Original Article

Predictors of Infodemic and Misinformation against COVID–19 among General Public of Rawalpindi

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Abstract

Background: The COVID-19 pandemic has been accompanied by an overwhelming spread of misinformation. The World Health Organization has termed this crisis an "infodemic," noting that misinformation. This deluge of unverified content hinders effective public health response. Despite numerous global studies, predictors of false information uptake remain understudied in Pakistan.

Objectives: This study aimed to identify predictors of infodemic, and misinformation related to COVID-19 among Rawalpindi's public.

Materials and Methods: This descriptive cross-sectional study was conducted in Rawalpindi, from April to June 2024. The study assessed perceived information gathering capacity and risk perception related to COVID-19 among individuals aged 18 and above. A sample size of 377 was calculated. Convenience non-random sampling was used. Ethical approval was obtained from the Institutional Review Board of Rawalpindi Medical University, and data analysis was performed using SPSS version 26 applying descriptive statistics and Spearman's rank correlation analysis.

Results: The study surveyed 394 individuals, with 55.3% males and 44.7% females. Most participants were in the 18-24 age group with varying educational backgrounds. Findings showed confidence in gathering information about COVID-19, and distinguishing facts from rumors. Perceptions of COVID-19 severity and susceptibility varied, with mixed emotions towards the pandemic and trust levels in information sources. Positive correlations were found between information gathering capacity, judgment frequency, and preventive behaviors against COVID-19.

Conclusion: Relying on statistical, experimental evidence, and preventive measures enhances information gathering capacity. However, there is no direct link between reliance on scientific evidence and the ability to differentiate rumors from facts.

Keywords: COVID-19, Infodemic, Misinformation, Public Health

Introduction

The public's ability to make educated decisions has been hampered by the COVID-19 pandemic's rise in incorrect information regarding the illness. Even while it is still unclear how widespread the false information about COVID-19 is online, it is still a serious cause for concern. Situations when people's factual views lack conclusive proof and expert consensus are often referred to as misinformation.[1] The World Health Organization claims that since misinformation spreads quickly and has profound influence because it is readily available, the fight against the pandemic is also the fight against disinformation. Concerning the stakeholders are false information and unverified details.[2]

In times of health emergency, the public's ability to participate in healthcare and preventive decisions depends on their ability to access trustworthy information sources and services. However, the public finds it challenging to distinguish genuine information due to the amount of health-related content on social media without thorough verifications, which hinders efficient public health responses.[3] Fondazione Bruno Kessler after analyzing 112 million COVID-19-related posts on social media, found that 42% of messages were posted by bots on social media platforms and that over 40% of posts included information from untrustworthy sources.[4]

Misinformation can take many different forms and propagate through a variety of channels, including as engaged echo chambers, persistently incorrect beliefs and messages, and misleading messaging efforts.[5, 6] While extensive research has focused on identifying and categorizing misinformation related to COVID-19,[7, 8] detecting misinformation using machine learning algorithms,[9, 10] or exploring the behavior-related consequences of misinformation,[11, 12] scant attention has been paid to understanding the characteristics of individuals or groups who embrace false information about the virus.[13, 14] Numerous research revealed that the COVID-19 immunization campaign is at risk due to the infodemic of false information. This is concerning because South Asians worldwide bear a disproportionately high burden of COVID-19 infection, hospitalization, and death.[15, 16] For the benefit of the Pakistani government and people, numerous studies established a baseline about the predictors of fake news sharing regarding the COVID-19 epidemic,[17] yet no such study has been conducted in Rawalpindi.

The aim of our study was to identify the predictors of infodemic and misinformation against COVID-19 among general public of Rawalpindi by analyzing their behavioral attributes and to determine their reliance on various types of evidence regarding the pandemic.

