

Access this article online

Quick Response Code:



Website:
www.jehp.net

DOI:
10.4103/jehp.jehp_1603_20

An altmetric analysis of online news on India's first indigenous COVID-19 vaccine

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Received: 09-12-2020
Accepted: 05-03-2021
Published: 30-09-2021

Abstract:

BACKGROUND: Covaxin is the first indigenous vaccine developed in India against COVID-19. The purpose of this study was to analyze the news stories on Covaxin published in the online media between two statements issued by Indian Council for Medical Research on 2nd and 4th July for their content, quality of information, and reporting standards.

MATERIALS AND METHODS: A systematic search was performed on Google to identify the news stories related to Covaxin in the English language published between these two statements. The selected news stories were subjected to content analysis and reviewed using the screening points developed through a consultation by two independent experts using ten prevalidated criteria for health news review. The data were analyzed in MS Excel and StataMP14.

RESULTS: The final analysis included 24 news stories. The mean and median score of the news stories is 10.71 and 12 (out of 20), respectively, with a score ranging from 2 to 17. The stories did not promote disease or vaccine mongering (100%), adequately mentioned the true novelty of the vaccine (95.8%), and source of the information (83.3%). However, they mostly failed to mention the information on costs, research data related to benefits, and harms and quality of the available evidence.

CONCLUSION: There is a lack of reporting of detailed analysis about the methodology of development of the vaccine and limitations in its research design by health journalists. It is important to train journalists on proper reporting of health news to improve its quality in Indian media.

Keywords:

Covaxin, Covid-19, health news review, news analysis

Introduction

The world is facing a global pandemic of Covid-19. More than 50 million cases are diagnosed with the infection along with 1.2 million deaths worldwide as reported by the WHO on November 10, 2020.^[1] This pandemic has brought the entire world to a standstill leading to collapse of global economy.^[2] The countries are desperately looking up for a cure and vaccine to contain the spread of this disease and re-start their economies. The

WHO solidarity trial concluded that the use of hydroxychloroquine and lopinavir/ritonavir drugs have no benefit in the treatment of Covid-19 patients.^[3] The drugs such as remdesivir and favipiravir have been authorized for the emergency use only.^[4] As per the WHO draft landscape for COVID-19 vaccines, 47 candidate vaccines are in different stages of clinical evaluation and 155 candidate vaccines in preclinical evaluation globally.^[5]

India is known as the "pharmacy of the world" due to its immense potential to manufacture and supply pharmaceutical

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How to cite this article: Royal A, Ahmad S, Qureshi A, Chaudhary V, Jindal T, Kumar V, *et al.* An altmetric analysis of online news on India's first indigenous COVID-19 vaccine. *J Edu Health Promot* 2021;10:348.

drugs, vaccines, and biologicals across the globe at affordable prices.^[6] The world is eyeing toward India for the manufacture and supply of Covid-19 drugs and vaccines once they are developed. India also started clinical trials of two indigenous vaccines: (1) Covaxin: An inactivated vaccine developed by Bharat Biotech Company, in association with the Indian Council for Medical Research (ICMR) and the National Institute of Virology and; (2) ZyCoV-D: A DNA plasmid vaccine developed by Zydus Cadila group.

This pandemic is also accompanied with a severe "infodemic" which can be defined as an overabundance of both accurate and inaccurate information during an epidemic. The circulated false information can be disinformation (false information formulated with wrong intentions) and misinformation (false information spread with or without wrong intentions).^[7] This has resulted in problems to find reliable sources and guidance for the people and has seriously compromised the fight against the pandemic.^[8,9] Bruno Kessler Foundation conducted an analysis of COVID-related 112 million messages in 64 languages and reported that 40% of these messages were contributed from unreliable sources.^[7] According to an ongoing Global Tweet Statistics conducted by COVID-19 Infodemic Observatory, 42.3% tweets associated with pandemic are created by bots and 29.2% are still from unreliable sources on September 29, 2020.^[10]

