

Media coverage of COVID-19 health information in India: a content analysis

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Summary

Effective response to the COVID-19 pandemic is dependent on individual understanding of the disease and compliance to prevention measures. Early media depiction of health information about COVID-19 may influence public perceptions and behaviour. Media should ensure coverage is relevant, timely and actionable to encourage individuals to respond appropriately. India has been particularly affected by a large COVID-19 caseload. We analysed online reporting in India to assess how well the media represented health information about COVID-19 as per the World Health Organization's Strategic Risk Communications guidelines. This included media coverage of symptoms, transmission and prevention. We found that limited articles (18.8%) provided actionable suggestions to readers, including urging people to stay at home and social distance. Most articles were relevant as per WHO COVID-19 updates, accurately covering symptoms, risk factors for severe symptoms, transmission and prevention. However, 40% of media coverage of treatments options provided misleading information, such as suggesting plasma therapy or chloroquine, were effective. In addition, only 1.9% of articles included discussion of equity issues, where many prevention activities such as distancing are less applicable in lower-income households. Sixty-seven per cent of articles quoting sources of information quoted credible sources such as public health agencies and researchers. Media coverage also did not appear to reflect WHO updates in a timely manner, with most of the coverage preceding these updates. The findings show that Indian media should focus on actionable and relevant reporting that provides guidance for individual response. Media should also endeavour to report on evidence-based prevention and treatment options to avert the spread of misinformation.

Lay Summary

The way media represents health information about COVID-19 may influence public understanding of the virus and behaviours they take to contain its spread. Therefore, media coverage should be accurate, timely and provide specific actions. India has been particularly affected by COVID-19. Based on the World Health Organization's Strategic Risk Communications guidelines, we analysed online reporting in India to assess how well the media represented COVID-19 health information. This included media coverage of symptoms, transmission and prevention. We found that very few articles provided direct suggestions to readers on prevention behaviours, such as staying at home. Most

articles accurately covered symptoms, risk factors for severe symptoms, transmission and prevention. However, there was limited coverage of equity issues that affect low-income households, such as their ability to social distance or hand wash. In addition, treatment options not known to be effective received high coverage, such as plasma therapy. Only some articles included credible sources of information such as quoting public health agencies and researchers. Media coverage also usually preceded official updates from WHO, rather than waiting and responding to validated information. The Media should report on evidence-based prevention and treatment options to avert the spread of misinformation and encourage appropriate behaviours.

Key words: communication, COVID-19, health behaviour, health information, media

INTRODUCTION

India, with an estimated 1.3 billion population, is facing a rampant surge of cases and casualties due to COVID-19. It is the second-worst affected country as of October 2020 (World Health Organization, 2020). India's response to the pandemic is further challenged by social inequities, fragmented health governance and its resource-constrained health system (Chetterje, 2020). In absence of a vaccine and with evolving understating of clinical management, disease containment is highly dependent on community behaviour (Trivedi, 2020).

Effective public risk communication is an essential component of managing disease outbreaks. Such communication should be timely, accurate, understandable, based on credible sources, and should include actionable suggestions for individuals (World Health Organization, 2008). In particular, communication at the beginning of a pandemic shapes individual habits for the long-term duration of the emergency (Xiao *et al.*, 2015; Lep *et al.*, 2020). Behavioural and social interventions mitigate the effects of outbreaks, because many interventions rely heavily on community engagement, participation and intersectoral coordination. It is documented that audience dependency on mass media increases during the periods of rapid social changes and crises, especially for information on protective behaviours and treatments (Ball-Rokeach and DeFleur, 1976). For example, an analysis from the H1N1 epidemic in 2009 concluded that the information presented in mass media influenced social distancing and vaccine uptake behaviour (Collinson *et al.*, 2015).

In India, the first case of COVID-19 was reported on 31 January 2020, 5 weeks before the World Health Organization declared COVID-19 a pandemic on 11 March 2020. An acute surge in the number of cases was observed in mid-March, after which a nationwide lockdown was implemented. Near-total restrictions meant a fall in print media circulation, and digital mass media dominated communication (Dutta, 2020). Thirty-four

per cent of the population is regularly accessing the Internet, which likely increased during COVID-19 lockdowns (World Bank, 2019). Hence, the presentation of health information relating to COVID-19 in online media helped in the spread of information (and misinformation) and potentially influenced behaviour. Previous research has shown that repeated messaging in the media can shift population perceptions and ensure greater compliance to protective measures (Agha, 2010; Wakefield *et al.*, 2011a).