Materials and Methods

This descriptive cross-sectional study was conducted from April 2024 to June 2024 at Rawalpindi, Punjab, Pakistan. The general public of Rawalpindi (≥ 18 years of age) was invited to participate in an online survey through Google forms. General Public of Rawalpindi ≥ 18 years of age was included in

the sample size. Those who were ≥ 18 years of age but did not give consent to participate in the study were excluded from the study. A sample size of 377 was calculated with 95% CI, 5% margin of error using WHO Sample Size Calculator. The sampling technique used was convenient non-random type of sampling. The use of the data for research purposes was explained and written consent in the first section of the online survey was taken from all participants before filling in the questionnaire. The questionnaire was divided into 3 sections. The first part was about demographics. The second part consisted of 3 questions on perceived information gathering capacity. The third part consisted of 14 questions on risk perception. Ethical Approval was taken from the Institutional Review Board of Rawalpindi Medical University. Perceived information gathering capacity was assessed by asking the participants whether they would be able to gather additional information, separate rumors from facts, know where to go for more information regarding COVID-19. The response was recorded using Likert scale. Risk Perception was assessed by dividing it into perceived severity & susceptibility; perceived severity included question about the severity of consequences of being affected by COVID-19. Response was recorded using Likert scale. Perceived susceptibility was assessed by asking the participants about the likeliness of being infected with COVID-19, their emotions about the pandemic, the current level of their knowledge about the disease, trust about the relevant sources of information in Pakistan, their current level of education, how frequently they made judgment on the pandemic based on scientific, statistical, experiential & experiential type of evidence, their disease prevention behaviors and their satisfaction with Pakistani government's action to deal with corona virus. The response was recorded using Likert scale. The questionnaire was derived from the study "Experience, experts, statistics, or just science? Predictors and consequences of reliance on different evidence types during the COVID-19 infodemic"[18]. SPSS version 26 was used for data entry and analysis. For demographics and all the qualitative variables, descriptive statistics were applied to calculate the percentage. Spearman's rank Correlation analysis was applied to see the relationship between the perceived information gathering capacity and frequency of making judgement on the pandemic based on scientific, statistical, experiential & experiential type of evidence, their disease prevention behaviors. p value <0.05 was considered statistically significant.

Results

This cross-sectional study was conducted at Rawalpindi, Punjab, Pakistan. General Public of Rawalpindi aged ≥ 18 years was invited to participate in an online survey through Google forms. The total number of individuals who participated in this survey was 394, out of these 55.3% were male and 44.7% were females. 90.9% individuals belonged to the age group 18 to 24 years old, 5.3% individuals belonged to the age group of 25 to 34 years, 2.0% individuals belonged to the age group of 35 to 44, 0.3% individuals belonged to the age group of 55 to 64. The Highest level of Educational Qualification of the participants was (1.8%)

Elementary school and below, (45.2%) Middle school and high school, (43.9%) bachelor's degree, (6.9%) master's degree, (6.9%) Doctorate degree. (Table 1)

Table 1 *Demographic Details of the Study Participants.*

Variables	Percentage
Age	
18 to 24	90.9%
25 to 34	5.3%
35 to 44	2.0%
45 to 54	1.5%
55 to 64	0.3%
Gender	
Male	55.3%
Female	44.7%
Highest Level of Educational Qualification	
Elementary school and below	1.8%
Middle school and high school	45.2%
Bachelor's degree	43.9%
Master's degree	6.9%
Doctorate degree	6.9%

Table 2 shows that majority of the population agreed that if they wanted to get more information about coronavirus, they could readily take the time to gather any additional information they might need (64.2%); would know how to separate facts from rumors (73.6%); would know where to go for more information (72.9%). Table 3 shows that the majority of the public think that the consequences of getting infected with Covid are severe (51.3%). On asking about the likeliness of getting infected with Covid majority of the population adopted a neutral stance (39.6%). When asked about feelings regarding Covid 64.2% did not feel disgust, 52.8% did not feel scared, 63.4% did not feel angry, 37.8% felt moderately compassionate, 60.8% did not feel elevated, 35.1% did not feel hopeful, 42.1% did not feel sad. Majority of the population (58.6%) agreed that people who are important to them (e.g. parents, friends, etc.) expect them to know something about coronavirus. On asking people How much do they think they