Every news whether on social media or on print media plays a vital role in providing information and creating awareness about the current scenario. People act and respond to the surroundings as per their perceptions. This perception in the current world is significantly influenced by the social and print media. However, various journalists and media houses have adopted the mal-practice of news mongering to sensationalize their news for increasing their target rating point and personal benefits.^[11]

Covaxin is the first indigenous vaccine developed by India against Covid-19. The vaccine received approval for phase 1 and 2 human clinical trials from the Drug Controller General of India, and the trials have commenced across various institutes in India in July 2020.^[12] On July 2, 2020, ICMR issued a letter stating that "Covaxin should be deal with highest priority and they are envisaged to launch vaccine by 15 August 2020 for public health use after completion of all clinical trials and to complete the enrolment all subject by July 7, 2020." However, on July 4, ICMR issued a clarification on the previous notice as there was hue and cry among public health professionals, vaccine experts and scientists due to unrealistic timeline, and date of release of vaccine with chances of compromising the development of the vaccine due to gross negligence to follow clinical as well as ethical

norms of a human clinical trial.^[13] Lots of information regarding this vaccine have also been published on various media platforms and e-newspapers. As the volume and velocity of spread of false information is extraordinarily high in this pandemic, the responsibility of preventing it falls on the mainstream media.

The purpose of this study was to analyze the news stories on Covaxin published on the online media between these two notices for their content, quality of information, and reporting standards.

Materials and Methods

Study Design and setting

This study is an altmetric content analysis of health news published on online media in India related to early launch of COVID vaccine and their quality assessment.

Study participates and sampling

The news for the analysis were selected through a systematic search strategy. We searched the term "COVAXIN" on Google and applied the filter for "news." Further the filters "Sorted by relevance" and "All news" were applied. We also set "Language Filter" for the search and chose 'English'. After that, we applied the "Date Filter" from the tool option and set the date from July 2 to July 4, 2020 as per the statements published by ICMR regarding Covaxin. For further screening, the title and abstracts of the selected news were checked for date of publication (2–4 July), title (including Covaxin and related terms), settings (news with Indian context), and English language. The screened news stories were accessed in full and read, and the stories not fulfilling the inclusion criteria were excluded in the final analysis according to the standard inclusion and exclusion criteria mentioned in Table 1.

Data collection tool and technique

A content analysis was performed for the selected news. The ten prevalidated health news review criteria were used for screening of the selected news stories.^[14] The selected news stories were reviewed using the screening points [see Table 1] developed through a consultation by two independent experts (public health expert and health journalist) and were given a score of "0" or "1" (0 for nonfulfilment and 1 for fulfilment of the criterion). The inter-reviewer agreement for each criterion was calculated through Cohen's Kappa. The final scores were calculated independently for the news stories as well as for individual criterion and analyzed. The calculations were done in MS Excel 2007 and StataMP 14.

Ethical Consideration

This is an (analysis and quality assessment of news already published in public domain (secondary data

Table 1: Individual criteria, explanations and screening points for review of the news

