Original Research Article

Vaccine news in India: trend and content analysis of online mass media

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ABSTRACT

Background: The media news influence shapes the public sentiments and behaviour. The recent experiences indicate significant influence of online news and social media on immunization behaviour in India. The objective was to study the profile and sentiments of online media news on vaccine and vaccination in India.
Methods: We searched the online news published during November 2015 to October 2017. The news contents were interpreted and categorised according to the vaccine and sentiments.
Results: Out of the total 1430 news items, 763 were eligible for review after removal of duplicates and unrelated items. Majority (75.5%) of the news were on the immunization program. While 45.5% news originated from sub-state level, 19.3% from state and 35.2% were from national levels. The measles-rubella vaccine topped the news (23.5%) followed by poliomyelitis (10.4%) and Japanese encephalitis (6.6%) vaccines. While 65.8% of news was positive, 27.9% and 6.35% were negative and neutral respectively. The negative news comprised of the adverse events, social resistance, and vaccine shortageent.
Conclusions: A sizable proportion of news contained negative messages, which may influence public vaccine behaviour. Past experiences (pentavalent and measles-rubella) calls for regular monitoring of media messages and adopt appropriate communication strategy to retain vaccine confidence and reduce vaccine hesitancy.

Keywords: Vaccine, Vaccination, Online media news, Sentiments, India

INTRODUCTION

India has made significant progress in routine immunization program with full immunization coverage (FIC) reaching 62% (2015-16), although there are sizable gaps between Diptheria-Pertusis-Tetanus doses (DPT-3 and DPT-1), measles containing vaccine doses (MCV-2 and MCV-1) coverages.[1] There are considerable differences between administrative and estimated or evaluation coverages.[2,3] India has introduced five new vaccines (Hib- Haemophilus Influenzae b, IPV-inactivated polio vaccine, rotavirus vaccine, rubella vaccine, and HPV- human papilloma virus vaccine) over last five years and the PCV (pneumococcal conjugate vaccine) is in pipeline. To further push the FIC, since December 2014, Indian Government launched Mission Indradhanush (MI) to vaccinate at least 90% of pregnant women against tetanus and ensure that all children are fully vaccinated against seven vaccine-preventable diseases before they reach an age of two years.[4] The drop in FIC coverage in Tamil Nadu, one of the better performing state over last decade and persisting low coverage in urban areas like Delhi raises concern regarding public confidence.[1,5] The recent experience of anti-vaccine messages in social media (Facebook, Whatsapp and others) and news media (print and online) targeted at measles and rubella (MR) campaign in south Indian states has forced national and state governments to develop multichannel communication strategies during subsequent phases of the campaign.[6] Public confidence in immunization is emerging as an important global public health issue for sustaining the immunization coverages for existing vaccines and introduction of new vaccines. The phenomena of dwindling public confidence on vaccines and rising hesitancy and reluctance is of great

concern for the infectious disease control. The vaccine reluctance and resistance were identified as important determinants during polio eradication program and required various context specific social mobilisation and mitigation efforts.[7] The emerging vaccine hesitancy in developed countries are also increasingly reflected in the low-and middle-income countries.[8] The World Health Organization's (WHO) Strategic Advisory Group of Experts (SAGE) on immunization recommended for documenting and monitoring the vaccine confidence and hesitancy indicators for adoption of appropriate communication and interventions strategies.[7] Several efforts have been made and are in progress exploring the vaccine attitude and hesitancy from various dimensions including the general population,[9] clinicians,[10] and the effects of social networking,[11] on vaccine acceptance. There were also instances of rise in resistance with compulsory vaccination drive in population with negative vaccination attitude.[12]

