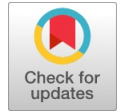


Mediating Health and Risk Information in WhatsApp and its Impact on Risk Perception and Risk Knowledge During COVID-19 Public Health Emergency

Varghese Riju Joshua, Anand Lenin Vethanayagam



Abstract: WhatsApp is India's most popular social media application and has emerged as a valuable tool for health and risk communication during the COVID-19 public health emergency (PHE). Public health institutions, WHO and Government agencies used WhatsApp Health Alert to distribute verified, accurate and timely information during the COVID-19 pandemic. This study examines the potential of WhatsApp as a primary source of health and risk information and its impact on users' risk knowledge and risk perception during the COVID-19 pandemic. We conducted a cross-sectional online survey among 453 WhatsApp users in Tamil Nadu during the COVID-19 lockdown in May-August 2021. Most of the respondents used WhatsApp as the primary source of COVID-19 information than other media. COVID-19 information in WhatsApp had a positive and significant impact on users' risk knowledge and risk perception. Regularly receiving and sharing COVID-19 information, subscribing to and participating in COVID-19-related group chats, and regularly updating WhatsApp statuses about COVID-19 were significant influencers of risk knowledge and risk perception. Future PHE response communication must build on these communication opportunities in WhatsApp rather than routed primarily to traditional methods.

Keywords: Health information, Risk knowledge, Risk perception, COVID-19, Public Health Emergency (PHE), WhatsApp

I. INTRODUCTION

WhatsApp is India's most popular social media application and has emerged as one the most popular tool for health and risk communication during the COVID-19 public health emergency (PHE). Recent studies monitor, discuss, and scrutinize the role of WhatsApp during COVID-19 PHE. Research on WhatsApp [1, 2, 3, 4, 5], mainly focuses on its potential in academic learning, knowledge sharing, social connectedness, travel and tourism, and source of misinformation. Liu & Tong [6] suggests WhatsApp may be an effective source of health information during the COVID-19 pandemic and might be the ideal platform to reach large communities.

Fewer studies have explored the potential of WhatsApp as a source of health and risk information during the COVID-19 pandemic. The research analyses the role of WhatsApp as a source of health and risk information during COVID-19 PHE and its impact on its users. The study had the following objectives: a) To study if WhatsApp is used as a primary source of health and risk information during the COVID-19 pandemic, b) to study the impact of COVID-19 information in WhatsApp on users' risk knowledge and risk perception.

II. WHATSAPP AND HEALTH INFORMATION

COVID-19 PHE is also an information crisis, the need for timely, accurate, verified information is high. Social media has emerged as one of the important sources of information during the COVID-19 PHE. [7]. People prefer social media as a convenient and familiar source of health information and to satisfy their information needs during PHE. [8, 9, 2, 10] Social media can be used for the effective dissemination of health information than traditional methods, to circulate timely health information to different stakeholders in healthcare settings and the public [11, 12]. Public health institutions, the World Health Organisation (WHO) and Government agencies in India used WhatsApp Health Alerts (WHA) to mediate timely, accurate, updated, context and agent-specific information to manage emerging information needs. People preferred WhatsApp for prolonged usage during adverse events, to truly express information needs and bypassed traditional media which are tarnished by gatekeeping, economic, and political interests [13]. WhatsApp groups are the preferred source for health education, positively related to group learning, interaction, and resource sharing. [4]. It offers more visibility, accessibility, and scope for more customised communication opportunities [11, 14], more privacy and safe usage even to share restricted information, than other social media applications like Facebook [15]. WhatsApp is effective in sending alert messages, sharing locations for rescue efforts, distributing relief measures, and registering public grievances during the 2018 Chennai flood disaster [13]. Kilgour, You, & Johnson [16] reported that social media contributed to more misinformation and panic-inducing messages during the Ebola crisis in comparison with newspaper coverage. There was increased usage of social media during the COVID-19 pandemic.