Criteria	Explanation in the current context	Screening points for the news for analysis
#1: Does the story adequately discuss the costs of the intervention?	Since vaccine is in preliminary phase of research, the news story can report costs of existing alternatives and budgets allocated for the research and development of the vaccine	If any of the points is mentioned in the story, then it is considered to be 'satisfactory': Cost of Phase 1 trial or preclinical trials Implementation cost of Phase 2 and 3 trials Cost of the alternate treatment or preventive measures (drugs, other COVID vaccines, prophylaxis) Expected cost per vaccination if proven effective
#2: Does the story adequately quantify the benefits of the treatment/test/product/procedure?	The evidence in the mentioned period could not justify/guarantee its efficacy/effectiveness in humans and the statement of the efficacy or effectiveness of the vaccine in humans can't be concluded The news mentioning the benefits of the current vaccine on the basis of stories/ anecdotes from the participants (patients) without scientific data/proof is not reliable at the stage	Story points out that researchers have no guarantee that the intervention will provide the same benefit to people as it is in the initial phases of trials or mentions that the effectiveness of the vaccine is not yet concluded and further research is needed. If this is mentioned in the story, then it is considered to be 'satisfactory' The benefits of the vaccine are based on stories/anecdotes of patients/participants. If this is mentioned in the story, then it is considered to be 'unsatisfactory'
#3: Does the story adequately explain/quantify the harms of the intervention?	The potential harms of the vaccine in such an early phase of development are unknown. The story should mention that there could be potential harms of the vaccination that will be evaluated in the further phases of clinical trials before mass launch. The harms should not be denied only on the basis of the statements of the researcher without any scientific basis	If statements related to potential unknown harms of the vaccine on humans or its chances are mentioned in the story and the story addresses that the further research will explore the potential harms, then it is considered to be 'satisfactory' If there is no mention of possibility of harms of covaxin, its exploration in further trials or the harms are denied on the basis of anecdotes of researcher (without any data proving it), then it is considered to be 'unsatisfactory'
#4: Does the story seem to grasp the quality of the evidence?	The story should try to explore the following questions What are the limitations of the evidence of the existing trials/research on Covaxin? Was the study done in few people only? Was the study done for a short time? Was it mentioned that it was preliminary research and whether discussed in scientific meetings or with experts or not?	If any of these statements are mentioned in the story, then it is considered to be 'satisfactory' Limitation of the current study (preliminary trial) Few participants were studied for a short time or it was an animal trial The results are not discussed or disseminated in a scientific meeting with other experts
#5: Does the story commit disease-mongering/intervention mongering?	The story should be free from any mongering, wrong and sensationalized information about the vaccine or COVID-19	If any of the following points is present in the story, then it is considered to be 'unsatisfactory' Intervention mongering Use of similar phrases "this is a real game-changer/breakthrough/cure" The content of news is fake Sensationalizing the vaccine, disease or the notice of clinical trials
#6: Does the story use independent sources and identify conflicts of interest?	News stories should identify the source of the story and mention the conflict of interests of the source	If this statement is mentioned in the story, then it is considered to be 'satisfactory' Source of the story (letters issued by ICMR, WHO view points on the trial) Source of funding of 1. Studies/news published/presented in favor of covaxin 2. Funded by a conflicted body of organization
#7: Does the story compare the new approach with existing/other alternatives?	The story should discuss this new vaccine with mentioning progress in research for other available alternatives (treatment drugs like remdesivir, other COVID vaccines) There should be a discussion on the comparison of advantages/disadvantages of the new vaccine with existing/alternative approaches	If this statement/analysis is mentioned in the story, then it is considered to be 'satisfactory' Comparison with other vaccines, drugs and medicines Covaxin versus other vaccines or treatments

Contd...

Table 1: Contd...

Criteria	Explanation in the current context	Screening points for the news for analysis
#8: Does the story establish the availability of the treatment/test/product/procedure?	There should be a discussion of the steps left (phases of clinical trials) in the process rather than guesses about when it will be available (about the time required to complete the phase 2 and 3 trials and launch of vaccine) It should also discuss the rationality of the availability of the vaccine to people as per the mentioned deadline of August 15 th	If similar statements/description/analysis is mentioned in the story, then it is considered to be 'satisfactory' Is the date of 15 th August for the availability of vaccine for population use is realistic? Discussion on the phases of clinical trials of the vaccine
#9: Does the story establish the true novelty of the approach?	By mentioning one idea, it may appear that it's the only thing being researched in the field. Putting this in context of past research helps keep hype in check. Covaxin is a novel intervention as it has been developed in India. There should be a mention of the reason and supportive details	If statements and their description is mentioned in the story, then it is considered to be 'satisfactory' Covaxin is an indigenously developed and novel vaccine Sources citing the same
#10: Does the story appear to rely solely or largely on a news release?	The news relies on a news release/letter released by ICMR as the sole source of information. There should be a detailed analysis and truth digging of this news release and letter from ICMR	If the similar statements mentioned in the story, then it is considered to be 'satisfactory' Source of the news mentioned along with a detailed analysis of the news release/letter If the story only explains the letter without any analysis (news is just a copied version of original notice from ICMR) then it is considered to be 'unsatisfactory'

ICMR=Indian Council for Medical Research

analysis). There are no ethical issues associated with this study.