A survey on vaccine confidence across 67 countries, observed wide variation in vaccine-sceptical opinion between countries and regions globally. Compared to global average of 12% for negative attitude towards vaccines, European region had seven of the ten least confident countries (negative attitudes in the range of 27%-41%).[13] There was no definite predictive association between vaccine-sceptical opinion and religion across different countries. Thus vaccine confidence and attitude appears to be driven by more local context and issues and influenced by socio-cultural, political and other cross-cutting factors. According to vaccine confidence project, positive attitudes were expressed for importance, safety, effectiveness and compatibility with religion by 92.3%, 87.5%, 87%, and 72.9% Indian respondents respectively.[14] The proportion of strongly positive responses progressively dropped for the components of importance (87.8%), safety (74.8%), effective (73.5%) and compatibility with religion (63.5%).[14] The internet penetration in India stands at 35% (2016-17) and expected to cross 50% by 2020. About 80% of internet traffic is through mobile phone/devices (2nd largest globally) and weekly time spent on mobile media is about 7time of television and 15 times of print media.[15] Thus importance of internet and mobile media is important in current context, which may shape the public opinion. Public opinions are usually influenced by messages from various sources including the community key influencers, peers, mass media, now emerging social media and past experiences. Although the influences are multidimensional and effects are multidirectional, every component of communication play important role in the whole vaccine attitude, acceptance, hesitancy and resistance space. This paper focuses on documenting the mass media messages on vaccine, vaccination and national immunization program in Indian context which have potential role in shaping the vaccine attitude.

METHODS

Our objective was to map and describe the profile of news on web mass media published over last 2 years in

India. To map these items, we manually collected the online mass media news for the period November 2015 through October 2017. We searched using the Google search engine using the search words 'vaccine immunization India vaccination news' for the news items. The news items were read and coded according to the vaccines focused, content (national program, vaccine campaign, research and development, adverse events, public concern, etc.) and sentiment (positive, neutral or negative). Two authors independently read and coded the news items according to the vaccine focus, content and sentiment. The assessments by rates were matched and the mismatch items were reviewed jointly to arrive at an agreement. Descriptive analysis was undertaken using the identified variables.

Ethical issues

As the data used for this study were obtained from publicly available information and not linked to any identifiable individual, explicit individual consent is not required. This has been reviewed by Institutional Ethics Committee and exempted.

RESULTS

This search extracted a total of 1430 news items in the period. Out of these 67 news items were duplicate and 600 items were not related to vaccines, thus removed as reflected in flow chart (Figure 1). The remaining 763 news items were published in e-newspapers (n=555; 72.7%), e-news channels (n=45; 5.9%), e-magazines (n=43; 5.6%), websites (n=81; 10.6%) and blogs (n=39; 5.1%). These news items focused on about 28 specific vaccines as summarised in Table 1. The measles and rubella (MR) vaccine topped the news (23.5%) followed by poliomyelitis and Japanese encephalitis (JE) vaccines (10.4% and 6.6% respectively). The chronology of the publication of these news items is shown in Figure 2. The surge in quantum of news January 2017 onwards coincide with the preparation for MR campaign in India, which started in February 2017 and continued through 2017. A small rise in news items during March-April 2016 was due to launch of rotavirus vaccine. As reflected in Table 2, majority of the news focused on national immunization program (n=576; 75.5%) followed by vaccine research and development (n=82; 10.7%), awareness efforts on vaccine and immunization program (n=60; 7.8%); vaccine related commercial and business (n=30; 4%) and vaccine storage and logistics (n=15; 2%). Out of the news on national immunization program; majority focused on universal immunization program (50.9%), mass vaccination efforts (18.7%); special focus on MI (3.9%) and launch of new vaccines (2%). On analysis of the news sentiments, majority (n=502; 65.8%) were categorised as positive, while 27.9% (n=213) of news were grouped as negative and some as neutral (n=63; 6.35%). Over half of the positive news focused on six vaccines including MR (21.7%), poliomyelitis (10.8%),

