misinformation (88%) is propagated through social media.[3] Scientific study is needed to evaluate the extent of misinformation.[7]

In Pakistan, there is an increasing number of internet users. The majority of our population is youth and social media is their major source of information. Since the beginning of the pandemic, social media usage has been on the rise. Pakistan is susceptible to the havoc of misinformation, particularly in this pandemic. Therefore, assessment of the attitudes, behavior, and misconceptions regarding COVID-19 is the need of the hour. Therefore, the major objective of our study was to assess the extent of misinformation on social media about COVID-19, its effect on vaccination, cross-checking of information by users, and gauge the usefulness of the information.

Materials and Methods

It was a descriptive cross-sectional study and a non-probability convenience sampling technique was used. The study was carried out on the specified population of Rawalpindi and Islamabad including urban and rural populations within the boundaries comprising of active social media users for at least 6 months prior to the start of the study i.e., November 2020 to April 2021.

The duration of the study was 8 months starting from 18 April 2021 to 18 December 2021. Inclusion criteria were active social media users aged between 18 to 55 years for at least the past 6 months**.** Exclusion criteria included uneducated people and employees of social media companies. Data analysis was done using SPSS version 25. Descriptive statistics were used to measure quantitative and qualitative variables. Pie charts and bar charts were used to elaborate the data**.** Sample size calculation was done by using the WHO calculator taking confidence interval as 95%**,** and prevalence as 33.8%[3] with a margin of error of 5%. The estimated sample size was 406. The results were considered significant when the P-value was 0.05 or lower and considered insignificant when it was higher than 0.05.

Data were collected using self-structured questionnaires. Forms were distributed among the sample population. Consent was sought from the participants via consent forms attached to the questionnaires. Participants could either give consent to fill out the questionnaire or refuse.

Results

A total of 406 participants took part in this study. 214 (52.7%) were males while 182(47.3%) were females (Table I). The age distribution and other demographic details are depicted in Table I.

Out of 406 participants, 79.3% were vaccinated and 20.3% were not vaccinated. Detailed information is shown in Figure 1.

Most of the social media users were using Facebook, YouTube, and Instagram. Detailed information is mentioned in Figure 2.

Misinterpretation of information through official sources was noticed by 62.7% of the participants while 33.8% of participants had no information in this regard. Around 3.5% of people did not remember whether they have heard the news or not. The details

of the other misinformation about Covid-19 are depicted in Table II.

Figure 3 shows the type of news conveyed on social media. The most common news found through social media was about the number of COVID-19 (66.9%) and the death toll (64%).

Out of 406 people, 78.1% of participants heard that vaccinated people will die in two years and 21.2% of participants did not hear any such statement. About 0.7% of people did not remember whether they have heard the news or not. Other details are shown in Table III.

Out of 406 people, 72.9% of the respondents heard that SARS-CoV-2 is not heat resistant while 26.6 % of the respondents did not hear any such statement. 0.5% did not remember whether they have heard the news or not. Other characteristics of SARS-CoV-2 are mentioned in Table IV.

Out of 406 participants, 49% of participants cross-checked their information about COVID-19, while 32% of the participants did not cross-check. Almost 19% of the participants cross-checked sometimes. Other information about personal behavior toward COVID-19 is depicted in Table V.

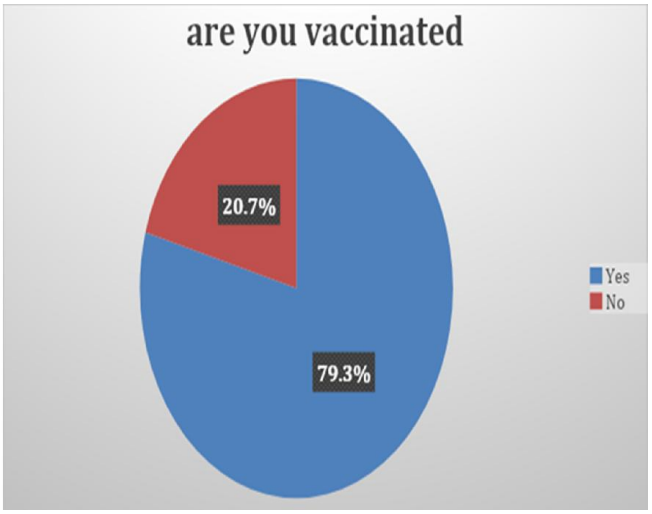

Figure 1: Vaccination status of study participants (n=406)