Thus, we hypothesize that coverage of COVID-19 disease information by online leading national newspapers is likely to be influencing individual knowledge and behavioural responses to COVID-19. We systematically analysed news and stories published online in leading English-language newspapers during the early phases of the pandemic from March to April 2020 as this is a critical time for forming appropriate individual perceptions and knowledge to respond to a pandemic. The objective of this analysis was to identify how COVID-19-related health information was disseminated by mass media against the World Health Organization's (WHO) Strategic Risk Communications guidelines (World Health Organization, 2017). We analysed the media coverage on the mode of spread of COVID-19, prevention and treatments. We also identified patterns of misinformation to assess accuracy in reporting. Lastly, we analysed whether the information considered equity, as individuals of different income levels have different capabilities to engage in prevention activities such as hand washing and social distancing (Shadmi *et al.*, 2020).

METHODS

Search strategy

The websites of the top five Indian national English newspapers were systematically searched. These newspapers were: *The Times of India*, *The Hindu*, *The Hindustan Times*, *The Indian Express* and *The Tribune*,

as identified by highest website visitation. In all websites, either the archive of the dedicated ‘Coronavirus’ or ‘COVID-19’ sections were screened, or if this section was not present, website searches of two terms ‘coronavirus’ and ‘COVID-19’ were conducted. To capture media narrative during the early phase of the pandemic, we restricted searches to articles published between 11 March and 30 April, the immediate period after WHO declared COVID-19 a pandemic. Articles found in the initial search were screened by title. All articles including reports or editorials in the English language were included.

All articles that discussed health information related to COVID-19 and may influence knowledge and behaviour at an individual level were included for further content analysis. We included articles that (i) described COVID-19 symptoms and transmission, (ii) identified risk factors for severe symptoms, (iii) discussed prevention strategies such as wearing masks or social distancing and (iv) discussed possible cures or treatments. Articles were excluded if they only discussed state-level actions, such as lockdowns, without relating these to individual-level actions and implications, or if they did not cover the Indian context.

Framework

The WHO Strategic Communications Framework evaluates reporting based on six key components of effective coverage. We analysed only five components: actionable, credible, understandable, relevant and timely. The sixth component, accessibility, assessed the types of media channels and data sources used by the media. As this study was restricted to English-language online/digital media only, this component was not relevant.

These components and their indicators measured are summarized in [Table 1](#).

The articles were analysed as per the indicators in [Table 1](#) and judgement of the effectiveness of communications in Indian media.

For the Timely and Relevant components of the framework, a timeline of WHO communications based on their updates was developed that detailed when new information on COVID-19 transmission, risks, prevention and response. Article content data were mapped against this timeline to see if Indian media reporting adapted to new information, and whether the content was accurate.

Analysis

All articles were downloaded from the websites and uploaded and analysed with NVivo 12 software ([QSR International Pty Ltd, 2018](#)). Articles were divided between four coders and content was coded against main topics covered as well as the use of complicated jargon, credible sources and provision of actionable suggestions. All coders shared any new codes generated and discussed discrepancies to ensure concurrence on daily basis.

Frequencies were calculated for the number of articles coded against each of the five WHO framework components, and also for sub-codes under these. Pearson chi-squared tests were used to assess differences between proportions using SPSS version 25 ([IBM Corp, 2017](#)). Specifically, comparisons were drawn to determine which COVID-19 preventative measures were more commonly identified in articles, whether credible or non-credible sources were quoted more, to identify which high-risk groups were featured more than others, and which transmission modes of COVID-19 were identified more.