rotavirus vaccine (8%), pneumococcal vaccine (7%), JE (4.4%), and human papilloma virus vaccine (4%). Over half of the negative sentiment news targeted at four vaccines including measles and rubella (25.7%), Japanese encephalitis (11.2%), poliomyelitis (10.7%), and influenza vaccine (6.1%). The negative news mainly focused on the adverse events following vaccination, social resistance to MR vaccination campaign, shortage of vaccine supply (injectable polio vaccine), and inadequate effort towards influenza disease outbreak. On mapping of the geographic origin of these news items (according to the newspaper publication and place of report), 35.2% of the news originated from national level, while 19.3% and 45.5% were from state and sub-state levels respectively. The geographic distributions of the news are reflected in Figure 3, where the size of the bubbles is proportionate to the number of publications. Most of the bubbles coincided with the states where new vaccine or campaign was launched.
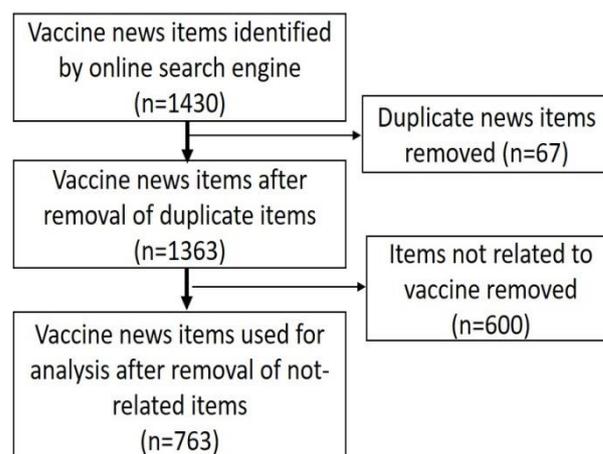
**Figure 1: Flow chart of search and review of news items.**

Table 1: The vaccines focused in the news items.

| Sl no	Vaccine type	Frequency n (%)	Sl no	Vaccine type	Frequency n (%)
1	BCG	6 (0.8)	15	Malaria	7 (0.9)
2	Chicken pox	2 (0.3)	16	Measles & rubella	179 (23.5)
3	Chikengunia	5 (0.7)	17	Measles, mumps & rubella	2 (0.3)
4	Cholera	10 (1.3)	18	Pentavelent	12 (1.6)
5	Dengue	12 (1.6)	19	Pneumococcal	42 (5.5)
6	DPT	10 (1.3)	20	Poliomyelitis	79 (10.4)
7	H1N1	6 (0.8)	21	Rabies	11 (1.4)
8	Hepatitis virus (A/B/C)	19 (2.5)	22	Rotavirus	46 (6.0)
9	Hemophilus influenzae B	1 (0.1)	23	Swine flu	13 (1.7)
10	HIV	4 (0.5)	24	Tuberculosis	6 (0.8)
11	Human papilloma virus	29 (3.8)	25	Tetanus	2 (0.3)
12	Influenza	27 (3.5)	26	Typhoid	4 (0.5)
13	Japanese encephalitis	50 (6.6)	27	Yellow fever	5 (0.7)
14	Leprosy	3 (0.4)	28	Zika virus	4 (0.5)
			29	Other	167 (21.9)

Note: BCG: Bacillus Calmette–Guérin vaccine; DPT: Diptheria, pertusis & tetanus HIV: Human immunodeficiency virus.

Table 2: Categories of the news contents.