Table 2 *Perceived Information Gathering Capacity.*

If I wanted to Get More Information about Coronavirus	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
Readily take the time to gather any additional information I might need.	7.1%	7.9%	20.8%	32.5%	31.7%
Know how to separate facts from rumors.	3.0%	8.9%	14.5%	36.3%	37.3%
Know where to go for more information.	5.3%	7.1%	14.7%	32.5%	40.4%

currently know about coronavirus, 49.8% responded that they know a great about Covid. 50% of the population responded that they need to know a lot more when asked that how much more, if at all, do they think they need to know about coronavirus in order to deal with it adequately. When asked that how much trust do people have in the following to give them accurate information about coronavirus, 43.1% showed complete trust on Pakistani Doctors/Scientists, 38.8% showed moderate trust on National Centre for Disease Control & Prevention (NCOC), 63.2% showed no trust on Pakistani Media, 56.1% showed no trust on Pakistani Government. 44.2% responded that they sometimes made a judgment on coronavirus based on scientific information with a great deal of detail. 42.6% responded that they sometimes made a judgment on coronavirus based on statistical information. 39.3% responded that they sometimes made a decision about coronavirus based on their previously existing knowledge and experience. 55.8% people responded that they placed their trust in the experts and gone with their recommendation on coronavirus all the time. 62.4% responded that they have taken action to protect themself from getting infected with coronavirus all the time.

Table 3 *Risk Perception of COVID-19 in sample population.*

	Not at all	Mildly	Moderately	Very	Great deal
How severe consequence of getting infected with coronavirus is?	5.6%	9.1%	34.0%	36.3%	15.0%
How much do you feel?					
Disgusted	35.3%	28.9%	21.6%	12.2%	2.0%
Scared	18.8%	34.0%	29.2%	13.2%	4.8%
Angry	37.3%	26.1%	21.1%	11.9%	3.6%
Compassionate	13.2%	20.6%	37.8%	20.6%	7.9%
Elevated	31.4%	29.4%	26.4%	9.1%	3.3%
Hopeful	13.5%	21.6%	29.9%	24.6%	10.4%
Sad	12.2%	29.9%	27.4%	20.3%	10.2%
How likely are to get infected with coronavirus?	10.9%	24.6%	39.6%	18.8%	6.1%
How much trust do you have in following?					
Pakistani Doctors/Scientists	5.3%	15.0%	36.5%	30.7%	12.4%
NCOC	9.4%	22.1%	38.8%	21.8%	7.9%
Pakistani Media	29.4%	33.8%	28.4%	7.6%	0.8%
Pakistani Government	22.3%	33.8%	31.5%	10.4%	2.0%
How often about coronavirus you made a judgment based on scientific information?	6.6%	16.2%	44.2%	27.4%	5.6%
How much do you know about coronavirus?	2.5%	9.4%	37.8%	39.8%	10.4%

Table 4 shows a positive significant correlation between ability to readily take time to gather additional information about the pandemic and the frequency of making judgements about the pandemic on scientific (r=0.170, p=0.001), statistical (r=0.182, p=0.000), experimental (r=0.163, p=0.001), expert (r=0.116, p=0.022) knowledge & taking preventative measures against covid (r=0.110, p=0.028).

Table 4 *Correlation Between Perceived Information Gathering Capacity and Frequency of Making Judgments on Scientific, Statistical, Experimental, Expert Knowledge & Taking Preventative Measures.*