Results

The search for the term "Covaxin" on Google extracted 1,980,000 results. The sorting of the results by "relevance" and application of filter "News" reduced the results to 1,140,000. The application of "English" language filter extracted 2400 results only. The date filter was set from July 2 to July 4. It resulted in the reduction of news to 229. The title and abstracts of the selected news were checked for the inclusion criteria. This preliminary screening was conducted on July 12, 2020 and resulted in the extraction of 36 news stories [Figure 1]. These news stories were downloaded, and 12 news were excluded (6 news were repeated, 3 were not eligible as per inclusion criteria and 3 were not related to the vaccine in assessment) after reading full description by two independent reviewers. The final analysis included 24 news stories.

Content analysis of news

A deductive thematic analysis of the selected news was performed to understand the content reported in the news stories. The content analysis revealed that the news coverage reported a range of information from the general process of vaccine development to the description and importance of permissions and research ethics involved in conducting clinical trials for its development. The stories also reported details of step-wise development of Covaxin: Completed clinical trial, outcomes of the trials, and forthcoming plans for the next phases of clinical trials. The content mentioned the

launching dates of Covaxin as mentioned in the first letter issued by ICMR on July 2 and also provided justification issued by the ICMR for its early launch. There is also description of possible dosages and schedule for Covaxin without any data or analysis to justify this information. A few news ($n = 4$) stories critically analyzed the statement and mentioned the concerns expressed by various public health experts and scientists. Some of the stories also debunked the myths circulating in the social media related to the early launch Covaxin. Three news stories also mentioned details of the clinical trials of alternate vaccine by Zydus Cadilla. One of the stories also mentioned the current uncertainty to comment on the cost of vaccination. None of the stories mentioned the data on budget allocation on the past trials and the upcoming phases of the trials. The themes extracted from the analysis along with some of the related excerpts are reported in Table 2. The framework of the themes extracted in the content analysis of these news stories is reported in Figure 2.

Health news review

The selected news stories were reviewed using the screening points of the modified criteria by two independent reviewers. The inter-reviewer reliability is assessed through calculation of Cohen's Kappa Statistics and interpreted.^[15] Eight out of ten review criteria have moderate to very good inter-reviewer agreement.

Assessment of the news story for all criteria

Each news story ($n = 24$) was scored for a maximum score of 20. The mean and median score of the news stories is 10.7 and 12, respectively, with a score ranging from 2 to