Sl no	Content categories	Frequency n (%)
1	**National immunization program**	576 (75.5)
	1.1 Immunization programme	388 (50.9)
	1.2 Mass vaccination program	143 (18.7)
	1.3 Mission Indradhanush	30 (3.9)
	1.4 Launching of new vaccine	15 (2)
2	Vaccine and immunization awareness	60 (7.8)
3	Vaccine research & development	82 (10.7)
4	Vaccine storage and Logistic	15 (2)
5	Commercials and business	30 (4)
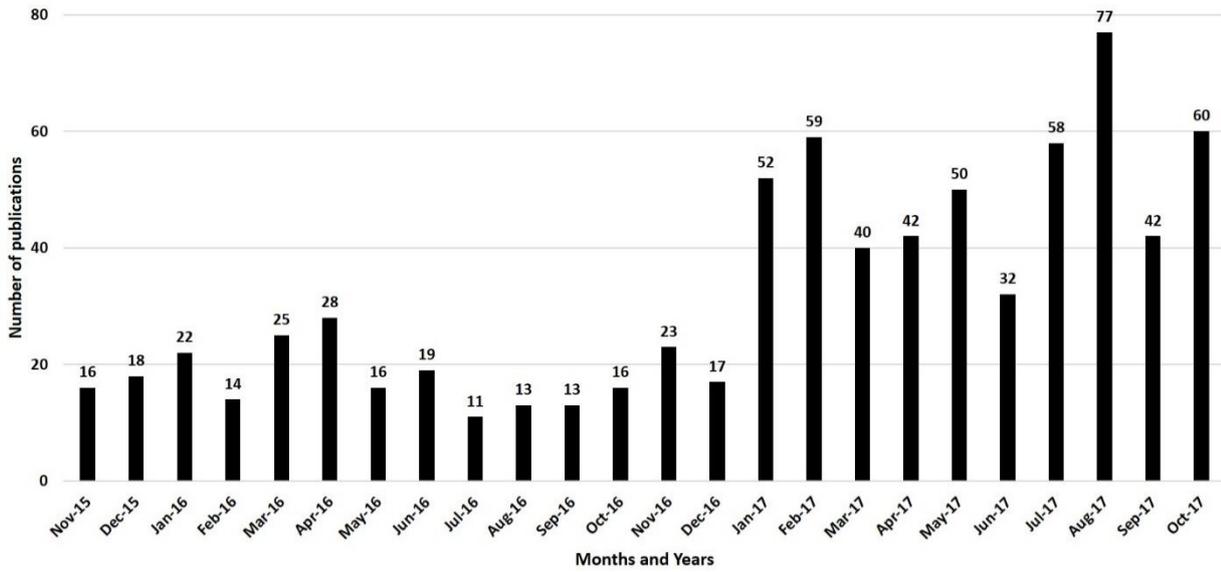
Figure 2: The trend of publication of the news items.
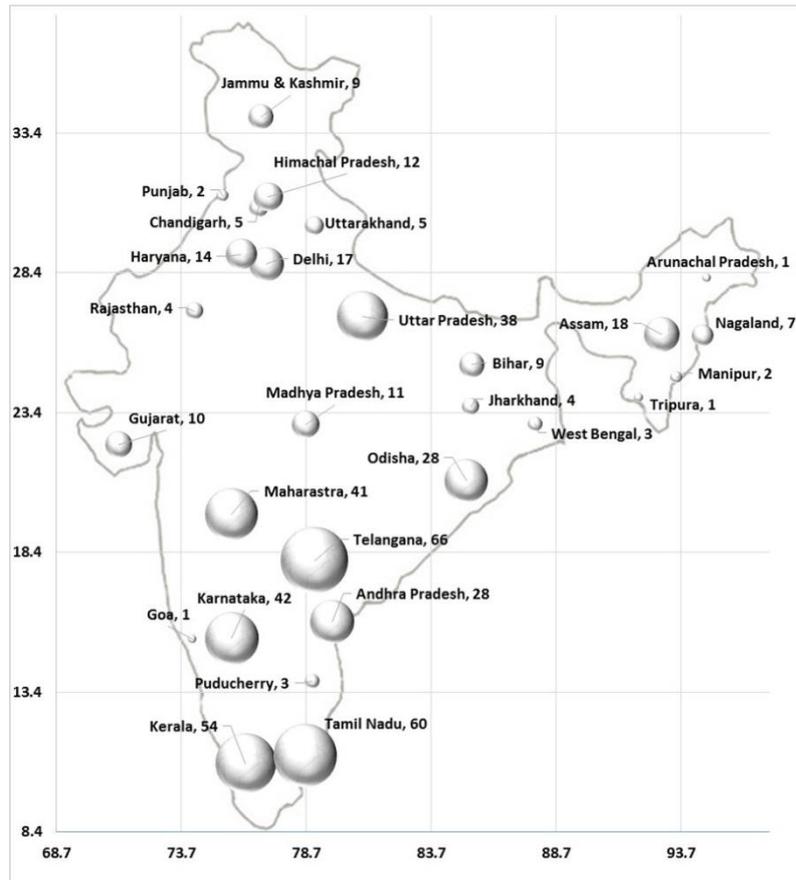
Figure 3: The geographic distribution of the vaccine news in India.