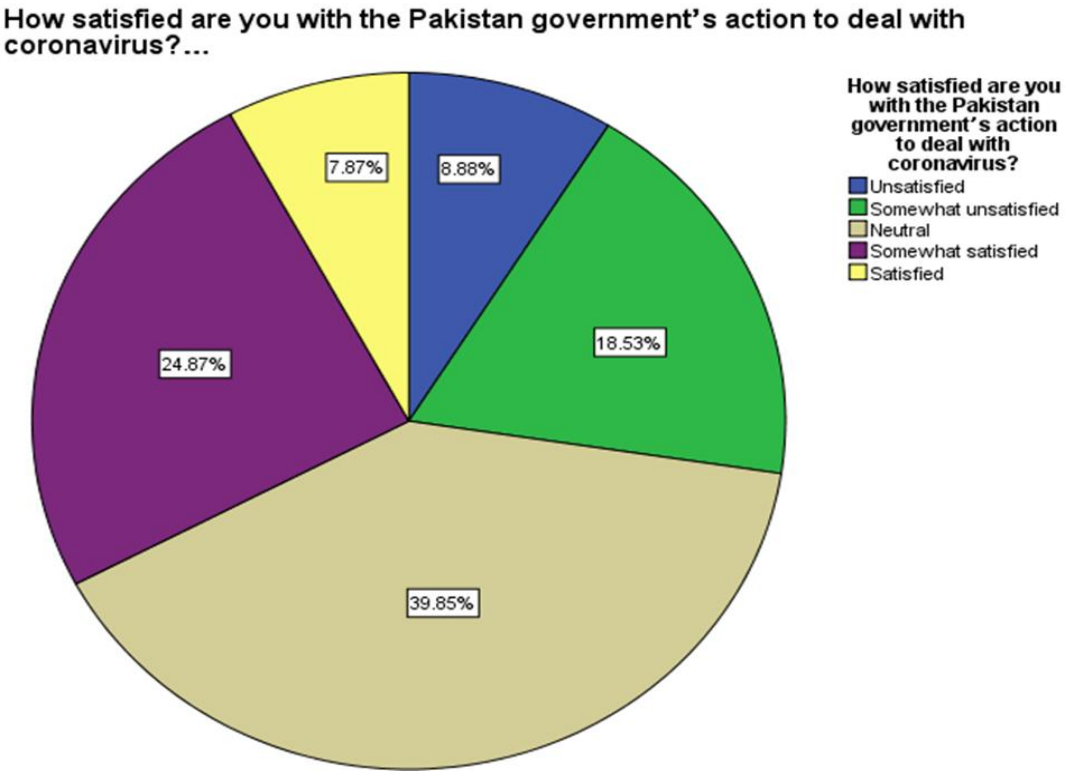
	Readily take time to gather additional info I might need	**Knowing how to separate facts from rumors**	**Know where to go for more info**
How often have you made a judgment on coronavirus based on scientific information with a great deal of detail?	0.170* (0.001)	0.088 (0.083)	0.188** (0.000)
How often have you made a judgment on coronavirus based on statistical information?	0.182** (0.000)	0.141** (0.005)	0.187** (0.000)
How often have you made a decision about coronavirus based on your previously existing knowledge and experience?	0.163** (0.001)	0.122* (0.016)	0.170** (0.000)
How often have you placed your trust in the experts and gone with their recommendation on coronavirus?	0.116* (0.022)	0.079 (0.016)	0.135** (0.007)
How often have you taken action to protect yourself from getting infected with coronavirus?	0.110* (0.028)	0.130** (0.010)	0.183** (0.000)

A significant correlation was found between the ability to separate facts from rumors and frequency of making judgements about the pandemic on statistical (r=0.141, p=0.005), experimental (r=0.122, p=0.016) evidence & taking preventative measures against covid (r=0.130, p=0.010). No significant correlation was found between the ability to separate facts from rumors and frequency of making judgements about the pandemic on scientific (r=0.088, p=0.083) & expert knowledge (r=0.079, p=0.116). A positive

significant correlation was found between the ability to know where to go for additional information and the frequency of making judgements on scientific (r=0.188, p=0.000), statistical (r=0.187, p=0.000), experimental(r=0.170, p=0.000), expert (r= 0.135, p=0.007) knowledge & taking preventative measures against covid (r=0.183,p=0.000).

Figure 1 shows that the majority of the population adopted a neutral stance (39.85%) when asked about whether they were satisfied with Pakistan government's action to deal with Covid.

Figure 1 *Satisfaction of participants with government action for COVID-19.*



Discussion

"Too much information encompassing false or misleading information in cyber and physical environments during a disease outbreak" is the literal meaning of the COVID-19 infodemic.[19] It has been one of the main roadblocks to halting the persisting COVID-19 pandemic by fracturing people's viewpoints and making it tough for public health measures to be followed.[20] Especially, the widespread dissemination of disinformation about pandemics has contributed to the acceptance of conspiracy theories and has had a detrimental impact on decisions made about health.[21, 22] Our study

mainly aimed at determining the determinants of this misinformation and infodemic by correlating the public's ability to gather information with the reliance on various types of evidence and frequency of taking preventative measures.