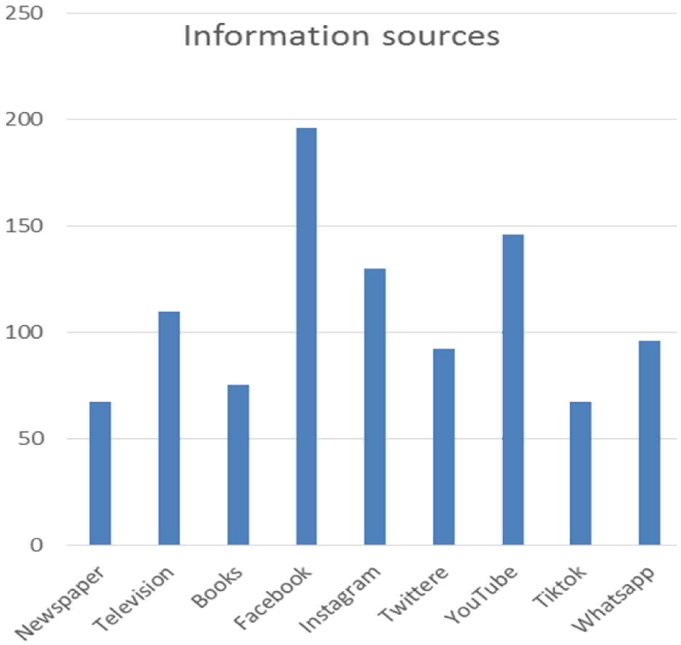

Figure 2: Trends of using social media platforms (n=406)

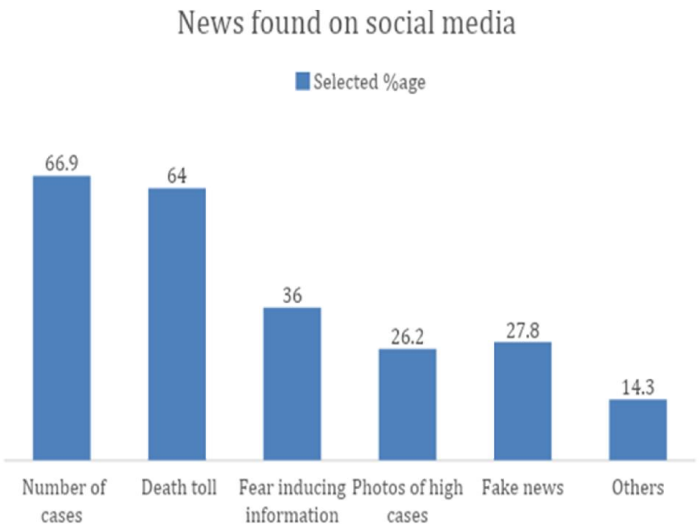

Figure 3: Type of news conveyed by social media (n=406)

Table I: Demographic details of study participants (n=406)

Demographic variables		n	%
Gender			
	Male	214	52.7
	Female	192	47.3
Age (years)			
	18-30	360	88.7
	31-42	33	8.1
	43-55	13	3.2
Marital status			
	Married	76	18.7
	Unmarried	330	81.3
Socio-economic class (monthly income in rupees)			
	20000	87	21.4
	20000-50000	101	24.9
	>50000	218	53.7
Education			
	Just reading and writing	11	2.7
	Primary school	12	3.0
	Secondary school	20	4.9
	High school	65	16.0
	Diploma	13	3.2
	Bachelor	285	70.2
Residence			
	Urban	268	66.0
	Rural	138	34.0

Table II: Misinformation about COVID-19 (n=406)

Type of misinformation	Options	n	%
Government is keeping important secrets about covid-19 from the public	Yes	253	62.3
	No	127	31.3
	Do not know	26	6.4
Government is misinterpreting information	Yes	254	62.7
	No	137	33.8
	Do not know	14	3.5
COVID-19 is created by the Chinese	Yes	311	76.6
	No	89	21.9
	Do not know	6	1.5
News is being withheld from public	Yes	249	61.3
	No	145	35.7
	Do not know	12	3.0
COVID-19 is predicted in a book	Yes	230	56.7
	No	120	29.6
	Do not know	56	13.8