Table 1: WHO Strategic Communications Framework analysis ([World Health Organization, 2017](#))

Framework component	Definition	Indicator
Actionable	Provides behaviour-based guidelines to target audience	% of articles that had actionable suggestions (for individuals)
Credible	Quotes sources with technical/expert knowledge	% of articles using credible sources
Relevant	Covers content relating to WHO updates and recommendations	% of articles reporting according to WHO recommendations
Timely	Content immediately follows WHO update publication	% of articles reporting key updates 1–2 days after release of WHO updates
Understandable	Use of simple language understandable by the lay population	% use of complicated language

RESULTS

The title search found 3507 articles, which were downloaded for full-text review. From these, 1085 were excluded during the full-text review. In total, 1008 were excluded as they did not cover included topics, such as exclusively reporting on state-level responses to COVID-19, not discussing COVID-related health issues, and not covering individual-level responses. Forty-four were excluded as they covered another country's experience exclusively, and the remaining 33 were non-text articles, duplicates or from outside the date range. About 2422 articles were included in the final analysis. [Supplementary File S1](#) provides illustrative quotations from media articles for main findings.

Article characteristics

Of 2422 articles included, 222 (9.2%) were from the *Times of India*, 786 (32.5%) were from *The Hindu*, 659 (27.2%) were from the *Hindustan Times*, 568 (23.5%) were from *The Indian Express* and 187 (7.7%) were from *The Tribune*.

One thousand and twenty-four (42.3%) articles were written by unspecified journalists. One hundred and forty-four (5.9%) were written by news agencies. The remaining 1254 (51.8%) of articles were written by 591 different journalists.

Actionable

Four hundred and fifty-six (18.8%) of all articles provided explicit actionable suggestions for individuals. [Table 2](#) list out the most common actions stated in articles ([Supplementary File S1](#), Refs. 1–3).

Other individual actions that were covered in <5% of articles included urging people to download the Arogya Sethu app (the Indian government's contact tracing and information app), to use hand sanitizer, to donate to vulnerable families, to avoid touching their faces, to avoid physical contact, to stop spitting, to clean

home and object surfaces regularly touched by individuals, and urging foreigners to self-register their travels.

Credible

Six hundred and ninety-four (28.7%) of the total articles explicitly quoted identified sources of information. There were differences in frequency in which sources were used ($p < 0.001$).

From these articles, the most common source was individual experience ($n = 127$, 18.3%). Of these, 75 (59.1%) were individuals quoting their experience of self-isolation, 29 (22.8%) were people's experiences with COVID-19 and 24 (18.9%) quoted people who refused to or were unable to follow preventive practices such as wearing masks and social distancing ([Supplementary File S1](#), Refs. 4 and 5).

The next most commonly quoted sources were public health agencies including WHO, ICMR and others ($n = 225$, 32.4%); researchers or research studies (115, 16.6%); Indian Ministers including the Prime Minister and state Chief Ministers (110, 15.9%); clinical doctors or psychologists (94, 13.5%); celebrities (57, 8.2%); police (57, 8.2%) and the Ministry of Health (50, 7.2%) ([Supplementary File S1](#), Refs. 6 and 7).

Less than 5% of articles quoted other sources including other health workers or experts, religious leaders, experts outside the health sector, Indian civil society organizations, the national Ministry of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH) and the United Nations.

According to the WHO Strategic Communications Framework, credible sources are those with technical expertise in the public health issue. Overall, marginally fewer articles ($n = 464$, 66.9%, $p = 0.02$) used credible sources such as public health agencies, doctors and the Ministry of Health compared to non-credible sources such as individuals, the police and celebrities ($n = 541$, 78.0%).

Table 2: Actionable statements in articles

Statement	Number of articles (%), (N = 456)
Urging people to stay at home	150 (32.9%)
Urging people to maintain social distance when they left the home	145 (31.8%)
Urging people not to share fake information about COVID-19 without validating, and only use credible sources of information	60 (13.2%)
Urging people to wash hands with soap and water	60 (9.4%)
Urging people to wear a mask	43 (9.4%)
Urging people to get tested under different circumstances, e.g. if they have symptoms, have travelled to a hotspot or have been in close contact with a confirmed case	27 (5.9%)

Understandable

Only 86 (3.6%) of the total articles used complicated language or jargon. These included the use of medical language ($n=50$, 58.1%), scientific terms ($n=30$, 34.7%) and legal terms ($n=8$, 9.3%). For example, some articles used complex medical terms such as ‘immunoglobulins’ and scientific testing terms such as ‘sensitivity’ and ‘specificity’ without defining them (Supplementary File S1, Ref. 8).

Relevant

The following describes the relevance of media coverage against WHO’s updates on COVID-19.

It depicts how the media covered evolving scientific understanding related to the symptoms, transmission, preventive measures, risk factors and treatments/cures of COVID-19.