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But most of the health communication strategies are routed to traditional media and social media play a supportive technology in knowledge transfer [17]

III. RISK PERCEPTION

Risk perception is an individualistic and subjective value judgement about the characteristics, severity, and probability of risks of an impactful event [18, 19]. It is the probability of the event to occur, the severity of the event and susceptibility to an event. Health risks are mostly related to an individual's decisions to adopt or reject certain behaviours [20]. According to the risk information seeking and processing (RISP) model higher risk perception during public health emergencies influences people to seek more information. Risk perception affects behaviour, how people choose and process risk information, efficacy, and acceptance of recommended behaviours and how they adopt new behaviours [21]. People experience risks during new and unfamiliar events by making sense and cognitive evaluation of emerging information as they do not have experience of the same. If they feel dread of risk, they are more likely to search for more information [11] to validate effective response strategies. Individual's understanding of risks results in appropriate decision-making. Risk perception influences both negative and positive outcomes [19]. A higher degree of risk perception influences the intention to implement protective and precautionary practices which lead to healthy behaviour [11, 22, 19]. An & Sun [22] noted that the higher risk perception among the public is a key factor for risk management during a public emergency. Though risk perception is not the sole determinant of adopting recommended behaviours [20], the degree of risk perceived influences people to adopt response behaviour. The severity of the risk perceived increases the possibility to approve and follow the recommended behaviour. Repeated exposure to risk information consistently can stabilize risk perception [23] but can also result in information overload leading to information avoidance.

A. Risk Knowledge

Having the right knowledge about the risks during PHE helps people to adopt appropriate behaviour, reduce negative emotions and mitigate risks [24]. An increase in the knowledge level about health problems significantly improves chances for risk avoidance [23]. A right understanding of the risk has negative effects on risk perception. Increased knowledge reduces negative risk perception. Health information in social media influences the knowledge level among users [2]. Zhu & Deng [1] assessed risk knowledge based on how much individuals know about occurrences, symptoms, and mitigation of the risk. Post-Covid studies [3, 25, 1, 4, 5] report more acceptance of WhatsApp for learning, knowledge sharing and social togetherness influenced by perceived usefulness. A combination of risk perception and risk knowledge increases the acceptability of recommended behaviour, mitigation strategies and predictors of behaviour during a crisis. Exposure to risk messages increases risk knowledge and influences the perceived severity of the risk [23]. In Bangladesh, COVID-19 vaccine acceptability was reported among people who perceived COVID-19 infection to be

severe, more vulnerable to COVID-19 infection and have more knowledge about COVID-19 virus infection and vaccine [25].

IV. METHOD

We conducted a cross-sectional online survey among WhatsApp users in Tamil Nadu state in India during the COVID-19 severe lockdown period. The invitation for the Google Form survey link was distributed in May 2021 and responses were recorded until August 2021. Using the network sampling method, primary contacts from in the researchers' WhatsApp contact list were used for initial data collection. Respondents were requested to share the survey link further to their networks. 453 WhatsApp users completed the survey. The survey questions consisted of four sections: demographic data, WhatsApp as a primary source of information during the COVID-19 pandemic, risk knowledge and risk perception. WhatsApp as a primary source of information since the first lockdown announcement on March 24th, 2020, is measured using seven items; users regularly receive, read and share COVID-19 information in WhatsApp, member of WhatsApp groups about COVID-19 and participation in group chats, subscribe to WhatsApp information services initiated by Govt. and public health institutions like 'MyGov COVID-19 Helpdesk', and regularly update WhatsApp Status about COVID-19. Risk knowledge is measured using seven items [6]; knowledge about how COVID-19 spreads/mode of transmission, symptoms of COVID-19 infection, and health complications of COVID-19, how to protect from COVID-19, the importance of wearing masks/washing handing/social distancing, COVID-19 confirmation tests, treatment facilities, the number of cases per day; when to Quarantine/self-isolate, quarantine guidelines, and decisions issued by Govt. or any competent authorities. Risk perception is measured using four items [25]; perceived risk of COVID-19 infections, perceived susceptibility to risks, perceived trust in protective actions and perception about returning to post-covid normal.

We used SPSS 13 for data analysis. Descriptive analysis of demographics, WhatsApp as the primary source of information, risk perception and risk knowledge are tabulated. Relationship between WhatsApp as the primary source of COVID-19 information, risk perception and risk knowledge were analysed using independent t Test (gender, marital status) and one-way ANOVA (age, education, employment, and place of living). Logistic regression was used to test the impact of using WhatsApp for COVID-19 information on risk perception and risk knowledge.

V. RESULTS

A total of 453 WhatsApp users responded and completed the survey. The male and female representation in the sample was 53.9% and 43.1% respectively, most of them aged between 18 and 35 years and 55% were married.