Table III: Misinformation about Vaccine (n=406)

Effect of vaccination	Options	n	%
Vaccinated people die in 2 years	Yes	317	78.1
	No	86	21.2
	Do not know	3	0.7
Vaccinated people become ill	Yes	206	50.7
	No	152	37.4
	Do not Know	48	11.8

Table IV: Misinformation about SARS-CoV-2 (n=406)

Misinformation about SARS-CoV-2	Options	n	%
SARS-CoV-2 is not heat resistant and will be killed at a higher temperature	Yes	296	72.9
	No	108	26.6
	Do not know	2	0.5
Herbs save from Corona virus	Yes	300	73.9
	No	106	26.1
If you are able to hold breath for 15 seconds, it means you are not infected with Corona virus	Yes	242	59.6
	No	131	23.3
	Do not know	33	8.1
Bats spread Corona virus	Yes	256	63.1
	No	118	29.1
	Do not know	32	7.1

Table V: Personal behavior towards COVID-19 (n=406)

Features of personal behaviors	Options	n	%
Validity of information crosschecked	yes	199	49
	No	130	32
	Sometimes	77	19
Social distance of 1 meter	Yes	164	40.4
	No	130	32
	Sometimes	112	27.6
Wear a mask /handwashing	Yes	312	76.8
	No	89	21.9
	Sometimes	5	1.2
Comments\Posts\tweets read on social media found useful	Yes	282	69.5
	No	124	30.5

Discussion

Our study has been conducted after a rapid surge in vaccination rates all over the world. Vaccination rates have tremendously increased as various types of vaccines are available all over the world. The social media users were thus found to be not affected by rumors. In our study, 79.3% of people were vaccinated. In a similar study conducted in the US, 70% of people were vaccinated.[15]

In our study, 70.9% of people checked social media and 29.1 % of people checked traditional media sources as their major source of COVID-19-related information. In a similar study in the US, 80.52 % of

people checked social media while 19.48 % of people checked traditional media as their major sources of COVID-19-related information[16]. This difference may be due to the lack of technology and education in Pakistan as compared to the US so fewer people have access to the internet and thus, social media.

In our study, 66.9% of people found news about the number of COVID-19 infections on social media. According to a study, 49.1% of people in America use social media for information about the COVID-19 infection rate[17]. Our study differs from this study because most of the individuals in our study are social media users and they get most of the information from it. According to our study, 36.13% of individuals found fear-inducing information about COVID-19 on social media. According to a study, people became desensitized to the fear-inducing information they found on social media when the death toll reached the third quartile and fourth quartile.[18]

According to our study, 27.97% of people found fake news on social media. A study conducted in Bangladesh tells us that there has been a 67.2% rise in fake news related to health about COVID-19.[19] Our study is different because of the fact that the population under our study depended mostly on social media for news and did not double-check the information they found. In our study, 86.63% of people used social media whereas according to a study in America, 72.3% of the population used social media.[17] The difference in our study may be due to our population having access to mobile phones and the internet and lack of education which leads to their reliability on social media.

In our study, 62.62% of people thought that the government kept secrets about COVID-19 from the public. According to a study in America, 48% of people thought that they had seen at least some information that was made up and was not true.[20] The difference in our study is, perhaps, due to the lack of trust in official sources and people having inaccurate information about COVID-19. In our study, 76.98% of people thought that the virus was created by the Chinese. According to a study, 46% of Americans believed that the virus originated from a lab leak in China.[21] The difference in our study may be due to our population believing in any rumors they hear and not cross-checking the information they get.

In our study, 61.63% of the population thought that the news about COVID-19 is withheld from the public. According to a study in America, 32% of the people thought that the news regarding the availability of vaccines or treatment for COVID-19 was being withheld from the public.[22] The difference in our study may be due to a lack of trust in the official media and people trusting any right or wrong information they get. In our study, 73.26% of people believed that COVID-19 was not heat resistant. This is only a myth and according to many researchers and scientists in the world, the virus is heat resistant. Our study is different because most of the people we surveyed were young and they double-checked the information they found on social media. Hence, they believed that the virus is not heat resistant.[23]

In our study, 74.25% of people thought that herbs could be a cure for COVID-19. Research in Saudi Arabia tells us that 14.2% of people used herbs for treating COVID-19.[24] The difference in our study may be due to the firm belief of people in herbs and homemade medicine for many diseases along with COVID-19. In our study, 59.90% of people thought that if they are able to hold their breath for 15 seconds, they are not infected by the coronavirus. However, studies show that COVID-19 can cause shortness of breath in infected individuals.