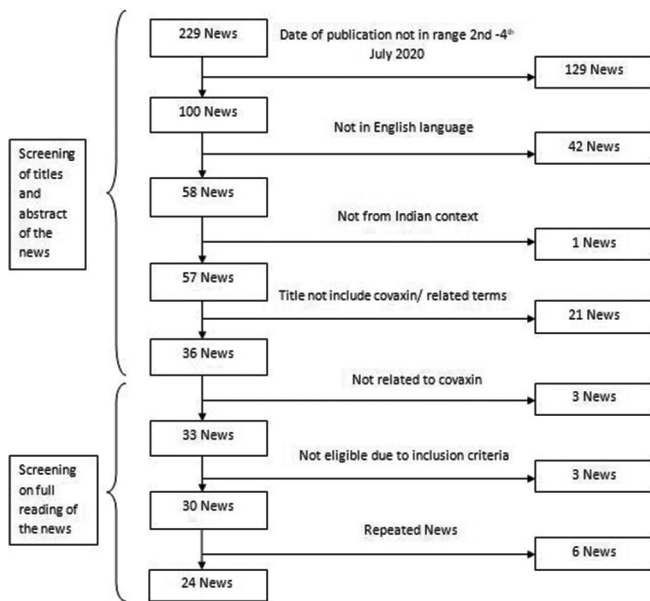


Figure 1: Flow of literature

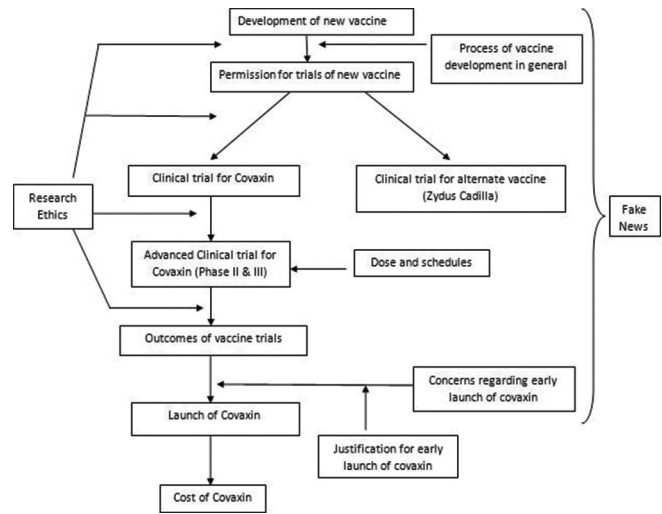


Figure 2: Framework of the content of the analyzed news stories

17. The news stories having lower scores were those that provided with a deadline of launch of vaccine, having high expectations about the same or the articles which provided explanation about circulating fake news only. The whole procedure of the vaccine development had not been discussed in the proper detail by these news articles. In contrast, the news articles having better scores mentioned information related to the procedure of development, cost, potential harms or benefits of the vaccine, and had also provided critical analysis of the early launch of the vaccine and its limitations.

Assessment of individual criteria for the news stories

The total score for the individual criteria ranged from 4 to 46 (maximum score = 48). None of the news (out of 24) promoted disease/vaccine mongering. The information related to identification of independent sources and conflict of interests, true novelty of vaccine, and source of news release were reported in 20 (83.3%), 23 (95.8%), and 20 (83.3%) of analyzed news stories, respectively. On the contrary, the relevant details related to costs and quantification of benefits were reported in only 3 (12.5%) and 10 (41.7%) of news stories, respectively. The explanation/quantification of harms, quality of evidence, comparison with alternatives, and establishment of availability of vaccine were provided in 11 (45.8%), 13 (54.2%), 12 (50%), and 11 (45.8%) news stories only [Table 3].

Discussion

The concerns related to quality of news stories and media coverage on health and related issues has increased in India in recent years.^[7] For instance, media coverage of

H1N1 outbreak in an esteemed Indian newspaper framed the disease as deadly by presenting it in a sensational manner to create a sense of fear and panic among the readers. The coverage also failed to report information on percentages of dead or recovered cases and created an unrealistic sense of uncertainty and anxiety.^[16] In contrast, a study conducted in 2009–2010 found that the newspaper coverage in UK “largely measured” the real swine flu epidemic unlike the media in other parts of the world which resulted in overhyping of the flu pandemic in these countries.^[17]

This study was conducted to analyze the news stories published in the online media on the issue of early launch of Covaxin as mentioned by the letters issued by ICMR. The Honourable Supreme Court of India in the end of March 2020 ordered print, electronic and social media to retain a strong sense of responsibility and avoid dissemination of news capable of creating panic. The order also directed media channels to refer to and publish the official version of the developments related to the pandemic.^[18] This could be the underlying reason for the absence of statements in these stories that could promote disease or vaccine mongering. Furthermore, the news stories adequately provided information on the true novelty of the research as this vaccine is related to the developments in the management of the pandemic. As the source of the news was an official body (ICMR), the stories adequately reported the sources of the news release.