The results of our study showed that the individuals residing in Rawalpindi, Punjab, Pakistan that frequently relied on scientific evidence with respect to COVID had a better ability to gather perceived information but at the same time no correlation could be found between the ability to separate rumors from facts and reliance on scientific evidence as it was shown by a study conduced in the US which indicated that false information regarding COVID-19 can coexist with officially recognized theories. Individuals frequently have a variety of beliefs, therefore it's critical to dispel myths with factual knowledge.[23] At the same time a similar study conducted in US, the believability on COVID-19 misinformation was significantly reduced after introducing a scientific infographic as an intervention.[24] The difference in the findings might be because of the cultural and regional differences in the societal norms & lack of trust of Pakistani people on Pakistani doctors/scientists.

The results of our study showed that individuals residing in Rawalpindi, Punjab, Pakistan that frequently relied on statistical evidence for making judgement about the pandemic had better perceived information gathering capacity but at the same time mischaracterization of statistical information fueled the infodemic about COVID-19 in the United Kingdom[25] as it can lead to confusion and erosion of trust on health surfaces among the masses. Another study conducted in the US suggests that investigative factchecks provide a viable counternarrative to COVID-19 misinformation even in the context of the increasing commercialization of America's pandemic response and polarization more generally[26] indicating that statistical monitoring and targeted interventions are crucial in mitigating the COVID-19 infodemic which is similar to our findings that might be because of the fact that a lot of misinformation employs limited sample sizes or anecdotes. Larger, representative samples are necessary for rigorous statistical analysis to produce insightful results that can lead to finding trends and patterns in data from a variety of populations that disprove myths.

A study conducted in the United States indicated that the individuals who showed a greater degree of scientific literacy and analytical thinking were also better at discerning between authentic and erroneous information. Moreover, the participants' ability to comprehend truth when choosing what to share was considerably augmented by a brief reminder about accuracy at the very beginning of the trial[27] which is similar to our findings that the individuals who rely on the experimental evidence frequently were able to efficiently gather the perceived information. A study conducted in the United Kingdom also indicated that experimental models effectively put an end to myths about the COVID-19.[28] The similarities in the results might be because

of the wide range availability and easy access to the experimental data.

Our results showed that people who frequently relied on expert evidence knew where to go for more information and could readily take time to gather information about the pandemic but at the same time the ability to separate rumors from facts was not found to be related to the reliance on expert evidence which is different from the finding that expert evidence plays a crucial role in holding the tide of COVID-19 misinformation.[29] The difference in findings can be due to the lack of trust of Pakistani nation on Pakistani doctors/scientists.

The results in our study indicate that people who frequently adopted preventative measure against the pandemic were efficiently able to gather perceived information and separate rumors from facts which is similar to finding of World Health Organization that productive health campaigns stress preventive measures. By disseminating accurate information, campaigns confront disinformation.[30] The similarities in the findings can be due to the fact that when people perpetually adopt preventive practices, it becomes the community standard. Misinformation that goes against these norms stands out and is more likely to be challenged.

The study only talks about lack of relationship between reliance on scientific & expert types of evidence and the ability to separate rumors from the facts but doesn't indicate the cause. Similarly, it indicates the dissatisfaction of the general public with respect to the Pakistani government's actions against the pandemic as well as the distrust of the public in official sources of information but doesn't indicate the cause. So, future studies should be focused on finding these causes.

Conclusions

This study approves that greater is the reliance on the statistical, experimental evidence & frequency of adopting preventative measures greater will be the perceived information gathering capacity. But at same time also indicates that, although greater is the reliance on scientific & expert evidence greater will be the ability to readily take time to gather more information and the knowledge about where to go for more information about the pandemic, there is no relationship between reliance on these types of evidence and the ability to separate rumors from the facts.

Moreover, the study also highlights the lack of satisfaction of the general public with respect to the Pakistani government's actions against the pandemic as well as the distrust of the public in official sources of information.

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