More than 99% had undergraduate-level education or above. 26.7% were students, 63.3% were employed or self-employed, 6.6% were homemakers and only 2.4 were not employed. Half of the respondents (51%) were from urban regions, 20% from semi-urban and 28.5% from villages during the period of study.

A. WhatsApp and COVID-19 information

WhatsApp as a primary source of COVID-19 information was examined using seven items (Table No. 1) Overall averages show 34.94% (23.27% A & 11.67% SA) respondents used WhatsApp as the primary source for COVID-19 information, 22.5% reported neutral, and 42%

(30.41 D & 12.14% SD) have not used WhatsApp as the main sources. More than 55% (32.3% A & 23.7% SA) users regularly received COVID-19 information on WhatsApp, 37.6% (23.1% A & 14.5% SA) regularly shared COVID-19 information, 36% (26.9% A & 9.1% SA) read most of the WhatsApp messages about COVID-19, 37.1% (30.1% A & 7% SA) participated in WhatsApp group chats about COVID-19. Only 22.6% (14% A & 8.6% SA) are members of COVID-19-related WhatsApp groups. WHO, the Central and State government-initiated WhatsApp groups to disseminate verified, accurate and updated information to the public and to manage infodemics. Almost 60% (46.8% D & 12.4% SD) did not subscribe to any of these WhatsApp information centres.

Table No I: WhatsApp as the primary source of COVID-19 Information

S No	From your WhatsApp usage since COVID-19's first lockdown announcement on March 24, 2022	SD	D	N	A	SA
1	Received regular information / daily updates about COVID-19	3.8	16.7	23.7	32.3	23.7
2	Member of a WhatsApp group about COVID-19 information	16.1	45.7	15.6	14.0	8.6
3	Subscribed to services like 'MyGov COVID-19 Helpdesk'	12.4	46.8	15.1	16.1	9.7
4	Regularly sharing COVID-19 information	10.8	26.9	24.7	23.1	14.5
5	Reading most of the COVID-19 messages but do not share them	10.2	24.7	29.0	26.9	9.1
6	Participating in WhatsApp group chats and discussions about COVID-19	10.2	26.3	26.3	30.1	7.0
7	Updating daily my WhatsApp Status about COVID-19	21.5	25.8	23.1	20.4	9.1

SD- Strongly Disagree, D – Disagree, N – Neutral, A – Agree, SA – Strongly Agree

Table No II: Risk perception

S No	From your WhatsApp usage during the COVID-19 lockdown, did you experience these?	SD	D	N	A	SA
1	I or members of my household are likely to be infected by COVID-19 in the next few weeks	27.6	32.7	27.8	9.7	2.2
2	COVID-19 is likely to spread in my neighbourhood during the next few weeks	15.2	35.8	32.2	14.3	2.4
3	We are less likely to return to normal situations like before COVID-19	8.6	19.6	33.6	28.5	9.7
4	I will be infected by the COVID-19 virus even if I follow all guidelines (wearing a mask, social distancing, washing hands with soap)	16.6	30.0	27.6	19.9	6.0

B. COVID-19 Information in WhatsApp and Risk Perception

The perceived risk of COVID-19 from WhatsApp usage was examined using four items (Table No. II). 46% (29.52% D & 17% SD) of WhatsApp users reported to have perceived less risk of COVID-19, 30.3% responded neutral and only 23% (18.1% A & 5.07% SA) perceived a higher risk of COVID-19. 12% (9.7% A & 2.2% SA) perceived the risk of COVID-19 infection spreading among their household members, 16.7% (14.3 A & 2.4%) among neighbourhoods and 25.9% (19.9% A & 6% SA) perceived the risk of getting COVID-19 infection even after following all guidelines and 38.2% (28.5% A & 9.7% SA) perceived post-COVID normal might not return soon. H1o - Health and risk information in WhatsApp about COVID-19 does not impact risk perception among WhatsApp users during the COVID-19 pandemic. Since $r=0.87$ (Table No. III) signifies a strong and positive relationship between the variable X1 – X7 and risk perception (where x1 = received regular information / daily updates about COVID-19, x2 = member of a WhatsApp group about COVID-19, x3 = subscribed to Govt. initiated information services like 'my Gov COVID-19 helpdesk' to receive information, x4 = regularly share COVID-19 information, x5 = reading COVID-19 messages but do not share them, x6 = participating in group chats and discussion about COVID-19 and x7 = Updating WhatsApp Status regularly about COVID-19). Health, and risk information in WhatsApp about COVID-19 has a strong and positive impact on the risk perception of COVID-19 among WhatsApp users.