In our study, 63.36% of individuals thought that bats spread COVID-19. 65.14% of social media users and 50 % of non-social media users found this news. According to a study, bats can be a possible reservoir for COVID-19.[25] The population in our study did not double-check the information they found. This can be the reason why our study results are different from other studies. In our study, 50.73% of the population claimed that they had heard the rumor that the COVID-19 vaccine made people fall ill. An online study done by a multidisciplinary team in different countries showed that 22% of the population believed in rumors related to the adverse effects of the COVID-19 vaccine.[26] This difference in our region might be the reason that people use a lot of social media and seek information about COVID-19 from social media mostly. They do not cross-check the information and believe whatever is circulating on social media widely.

In our study, 32% of the population did not double-check information from social media. Likewise, according to a study done in America, 86% of the population did not double-check their social media information.[20] The difference in our study may be due to the reason that the majority of people who use social media in our region are youth, they have more exposure to the digital world and they have a more critical approach toward information gained from social media sources. In our study, only 40% of the population maintained social distance. Likewise, a survey carried out in America showed 92% of the

population practiced social distancing.[27] The difference in our study might be because of the irresponsible behavior of the population in our region and a lack of effective surveillance to control the pandemic. In our study, 76.84% of the population wore masks. According to a survey carried out in America, around 80% of the population wore masks.[28] The difference in our study may be due to the non-serious attitude of the general public in our region. A large chunk of the population still thinks that the pandemic is a hoax so they are adamant about practicing preventive measures.

Conclusion

Misinformation due to social media had a high influence on people regarding their vaccination, prevention, and treatment of COVID-19. Despite the rumors about COVID-19 on social media, the majority of people got vaccinated against COVID-19. The majority of the population observed preventive measures such as wearing masks, washing hands, and used to cross-check the information on social media either regularly or occasionally.

Acknowledgement

We would like to thank Muhammad Zaryab [1], Shahzaib Ahmad [1], Toseef Ilyas Bhatti [1], Khalil-Ur-Rehman [1], Ejaz Hussain[1], Ghulam Nabi Azad [1], Said Usman[1], Kainat Tabassum[1]
[1 Final year MBBS student, Rawalpindi Medical University] for playing an active role.