Symptoms of COVID-19

WHO stated that common symptoms of COVID-19 were fever, cough, shortness of breath, other cold-like symptoms and loss of taste or smell.

Fifty-two articles in total described symptoms of COVID-19, all of which discussed at least one WHO-verified symptom such as fever or cough (Supplementary File S1, Ref. 9). Other discussed symptoms were headache ($n=5$, 9.6%), shivering ($n=1$, 1.9%), body pain ($n=3$, 5.8%), rashes on toes ($n=1$, 1.9%) and diarrhoea ($n=1$, 1.9%). Severe symptoms such as pneumonia and kidney failure were discussed in 9 (17.3%) articles.

WHO also stated that it is possible for infected people with very mild symptoms to pass on the virus. Seventy-four articles identified that patients with few or no symptoms were testing positive. Thirty-four of these articles (45.9%) stated that transmission is likely from patients with few symptoms, as compared to significantly fewer ($n=1$, 0.2%) stating that transmission is unlikely (Supplementary File S1, Ref. 10).

WHO also debunked the ‘two strains of virus’ study proposing one strain of COVID-19 being more aggressive than the other. Only nine articles (2.1%) discussed the possibility of the presence of different strains in India, and no articles specifically discussed the study as the source.

Lastly, WHO provided information on COVID-19’s incubation period and average recovery period. Only 9 (2.1%) articles talked about the incubation period between exposure and onset of symptoms. All articles noted incubation period of up to 14 days. No articles

talked about the specific duration of symptoms or illness (Supplementary File S1, Ref. 11).

Transmission of COVID-19

WHO stated that human coronaviruses are usually spread by droplets (coughing) and close unprotected contact with an infected person (touching, shaking hands). They also stated that people can catch COVID-19 by touching surfaces upon which droplets land and then touching their face. WHO also explicitly stated that transmission does not occur through faeces.

A significantly higher proportion of articles covered the modes of transmission verified by WHO as compared to other unverified modes ($p < 0.001$). A total of 267 articles identified modes of transmission, including 91 (34.1%) identifying droplets, 76 articles (28.5%) identifying close contact with an infected person and 56 articles (21.0%) identifying contact with surfaces on which droplets land. Twenty-one articles (7.9%) discussed the duration that the virus is live on surfaces, quoting a similar range as stated by WHO. Transmission from faeces was covered in a limited number of articles ($n=8$, 3.0%) and 2 of these (25.0%) articles suggested transmission may be possible (Supplementary File S1, Refs. 12 and 13).

Other modes of transmission debated in the 267 articles which were not directly discussed by WHO included transmission from dead COVID-19 victims ($n=21$, 7.9%) and transmission from mother to child (12, 4.5%), with most articles stating transmission was not possible. The transmission of COVID-19 from food was also covered by 23 (8.6%) articles, of which 11 (47.8%) stated that transmission was unlikely via the consumption of food. The transmission from animals such as bats was also identified by the media ($n=14$, 5.2%) with most articles ($n=12$, 85.7%) stating that transmission was not possible (Supplementary File S1, Ref. 14).

Articles also discussed immunity from re-infection ($n=20$), of which 13 (65%) stated that immunity was short lived, 8 (40%) stated immunity is unknown, and 2 (10%) stating we were immune after contracting COVID-19 (Supplementary File S1, Ref. 15). Thirty articles discussed where or how to get testing. Seventeen articles (3.9%) discussed transmission during the summer, with 9 (52.9%) stating transmission continues in summer and hot climates, 6 (35.3%) saying the effect of weather is unclear and 4 (23.5%) suggesting spread is seasonal (Supplementary File S1, Ref. 16).