Table No III: Correlation between COVID-19 information in WhatsApp and Risk Perception

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.8717	0.767	0.703	0.4341

ANOVA TABLE

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.831	7	4.119	4.756	0.000
	Residual	385.380	445	.866		
	Total	414.212	452			



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Regression Equations is: $Y(\text{Risk perception}) = x_1(0.134) + x_2(0.079) - x_3(0.039) + x_4(0.171) + x_5(0.005) - x_6(0.148) + x_7(0.071) + 2.185$. Based on regression analysis, x_1 (0.13, Std Er 0.048), x_2 (0.079, Std Er 0.059), x_6 (0.148, Std Er 0.057) and x_7 (0.071, Std Er 0.057) are most influencing items on risk perception.

Table No IV: Risk knowledge

S No	Which of these did you know from WhatsApp than any other media?	SD	D	N	A	SA
1	I know about how the COVID-19 virus spreads	5.4	17.2	24.7	37.6	15.1
2	I know the symptoms of CoVid19	7.5	17.2	24.2	36.6	14.5
3	I learned how to protect myself from COVID-19	8.1	15.6	21.0	32.8	22.6
4	I know about COVID-19 testing and treatment	9.7	23.7	27.4	28.0	11.3
5	Got CoVid19 updates like the number of cases per day	12.4	28.0	22.0	25.3	12.4
6	I know about when to Quarantine/self-isolate, and quarantine guidelines.	10.8	21.0	24.7	31.2	12.4
7	Getting everyday updates issued by Govt. or any competent authorities about COVID-19	12.9	23.1	27.4	26.9	9.7

C. COVID-19 information in WhatsApp and Risk knowledge

The increase in risk knowledge about COVID-19 from WhatsApp usage was examined using seven items (Table IV). 45% (31.2% A & 14% SA) respondents agreed and 24.48% reported neutral about the increase in COVID-19 risk knowledge primarily from WhatsApp than other media. 52.7 % (37.6% A & 15.1% SA) know about how COVID-19 virus spreads, 51.1% (36.6% A & 14.5% SA) know about symptoms of COVID-19 infection, 55.4% (32.8% A & 22.6% SA) know about protective actions against COVID-19 infection, 39.3% (28% A & 11.3% SA) got information about COVID-19 tests and treatment facilities, 43.6% (31.2% A & 12.4% SA) know about how to quarantine guidelines and 36.6% (26.9% A & 9.7% SA) regularly read information about COVID-19 response efforts by Govt. or any authorities. H_0 – Health and risk information about COVID-19 on WhatsApp does not affect risk knowledge of COVID-19 among WhatsApp users. Since $r = 0.81$ (Table V) signifies a strong and positive relationship between variables studied ($X_1 - X_7$) and risk knowledge, H_0 is rejected. Health and risk information in WhatsApp about COVID-19 positively and significantly influences respondents' risk knowledge of COVID-19.

Table No V: Correlation between COVID-19 information in WhatsApp and Risk knowledge

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.819	0.754	0.751	0.83203

ANOVA TABLE						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	330.467	7	47.21	68.195	0
	Residual	308.063	445	0.692		
	Total	638.53	452			

Regression Equations is: $Y = x_1(0.403) + x_2(0.087) - x_3(0.097) + x_4(0.179) + x_5(0.085) + x_6(0.167) + x_7(0.152) + 0.056$. At 95% significant level, linear relationship is established among the variable ($x_1 - x_7$) studied impacts the risk knowledge of WhatsApp users. Based on regression analysis, x_1 (0.403, Std Er 0.043), x_4 (0.179, Std Er 0.052), x_5 (0.085, Std Er 0.037), x_6 (0.167, Std Er 0.051) and x_7 (0.152, Std Er 0.051) are the most influencing items on risk knowledge.