References

1. Ciotti M, Angeletti S, Minieri M, Giovannetti M, Benvenuto D, Pascarella S, Sagnelli C, Bianchi M, Bernardini S, Ciccozzi M. COVID-19 outbreak: an overview. Chemotherapy. 2019;64(5-6):215-23.
2. Waris A, Khan AU, Ali M, Ali A, Baset A. COVID-19 outbreak: current scenario of Pakistan. New Microbes and New Infections. 2020 Apr 14:100681.
3. Kouzy R, Abi Jaoude J, Kraitem A, El Alam MB, Karam B, Adib E, Zarka J, Traboulsi C, Akl EW, Baddour K. Coronavirus goes viral: quantifying the COVID-19 misinformation epidemic on Twitter. Cureus. 2020 Mar;12(3).
4. Southwell BG, Thorson EA, Sheble L. The persistence and peril of misinformation. American Scientist. 2017 Nov 1;105(6):372-5.
5. Chou WY, Oh A, Klein WM. Addressing health-related misinformation on social media. Jama. 2018 Dec 18;320(23):2417-8.
6. Kata A. Anti-vaccine activists, Web 2.0, and the postmodern paradigm–An overview of tactics and tropes used online by the anti-vaccination movement. Vaccine. 2012 May 28;30(25):3778-89.
7. Shahi GK, Dirksen A, Majchrzak TA. An exploratory study of covid-19 misinformation on twitter. Online Social Networks and Media. 2021 Mar 1;22:100104.
8. Diseases TL. The COVID-19 infodemic. The Lancet. Infectious Diseases. 2020 Aug;20(8):875.
9. World Health Organization. (2020) "Fighting misinformation in the time of COVID-19, one click at a time" The United Kingdom Government, United Kingdom: Author.
10. Naeem SB, Bhatti R. The Covid-19 'infodemic': a new front for information professionals. Health Information & Libraries Journal. 2020 Sep;37(3):233-9.
11. Cinelli M, Quattrociocchi W, Galeazzi A, Valensise CM, Brugnoli E, Schmidt AL, Zola P, Zollo F, Scala A. The covid-19 social media infodemic. Scientific Reports. 2020 Oct 6;10(1):1-0.
12. Hussain W. Role of social media in covid-19 pandemic. The International Journal of Frontier Sciences. 2020 Apr 19;4(2):59-60.
13. Rafi MS. Dialogic content analysis of misinformation about COVID-19 on social media in Pakistan. Linguistics and Literature Review. 2020 Oct 10;6(2):131-43.
14. Khan YH, Mallhi TH, Alotaibi NH, Alzarea AI, Alanazi AS, Tanveer N, Hashmi FK. Threat of COVID-19 vaccine hesitancy in Pakistan: the need for measures to neutralize misleading narratives. The American journal of tropical medicine and hygiene. 2020 Aug 5;103(2):603-4.
15. Loomba S, de Figueiredo A, Piatek SJ, de Graaf K, Larson HJ. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. Nature human behaviour. 2021 Mar;5(3):337-48.
16. Ho HY, Chen YL, Yen CF. Different impacts of COVID-19-related information sources on public worry: An online survey through social media. Internet Interventions. 2020 Dec 1;22:100350.
17. Merchant RM. Evaluating the potential role of social media in preventive health care. Jama. 2020 Feb 4;323(5):411-2.
18. Stevens HR, Oh YJ, Taylor LD. Desensitization to Fear-Inducing COVID-19 Health News on Twitter: Observational Study. JMIR Infodemiology. 2021 Jul 16;1(1):e26876. DOI: 10.2196/26876. Erratum in: JMIR Infodemiology. 2021 Jul 28;1(1):e32231. PMID: 34447923; PMCID: PMC8330886.
19. Al-Zaman MS. COVID-19-related fake news in social media. medRxiv. 2020 Jan 1.
20. Deane C, Parker K, Gramlich J. A Year of US Public Opinion on the Coronavirus Pandemic. Pew Research Center. Pew Research Center, March. 2021;5
21. Jia W, Lu F. US media's coverage of China's handling of COVID-19: Playing the role of the fourth branch of government or the fourth estate?. Global Media and China. 2021 Mar;6(1):8-23.
22. Garrison J. Nearly one-third of Americans believe a coronavirus vaccine exists and is being withheld, survey finds. USA Today. https://www.usatoday.com/story/news/politics/2020/04/24/coronavirus-one-third-usbelieve-vaccine-exists-is-being-withheld/3004841001/. Accessed. 2020 Apr;24.
23. Gupta D. Effect of ambient temperature on COVID-19 infection rate. Available at SSRN 3558470. 2020 Mar 21.
24. Alyami HS, Orabi MA, Aldhabbah FM, Alturki HN, Aburas WI, Alfayez AI, Alharbi AS, Al Masaood RA, Alsuhaibani NA. Knowledge about COVID-19 and beliefs about and use of herbal products during the COVID-19 pandemic: A cross-sectional study in Saudi Arabia. Saudi Pharmaceutical Journal. 2020 Nov 1;28(11):1326-32.
25. Shereen MA, Khan S, Kazmi A, Bashir N, Siddique R. COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. Journal of advanced research. 2020 Jul;24:91.

26. Islam MS, Kamal AH, Kabir A, Southern DL, Khan SH, Hasan SM, Sarkar T, Sharmin S, Das S, Roy T, Harun MG. COVID-19 vaccine rumors and conspiracy theories: The need for cognitive inoculation against misinformation to improve vaccine adherence. PloS one. 2021 May 12;16(5):e0251605.
27. Altman D. Most Americans are practicing social distancing. AXIOS.
28. Khubchandani J, Saiki D, Kandiah J. Masks, gloves, and the COVID-19 pandemic: Rapid assessment of public behaviors in the United States. Epidemiologia. 2020 Dec;1(1):16-22.
29. Nielsen RK, Fletcher R, Newman N, Brennen JS, Howard PN. Navigating the 'infodemic': How people in six countries access and rate news and information about coronavirus. Reuters Institute; 2020 Apr 15.