Table 3: Coverage of prevention activities

WHO-identified prevention activity	Number (%) of articles (N = 1065)
Clean hands regularly with alcohol-based hand rub or soap and water	76 (7.1%) discussed the use of hand sanitizer 119 (11.2%) discussed washing hands with water and soap. Washing hands was discussed significantly more than using hand sanitizer ($p = 0.002$)
Cover mouth and nose with a medical mask, tissue or flexed elbow when coughing or sneezing. Wash hands afterwards and discard mask or tissue	220 (20.7%) discussed mask wearing. Of these, 36 (16.3%) gave instructions on how to use the mask, washing hands prior to touching mask and discarding mask safely. 21 (2.0%) discussed respiratory etiquette such as covering mouth and nose while coughing.
Maintain 1 to 2 m distance between yourself and other people, and avoid unprotected close contact with people with symptoms	735 (69.0%) discussed social distancing. Of these, 118 (16.1%) urged individuals to stay at home, and 134 (18.2%) specifically urged people to maintain safe distance while going outside of home. 41 (5.6%) provided specific details on distances. This was always 1 or 2 m.
Stay at home if you feel unwell and maintain distance of over 1 m from others in your home.	24 articles (3.7%) discussed home isolation if unwell. From these, 18 (75%) discussed keeping distance from family members, but only 8 (33.3%) specified the recommended 1 m distance. 8 (33.3%) identified the need for separate rooms, 3 (12.5%) identified the need to wear a face cover, and 5 (20.8%) identified the requirement of having separate linen and utensils.
Clean possibly infected surfaces with disinfectant	60 (5.6%) discussed disinfecting and cleaning surfaces. 30 (50%) of these specified the use of disinfectant.
Seek medical care if you have symptoms	36 (3.4%) of articles provided guidance on when to get tested, such as if developing symptoms or if came in close contact with a confirmed patient
Avoid touching eyes, nose and mouth	13 (1.2%) specifically told individuals to not touch their face
Take care of your health through a balanced diet and sleep	28 (2.6%) discussed a healthy lifestyle including diet and exercise
Guideline of Business and Workplace management	23 (2.2%) discussed workplace management. Of these 23 articles, 6 (26.1%) identified the provision of face masks and sanitizers, 11 (47.8%) identified temperature screening, 8 (34.8%) identified working from home and 2 (8.7%) identified social distancing in the workplace.
Avoid spitting	19 (1.8%) discussed avoiding spitting
Eat only well-cooked food	5 (0.5%) stated that the virus was killed by cooking temperatures
Avoid contact with sick animals	0 (0.0%) stated individuals should avoid contact with sick animals
Other non-WHO recommended prevention activities	34 (3.2%)

Prevention activities

Table 3 outlines the prevention activities suggested by WHO, and the number of articles covering each one of them. A total of 1065 articles discussed prevention activities.

Social distancing had significant coverage and was the most commonly reported prevention activity compared to all others ($p < 0.001$). Mask wearing was covered significantly more than using hand sanitizers and washing hands ($p < 0.001$) (Supplementary File S1, Ref.

17). There was low coverage of when to get tested, the disinfection of contaminated surfaces, avoid touching the face, and not spitting in public (Supplementary File S1, Ref. 18). Workplace management had minimal coverage, and most of the WHO-specified strategies for this were not addressed.

The main non-WHO recommended prevention activity discussed was downloading the coronavirus contact tracing apps, such as the Indian Government's Aarogya

Setu app, which was mentioned in 34 (3.2%) of articles about prevention.

Risk factors for severe COVID-19 illness

WHO stated that older people and people with pre-existing medical conditions (such as, diabetes and heart disease) were more vulnerable to severe disease.

Of the total articles, 254 (9.4%) discussed high-risk groups for COVID-19. Of these, 96 (37.8%) identified the elderly and 105 (41.3%) identified those with pre-existing medical conditions as higher risk groups. These two groups were identified more commonly than any other group ($p < 0.001$) (Supplementary File S1, Ref. 19).

Other groups identified included overseas travellers ($n = 51$, 20.1%), children under the age of 5 ($n = 5$, 30, 11.8%), those in service professions such as teachers ($n = 24$, 9.4%), pregnant women ($n = 19$, 7.5%), those who smoke ($n = 17$, 6.7%), men ($n = 11$, 4.3%) and those exposed to greater levels of air pollution ($n = 8$, 3.1%).

COVID-19 treatments and cures

Three hundred and fourteen articles discussed COVID-19 treatments. WHO stated that chloroquine had been shown to inhibit the growth of COVID-19 virus in laboratory studies, but there is no evidence yet of effectiveness in humans. Seventy-five (23.9%) of these 324 articles discussed chloroquine. Of articles discussing chloroquine, only 35 (46.7%) identified that its effectiveness was unknown. However, 50 (66.7%) suggested that it may be effective, including 28 (37.3%) articles suggesting it could be taken as a preventive (prophylaxis) by high-risk individuals such as health workers. Nineteen (25.3%) articles discussed the side effects of its use, and only 9 (12.0%) explicitly stated that its use was not recommended (Supplementary File S1, Refs. 20 and 21).