DISCUSSION

It is perceived that the mass media and web media is influencing the public opinion and confidence on vaccine and vaccination program. This paper described the characteristics of the web mass media news published over last two years focusing on vaccine, vaccination and programs in India. The findings show that over three-fourth of the news focused on national immunization program including the routine immunization program

efforts, mass campaign, special immunization drives including MI and new vaccines. The introduction of rotavirus (introduced in April 2016) and rubella (as MR in January 2017) vaccines under universal immunization led the news items. The news volume increased with the introduction of new vaccines, but news traffic surged with launch of MR vaccine campaign. MR vaccine campaign topped the news chart for the vaccine resistance observed in good performing states of India. Paralleling the social vaccine resistance for administration of MR vaccines at schools and the adverse events reporting, media publication drive by government at national and state level was observed. Few news also reported the introduction of HPV vaccination under immunization program of selected states. A proportion of the news reported about the new vaccine development and clinical trials of new vaccines like dengue, malaria, human immunodeficiency virus (HIV), etc. There were also messages on adverse events following immunization and public reactions related to them. The sentiments of these news conveyed mostly positive or neutral, which focused on the national programs activities. But the news reporting negative sentiments were of concern. Most of the negative reports were reported from sub-state level.

Mass media communications have wider reach and are likely to influence the perception and opinion of the public. While they convey the national government's stand on the immunization and research efforts as hope, the adverse events (may be expected or unexpected) are likely to lower the confidence of the general public if not communicated appropriately. The negative sentiment news are of particular importance in view of the persisting unmet vaccine needs coupled with the emerging vaccine hesitancy and resistance in some segment of population. The public perception and opinion vary based on the sensitivity of the news.

Globally vaccine hesitancy and resistance are being recognised as emerging challenges and concerns for sustaining immunization coverage and achieve elimination of the vaccine preventable diseases. Monitoring of the vaccine confidence and hesitancy at global and national level has been recommended by WHO SAGE on Immunization for adoption of appropriate communication and interventions strategies.[7] A study on responses to news articles focusing on HPV program in Canada documented 52.7% positive, 33.7% negative and 10.8% neutral responses from public.[16] The negative comments contained concern about the safety, efficacy and distrust on pharmaceutical companies and government. Media content analysis has been considered as important research domain related to health behaviour, like smoking.[17] Another online media content analysis on HPV vaccine in Georgia revealed 52.4% reports as neutral.[18] While the reports raised concerns regarding cost and funding, the messages about safety, side effects and duration of protection were missing. Monitoring of online mass media, social media during a measles outbreak in Netherlands informed appropriate communication strategies to preserve vaccination acceptability.[19]

The social media messages (Facebook, Whatsapp, WeChat, Twitter, etc.) and internet media related to MR campaign dampened the anticipated coverage in better performing states (like Tamil Nadu, Karnataka and Kerala) and required special advocacy and communication strategies by national and state governments to sustain the campaign effort.[6] With increasing penetration of internet in India (35% in 2016 and expected to get doubled over next 5 years with the digital Indian push), the web is becoming a virtual place with repository of health-related information is not only reported but also actively expressed and shared.[15] But many of the web-based contents are not regulated or monitored and are at risk of spreading of non-scientific, erroneous and misleading information. The availability of online mass media messages regarding health, preventive and curative options, national programs including many non-scientific documents are likely to influence the public opinion and sentiments.[14] The current effort has some limitations. Few (2%) news items included in the search result were retracted by the publisher and not available for full reading. The penetration and circulation of the internet news among Indian internet users is not known. The health literacy status, influence of internet and impact of negative media news/ messages on vaccine behaviour in India is not documented.

The experiences from anti-vaccine sentiments and public activities related to polio eradication program, pentavalent vaccine and MR campaign have indicated the importance of news (earlier print and now internet), social media and informal local communications in maintaining public confidence on the vaccine and program. There is currently limited information Available at India regarding the profile of social media and internet media contents. Research efforts are needed to document and monitor the vaccine sentiments, hesitance and resistance to develop strategies addressing them for sustaining the vaccine confidence and coverage.

REFERENCES

1. National family health survey (NFHS-4) 2014-15. International Institute for Population Sciences (IIPS), Mumbai and Macro International; 2016. Available at: http://rchiips.org/NFHS/pdf/NFHS4/ India.pdf. Accessed 3 February 2018.
2. Bhatnagar P, Gupta S, Kumar R, Haldar P, Sethi R, Bahl S. Estimation of child vaccination coverage at state and national levels in India. Bull World Health Organ. 2016;94(10):728–34.