On the contrary, the stories mostly failed to mention the information on costs, research data on benefits and harms of the vaccine, and quality of the available evidence. This is a serious issue as a health intervention should be explored and reported in terms of research methodology and availability of quality evidence and a news story should mention the data on its benefits and

Table 2: Content analysis of the selected news

Theme	Extracts from the news
Development of covaxin	“ICMR and BBIL are jointly working for the preclinical as well as clinical development of this vaccine,” Study in four different animals and good immunogenic response serum was able to neutralise all the viruses Covaxin was evaluated in animals on Schedule and reported to be safe and immunogenic
Launch of covaxin	“Making the vaccine feasible for public use will take a year or more” “It is envisaged to launch the vaccine for public health use latest by 15th August 2020 after completion of all clinical trials”
Concerns regarding early launch of covaxin	“If a person is vaccinated, the body will take 28 days to produce antibodies. It is impossible to provide confirmed data by then” “Number of people, trials be completed and analysed by August 14 members of the independent DSMC. Unrealistic timeline of August 15”
Justification for early launch of Covaxin	Council said, process is exactly in accordance with globally accepted norms important for ICMR to expedite clinical trials with a promising indigenous vaccine
Permission for trials of new vaccine	DGCI allowed the company to conduct the first and second stages of the vaccine's human trials
Research ethics	“We have to explain the research protocol before the ethics” “A vaccine trial completed in little over a month, efficacy pre-decided” Some hospitals selected for clinical trials caution against ‘impossible’ timeline
Process of vaccine development in general	The CDSO has allowed phase I and II human clinical trials of Covaxin, making it the country's first Covid-19 vaccine to get this approval Phase I less than 100. Phase II commences where 100 to 300 people are enrolled to test efficacy and understand side effects. Phase III 3,000 participants for approval process after which it is rolled out “vaccine development takes time due to the phases involved”
Advance human clinical trials of covaxin	According to the Clinical Trials Registry-India, the Phase-I and Phase-II clinical trials of the covaxin will be carried out on 1,125 participants across 12 hospitals Bharat biotech trials of the vaccine are scheduled to begin across India this month
Dosage schedule	“One of the most important things of this phase is to check how long the immunity stays. This allows to determine how often a person will have to get re vaccinated” Reported be in “two doses and delivered to patients in a fortnight interval this month” during the human trial phase
Fake news	‘Bharat Biotech VP taking corona vaccine clinical trial is fake’ ‘routine procedural blood drawn for testing all production staff’
Cost of covaxin	‘Socially inclined organisation and a company that is focussed on public health too early to make any statement regarding the price.’
Outcome of vaccine trials	“Vaccine development is characterised by a high failure rate - often 93% between animal studies and registration of a product” ‘COVAXIN™ is an inactivated vaccine developed on a vero-cell platfor. Inactivated vaccines have a well-proven and accepted track record’
Production of new alternate vaccine	‘CDSO, granted approval to ZydusCadila to initiate phase I and II human clinical trials in India for its potential COVID-19 vaccine’
Trial for a new alternate vaccine	‘Zydus has already manufactured clinical GMP batches of the vaccine candidate and plans to initiate the clinical trials in this month across multiple sites in India’ ‘While, pharma major ZydusCadila became the second Indian company to get the DCGI approval for human clinical trials of its vaccine ZyCoV-D’

CDSO=Central drug standard control organization, DCGI=Drug Controller General of India, DSMC=Data safety monitoring committee, ICMR=Indian Council for Medical Research, GMP=Good Manufacturing Practice, BBIL=Bharat Biotech International Limited