WHO also stated that they were not aware of scientific reports of any additional negative effects of ibuprofen in the treatment of COVID-19. Of all the articles discussing COVID-19 treatments, only 5 (1.6%) discussed ibuprofen. All raised some concerns that ibuprofen may cause negative effects, but 2 (40%) also said there was not enough evidence yet.

WHO also provided detailed instructions to carers of COVID-19 patients. However, only 2 (0.6%) articles specifically focussed on instructions to carers of COVID-19 patients.

Lastly, WHO stated that it did not recommend the Bacille Calmette-Guérin (BCG) vaccine for the

prevention of COVID-19. Only 12 articles discussed the BCG vaccine, of which 6 (50%) suggested it may be protective, and 6 (50%) said more evidence was required or it was under trial.

Beyond those discussed by WHO, 314 articles covered a range of other treatments and cures. Plasma therapy was discussed in 64 (20.4%) of these. From articles discussing plasma therapy, 43 (67.2%) suggested the treatment was likely to be effective, 40 (62.5%) noted that it had not been proven to be effective, and 11 (17.2%) stated that the treatment was not recommended (Supplementary File S1, Refs. 22 and 23).

Forty-seven articles (15.0%) discussed vaccines, with 31 (66.0%) stating that vaccines were currently under trial, and 24 (51.1%) noting that development will take time (Supplementary File S1, Ref. 24). Twenty-four articles (7.6%) discussed Ayurveda and use of spices, with 16 of these (66.7%) suggesting that Ayurveda was preventative as an immunity booster. Further, 14 (4.5%) articles identified yoga as an immunity booster (Supplementary File S1, Ref. 25).

Other treatments covered by <5% of news articles (from 314 discussing treatments and cures) included: Remdesivir, extreme temperature, antibiotics, tea, alcohol, vitamin C, bleach and isopropyl, cow urine, paracetamol, keeping the throat moist, gargling, ivermectin, use of hot water, sepsivac, use of loud sound, gargles, lopinavir and ritonavir, arthritis medication, steam inhalation, heprin or anticoagulants, mycobacterium, nicotine substitutes, immunomodulators, siddha medicines and favipiravir.

Twenty-one articles (6.7%) explicitly stated that no cure exists.

Equity considerations

A few articles noted differences across groups in their responses to COVID-19. Of 76 articles discussing hand sanitizers, 2 (2.6%) discussed its unaffordability for some groups of the population. Of 119 articles that discussed hand washing, 12 (10.1%) identified that many do not have access to running water and soap for hand-washing. Of 735 articles discussing social distancing and self-isolating, 33 (4.5%) discussed that many people in low-income groups or living in slums or with shared bathrooms cannot social distance (Supplementary File S1, Ref. 26).

Timely

There was limited evidence that media coverage responded to WHO updates.

Often, media coverage preceded WHO statements. For example, WHO identified the loss of taste or smell as a COVID-19 symptom on 27 March 2020. Nine articles noted that the loss of taste or smell was a new symptom, but 7 of them (77.8%) were published before 27 March ([Supplementary File S1](#), Ref. 27).

In a few instances, media coverage appeared to reflect WHO statements. For example, all articles that discussed the BCG vaccine were published before 23 April, the date WHO confirmed that they do not recommend it as a preventative. No articles about its possible effectiveness were published after announcement by WHO on this date.

DISCUSSION

In this paper, we have analysed the contents of Indian news stories on the COVID-19 pandemic and assessed them as per WHO's Strategic Communications Framework. Such analysis is an important step towards understanding the patterns of mass media communication during an ongoing pandemic. Mass media is often the main source of information and knowledge for masses during a crisis, with influence over attitudes and preventative practice ([Wakefield *et al.*, 2011b](#); [Collinson *et al.*, 2015](#)).

The online news of five leading English-language newspapers produced significant coverage on COVID-19. These were published by a wide range of journalists. Due to state-supported lockdown and fear of spreading the virus through printed newspaper, the use of online news platform increased during the pandemic, suggesting a more significant role in providing crisis-related information ([Dutta, 2020](#)). A mathematical modelling study in China found that increased online media reporting on COVID-19 assisted in mitigating spread during the early stages of the pandemic ([Zhou *et al.*, 2020](#)). Thus, the analysis of article content in leading online media is a crucial step to understanding the risk communication to the masses.