3. India: WHO and UNICEF estimates of immunization coverage: 2016 revision. World Health Organization, Geneva; 2016. Available at: http://www.who.int/immunization/monitoring_surve illance/data/ind.pdf. Accessed 3 February 2018.

4. Travasso C. "Mission Indradhanush" targets India's unvaccinated children. BMJ. 2015;350:1688.

5. Devasenapathy N, Ghosh Jerath S, Sharma S, Allen E, Shankar AH, Zodpey S. Determinants of childhood immunisation coverage in urban poor settlements of Delhi, India: a cross-sectional study. BMJ Open. 2016;6(8):e013015.

6. John H. After Diphtheria, anti- vaccination groups oppose Measles Rubella shot, Kerala govt steps in. The News Minute. Online. 2017. Available at: https://www.thenewsminute.com/article/after-diphtheria-anti-vaccination-groups-oppose-measles-rubella-shot-kerala-govt-steps-69574. Accessed on 3 February 2018.

7. World Health Organisation. Report of the SAGE working group on vaccine hesitancy. World Heal Organisation; 2014. Available at: http://www.who.int/immunization/sage/meetings/2014/october/1_Report_WORKING_GROUP_vaccine_hesitancy_final.pdf. Accessed on 3 February 2018.

8. Campbell P. Understanding the receivers and the reception of science's uncertain messages. Philos Trans R Soc Math Phys Eng Sci. 2011;369(1956):4891–912.

9. Dubé E, Vivion M, MacDonald NE. Vaccine hesitancy, vaccine refusal and the anti-vaccine movement: influence, impact and implications. Expert Rev Vaccines. 2015;14(1):99–117.

10. Verger P, Fressard L, Collange F, Gautier A, Jestin C, Launay O, et al. Vaccine Hesitancy Among General Practitioners and Its Determinants During Controversies: A National Cross-sectional Survey in France. EBioMedicine. 2015;2(8):891–7.

11. Onnela J-P, Landon BE, Kahn A-L, Ahmed D, Verma H, O'Malley AJ, et al. Polio vaccine hesitancy in the networks and neighborhoods of Malegaon, India. Soc Sci Med. 2016;153:99–106.

12. Betsch C, Böhm R. Detrimental effects of introducing partial compulsory vaccination: experimental evidence. Eur J Public Health. 2016;26(3):378–81.

13. Larson HJ, de Figueiredo A, Xiahong Z, Schulz WS, Verger P, Johnston IG, et al. The State of Vaccine Confidence 2016: Global Insights Through a 67-Country Survey. EBio Med. 2016;12:295–301.

14. The Vaccine Confidence Project. The State of Vaccine Confidence: 2016. The Vaccine Confidence Project. 2016. Available at: http://www.vaccine confidence.org/research/the-state-of-vaccine-confidence-2016/. Accessed on 3 February 2018.

15. Mary Meeker. The Internet Trends 2017. Kleiner Perkins Caufield Byers; 2017. Available at: http://www.kpcb.com/internet-trends. Accessed on 3 February 2018.

16. Feinberg Y, Pereira JA, Quach S, Kwong JC, Crowcroft NS, Wilson SE, et al. Understanding Public Perceptions of the HPV Vaccination Based on Online Comments to Canadian News Articles. Grce M, editor. PLOS ONE. 2015;10(6):e0129587.

17. Jawad M, Bakir AM, Ali M, Jawad S, Akl EA. Key health themes and reporting of numerical cigarette–waterpipe equivalence in online news articles reporting on waterpipe tobacco smoking: a content analysis. Tob Control. 2015;24(1):43–7.

18. Habel MA, Liddon N, Stryker JE. The HPV Vaccine: A Content Analysis of Online News Stories. J Womens Health. 2009;18(3):401–7.

19. Mollema L, Harmsen IA, Broekhuizen E, Clijnk R, De Melker H, Paulussen T, et al. Disease Detection or Public Opinion Reflection? Content Analysis of Tweets, Other Social Media, and Online Newspapers During the Measles Outbreak in the Netherlands in 2013. J Med Internet Res. 2015;17(5):128.