Table 3: Individual criterion for news stories

Criteria	Total score (out of 48)	Number of news stories reported (out of 24) (%)	95% CI
Criterion #1 costs	4	3 (12.5)	2.66-32.36
Criterion #2 quantification of the benefits	18	10 (41.7)	22.11-63.36
Criterion #3 explanation/quantification of the harms	15	11 (45.8)	25.55-67.18
Criterion #4 details about quality of the evidence	19	13 (54.2)	32.82-74.45
Criterion #5 disease/vaccine-mongering	46	24 (100)	85.7-100*
Criterion #6 identification of independent sources and conflicts of interest	35	20 (83.3)	62.62-95.26
Criterion #7 comparison of the new approach with existing alternatives	17	12 (50)	29.12-70.88
Criterion #8 establishment of availability of the treatment/test/product/procedure?	18	11 (45.8)	25.55-67.18
Criterion #9 establishment of true novelty of the approach	44	23 (95.83)	78.88-99.89
Criterion #10 rely solely or largely on a news release	38	20 (83.3)	62.62-95.26

*One sided CI (97.5% CI), CI=Confidence interval

harms supported by the available research. Though important, it is very common that health journalists fail to mention these details in their stories. A study conducted by National Institute of Nutrition, Hyderabad, on news stories related to obesity in six Indian newspapers, found most of the coverage to be sensational. Many news articles on obesity were recognized to be self-contradictory and failed to mention the source of the information. Moreover, all the journalists ignored to report the research methods and rarely discussed the errors in research design.^[19] This information is important as it helps people to develop an informed opinion about these interventions.

Furthermore, the information on cost of development, dissemination and implementation of a health intervention, and its unit cost and allocation of budget is commonly neglected in the news stories. Cost and cost-effectiveness of a health intervention plays an important role at every level of implementation, and this information should not be concealed from the general masses. The stories also did not adequately mention the availability of the existing preventive and treatment options and on-going research on alternate vaccines and treatment options. The entire focus and exaggeration has been directed toward Covaxin only, despite of it being in the early stages of development at the time of announcement. It is important to mention the research and development of alternate treatments and interventions, especially in the current situation. Lack of reporting of above-mentioned information points toward the failure for in-depth exploration before writing news stories by health journalists. It could also be due to their lack of understanding about the importance of including scientific evidences as a result of improper training.^[7]

Reporting inadequate, misleading or incomplete news on issues related to health is a public health threat. This faulty reporting can misguide people resulting in greater risks to their health. This may also influence policy-makers to frame and adopt inadequate, harmful or unwarranted measures, regulations or policies.^[20] The Association of Health Care Journalists also accepts that the information provided in the news stories may help readers and viewers to take health care decisions and thereby recognizes the responsibility of journalists in covering news related to health.^[21]

The infodemic accompanying this pandemic has re-enforced the importance of optimum quality of health journalism. There is a need for dissemination of authentic information and this need could be addressed through mainstream media by health journalists. Reuters Institute conducted a study in six countries (excluding India) which reported that 60% of the respondents accepted the contribution of news media to understand

the pandemic.^[18] The study also reported a significantly higher trust on the information received from news media than social media.^[22] A survey conducted in India also reported that many people have debunked myths and conspiracy theories transmitted through social media and have relied on the scientific information received from authentic sources.^[23] Therefore, there is an urgent need to empower and train health journalists to ensure proper reporting of health news to prevent the spread of false information to curb the impacts of infodemic during this pandemic.

Conclusion

Mass media is an important medium to disseminate health news, shape the general understanding of people about health and promote public health. The inadequate, misleading, or incomplete reporting of health-related news constitute a public health threat. The news analysis revealed an inadequate and incomplete reporting of information on costs, data on benefits, and harms of the Covaxin as per the stage of its development and reported a failure to report the progress in research of alternative drugs and vaccines to prevent, treat, and manage Covid-19. This study also reported a lack of understanding to perform and report a detailed analysis of the methodology of development of the vaccine and limitations in its research design by health journalists. This seriously compromises proper reporting of this important health intervention according to the accepted standards of health news in journalism. There is an urgent need to deliver accurate, authentic, and complete information about health interventions in the current situation of infodemic during this pandemic. Therefore, it is important to take necessary steps to train health journalists on proper reporting of news to improve its quality in the Indian media.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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