Firstly, we found that only a small proportion of newspaper articles carried stories with actionable statements. This coverage was reflective of wider global trends, where the framing of COVID-19 communications has generally lacked self-efficiency ([Ogbodo *et al.*, 2020](#)). However, where actionable statements were given, these were reflective of the main action points from WHO.

Some critical WHO updates were ignored in the media and could potentially have been influenced by the flow of information from other local credible authorities and contextual circumstances. Firstly, there was low

coverage on when individuals should get tested and where this could be accessed. Such information is critical to ensure cases are identified in a timely manner to reduce spread ([Brotherhood *et al.*, 2020](#)). Secondly, articles with action points contained limited, such as specific instructions on how to care for COVID-19 patients at home, or how much distance was required for effective social distancing. Including information on how the public can follow prevention and treatment activities is critical to ensure they are conducted with maximum effectiveness ([Vaughan and Tinker, 2009](#)).

We found that most of the newspaper articles were understandable and used a mix of credible and non-credible sources as defined by WHO framework. Individual experience was the leading source used, although this is not considered a credible source by WHO. The next most common source was public health agencies, which was an encouraging result as it reflected that the media was seeking information from reputable sources.

The definition of credible and non-credible sources may be different for the general public as compared to WHO's definition. For example in Pakistan, individual experience was cited as a trustworthy source of information on COVID-19 by the general population ([Ejaz and Ittefaq, 2020](#)), and previous research has shown that sharing personal stories can change perceptions around social norms relating to the prevention of disease ([Lee and Su, 2020](#)). The use of personal stories has been shown in health promotion literature to be an effective method of altering perceptions and increasing attention to issues ([De Wit *et al.*, 2008](#); [Corcoran, 2013](#)). The inclusion of individual experiences in Indian media may support building behavioural norms around COVID-19 prevention.

Information presented in the media showed variable relevance as compared with WHO updates. Media coverage of the transmission of COVID-19 was reflective of the transmission modes WHO identified, with greater coverage of droplets, close physical contact and touching surfaces. However, transmission from faeces was covered despite WHO providing guidance that it was not likely to be a transmitter. The inability of transmission from faeces may warrant more coverage from the media, given the prevalence of open defecation in India and possible resulting rumours and fears ([Coffey *et al.*, 2016](#)).

Coverage of preventative measures was partially reflective of WHO guidelines, with focus on social distancing, washing and sanitising hands and wearing masks. However, there was limited coverage on some measures detailed by WHO such as spitting, eating well-

cooked food, avoiding sick animals, cleaning surfaces and what individuals should do if they had symptoms. These are important topics that require coverage. In particular, spitting should be addressed given its prevalence in India (Grace *et al.*, 2016). The focus of media should be more on context-relevant prevention strategies backed by information from credible sources.

Media articles addressed relevant risk factors, identifying the elderly and those with pre-existing medical conditions as at risk of severe illness. However, a range of other groups were also identified to some extent, such as men, pregnant women and children. While there is evidence that men are more susceptible to severe disease (Bwire, 2020), there is limited evidence that pregnant women or children are more at risk (Cruz and Zeichner, 2020; Qiao, 2020). Over-stating the risk in these groups may create unnecessary panic and have mental health consequences for parents and children (Khan *et al.*, 2020; Kumar and Nayar, 2020).

There was significant coverage suggesting chloroquine was an effective prophylaxis, despite WHO's advice not to take it. Emerging evidence suggests that this drug is not effective (Boulware *et al.*, 2020). Its overuse by the population may lead to people being exposed to its rare but possibly fatal side effects (Ferner and Aronson, 2020; Ma *et al.*, 2020). In addition, increased demand may reduce the supply of the drug for those who use it for life-saving treatment, such as for lupus (Pandey, 2020a). The Indian media should report the lack of evidence on chloroquine and discourage its use.