VI. DISCUSSION

This study examined the role of WhatsApp as the primary source of health and risk information during the COVID-19 PHE and its impact on WhatsApp users' risk knowledge and risk perception. Most of the recent studies highlighted the increased dependency on social media during COVID-19, though television is the most preferred source of COVID-19 information [26, 27]. This study data from WhatsApp users shows that almost 50% of them mainly used WhatsApp for COVID-19 information. Most of the sample respondents regularly received COVID-19 information and updates from WhatsApp and participated in WhatsApp group chats about COVID-19. The group discussion space might be used to validate, argue, question, and verify different information, ask for more information and reject other messages. It is also a socializing hub during the lockdown. Only 36% of

respondents regularly shared COVID-19 information, a trend said to be a cause for infodemics during the COVID-19 pandemic. Risk perception is an important determinant for risk information seeking and processing, accepting and adopting recommended behaviour, and decision-making during risky situations leading to healthy behaviour during PHE [19, 20, 11, 22]. This study reported strong and positive relationship between COVID-19 information in WhatsApp and risk perception ($r = 0.87$). Receiving regular information about COVID-19, member of a COVID-19 group, participating in group chats and discussions about COVID-19 and updating WhatsApp status regularly about COVID-19 had the most impact on risk perception. Most of the respondents perceived the risk of getting COVID-19 infection even after following all guidelines and were worried about returning to normalcy post-COVID. An increase in risk knowledge helps to manage negative emotions during the crisis, improve understanding of the situation, reduce risks and help people to adopt recommended behaviours [23, 24, 2]. WhatsApp users reported a significant increase in risk knowledge about COVID-19 from WhatsApp than other media ($r = 0.81$).



Receiving regular information / daily updates about COVID-19, regularly sharing COVID-19 information, reading most of the COVID-19 messages, participating in group chats and discussions about COVID-19 and updating WhatsApp Status regularly about COVID-19 had the most significant impact on the risk knowledge of the respondents. Respondents mostly agreed to know about how the COVID-19 virus spreads, its symptoms, protective actions to avoid infection, COVID-19 tests, treatment facilities for infection and efforts taken by the Government to manage the pandemic from WhatsApp than other media. Risk perception and risk knowledge combined predictors of behaviour during PHE, increase acceptance of recommended behaviour and mitigation strategies that can lead to effective management of the crisis. To manage the pandemic communication and misinformation WHO launched WhatsApp Health Alert (WHA) that provides COVID-19 information in 20 languages including English and Tamil (the language of the study population). In India, the Ministry of Health, and the State Governments launched WhatsApp-based information centre for answering queries related to COVID-19. updates, clarifying misinformation, case tracking, providing medical assistance, and support of people in quarantine. More than 60% of respondents did not subscribe to any of these services. Recent studies show gender, education, age, and social status significantly influence media and information choices [28]. Females are more likely to use social media for health information [27, 29] while male respondents reported preferred TV amongst the traditional media. Our data shows there is no statistically significant difference ($P > 0.05$) between age, gender, education level, employment, and place of living during the COVID-19 pandemic of the sample on the three factors of study; WhatsApp as the primary source of COVID-19 information, risk perception and risk knowledge According to Waldemar [9] dependency on WhatsApp over traditional media increased during COVID-19, created more transparency in information flow from reliable sources directly to the public, and contributed to reducing pandemic severity. Still, most of the health communication strategies are routed to the traditional methods. Our study shows that there is an increased dependency on WhatsApp for health information during health emergencies. Mulino, Suryoputro, & Jamil [3] suggested using WhatsApp for knowledge sharing should be from planned communication efforts and communication planners must familiarise themselves with the technical characteristics of WhatsApp before planning. WhatsApp can be used more than a supportive technology [17] for the effective dissemination of health information than traditional methods. It offers more visibility, accessibility, and scope for more customised communication opportunities [11, 14].

VII. CONCLUSION

This study analyses the potential of WhatsApp as a primary source of health and risk information during COVID-19 PHE and its significant impact on users' risk knowledge and risk perception. Health communicators and policymakers must explore these communication opportunities of WhatsApp for future PHE communication. With the popularity and reach of WhatsApp in India and the scope of impact on users' knowledge, health communication interventions must

integrate WhatsApp among the primary information sources. The findings of this study are limited to WhatsApp users' experience during the COVID-19 outbreak and lockdown period in May-August 2021 in Tamil Nadu only. Most of the respondents are WhatsApp contacts of researchers and their primary contacts. WhatsApp as a source of misinformation and infodemics also must be studied to fully evaluate its potential as a primary information source of health and risk information.

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