There was also significant coverage of plasma therapy, which was not verified by WHO, but was often suggested to be effective in the media articles. Plasma therapy should not be administered widely until its efficacy and safety have been established (Duan *et al.*, 2020). However, despite this, demand for this therapy has increased in India from patients (Pandey, 2020b), with the high level of positive media coverage possibly contributing to the public's awareness of this treatment option. The media narrative on treatment options are shaped by the statements and guidelines released by various agencies (Mehra, 2020), and the focus on plasma therapy in the media may be due to endorsements of the treatment by the Indian Ministry of Health and influential leaders, who until 28 April 2020 had voiced support for the treatment (Perappadan, 2020). WHO should consider directly addressing some of these popularly discussed treatments in their communications to dissuade people using them unsafely.

A wide variety of other preventative 'immunity boosters' were discussed in the media to a limited extent such as Ayurvedic medicine and yoga. The evidence on the

efficacy of most of these treatments is not conclusive (Snawerdt *et al.*, 2020). Endorsing these may give a false sense of security, preventing people from practicing evidence-based prevention measures, especially as many of these like wearing masks and staying at home are more difficult to implement (Sugavanam and Natarajan, 2020). These 'immunity boosting' treatments have been actively advocated by the Indian government, including from the Prime Minister and the Ministry of AYUSH (which promotes the application of traditional Indian medicine). As with plasma therapy, the media may be reflecting advice from these government agencies. The media has a role in holding authorities to account using expert advice, but this does not seem to be occurring to a great extent (Besley and Prat, 2006).

Overall, there was limited evidence that media coverage was reflecting WHO status updates, with news often preceding these. Although in order to increase accuracy the media could wait for validation from WHO, the fact that media coverage often preceded WHO announcements suggested that WHO may be lagging in their responsiveness themselves. For example, there was media coverage that men were more susceptible to severe COVID-19 symptoms weeks before WHO themselves confirmed this (Bwire, 2020). The media may be responding in a timely manner to people's concerns and questions. WHO may consider being more timely themselves to ensure accurate information is provided as early as possible in this crisis situation.

Lastly, very few articles discussed equity considerations of preventative activities. Many of the prevention activities are not feasible to implement given the living conditions of most Indians. For example, as 82% of rural households and 60% of urban households do not have running water, washing hands with soap regularly is not a feasible prevention option (NITI Aayog, 2019). In addition, although social distancing is well-covered in the media, there is variable relevance of this strategy in the Indian context. Social distancing is also not feasible in many crowded urban areas, especially in slum and low-income neighbourhoods (Wasdani and Prasad, 2020). During previous crises in India, greater coverage has been found to be associated with greater government response to mitigate the crisis and support the population (Besley and Burgess, 2000). Therefore, media should increase their coverage of these issues to ensure visibility.

Limitations

This analysis only considered online articles written in English due to constraints on resources and the ability to

collect hard-copy newspaper material under COVID-19 restrictions. In the latest Indian Readership Survey in 2017, it was found that about 39% of Indians read newspapers, 7.8% read newspapers online and 2.2% read from online English newspaper sources. Hence, English-language media is not the most widely read and these findings may not be generalizable to media coverage in other languages (Print Week, 2018). However, *The Tribune* and the *Times of India* have Hindi-language sister publications, and some similar coverage of these issues may occur. These newspapers also have print versions that cover similar material. Nevertheless, the five media portal covered in this analysis are leading sources of online and print media in English language and have very high influence on opinion makers, and to policymakers to some extent. In addition, we did not include social media-only coverage, which may have wider reach than traditional online media on perceptions and knowledge of individual. However, sharing information of many of the articles was present, and showed that articles were shared through social media channels. Much of this information forms part of social media news feeds.

CONCLUSION

This analysis of online English-language media coverage in India provided insights into the coverage and framing of COVID-19 information for the population. We found that the information provided by the Indian media was partially accurate as per WHO updates with the coverage of prevention activities. However, media coverage may have been more effective in assisting pandemic response with reporting of actionable recommendations by credible sources. In addition, inaccurate coverage of the possible preventative or treatment effectiveness of products such as plasma therapy and chloroquine is detrimental. Coverage should also focus more on issues of equity and inability of many population groups to engage in preventative activities to influence policy response. These findings also raise concerns regarding the swiftness of information dissemination by WHO, especially regarding treatment options. Such analyses are essential to understanding the messages populations are being exposed to and identify ways to improve coverage to be more accurate, reliable and useful to pandemic management.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Health Promotion International* online.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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