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Understanding health communication processes and challenges: cultural insights from *Katkari* tribal in western Maharashtra, India

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Abstract
Communication is integral to human interaction, facilitating information exchange and conveying symbolic meaning. In the realm of public health, effective communication is paramount for disease prevention, health promotion, emergency preparedness, dissemination of government health initiatives including policies. This qualitative inquiry explores the intricacies of communication within the Katkari tribe, a minority group residing in western Maharashtra, India. Utilizing anthropological theories, the study seeks to unravel how culture influences health communication among the community. The objectives encompass investigating health communication sources, examining communication patterns through a cultural lens, and documenting challenges in public health communication. Using an inductive approach to the data analysis, the themes that emerged, included the Accredited Social Health Activist, (ASHA), television, social media as the factors influencing health communication dynamics, including the effects of media and technology on tribal health and lifestyle, challenges in terms of gaps in comprehension and action, barriers of language, social isolation, deep seated misconceptions and the cultural influences on health behaviour and the strategies recommended to overcome the challenges. To improve health communication for India's tribal populations, it's crucial to use culturally tailored approaches. This includes incorporating traditional art and local artists, using multimedia tools like radio jingles and videos, offering incentives to healthcare workers, and employing visual aids in simplified language. Engagement of local communities in the process will lead to an effective implementation of health communication policies.

Keywords Health communication · Tribal · Challenges · Culture · India · Strategies

1 Introduction

Health communication is the science and art of using communication to advance the health and well-being of people and populations [1]. It is essential for preventing diseases, promoting health, and enhancing the population's quality of life, making it a pivotal component of public health efforts [2]. Public health communication involves the scientific development, strategic dissemination, and careful assessment of relevant, accurate, accessible, and understandable

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health information. This process is designed to effectively reach and engage target audiences with the goal of endorsing public health [3]. It shapes social norms, advocates for policy, educates and alerts the public, and encourages behaviour change for better health outcomes and healthier communities [3–5]. So it becomes strategic approach to support and improve population health.

The 'Tribe' and 'Tribal' in the context to this study refers to as a social group, usually with a definite dialect, cultural homogeneity, and unifying social organization. It may include several subs—groups and may have common ancestor as well as presiding deities [6]. Globally, tribal populations suffer significant health disparities, with about 15% living in extreme poverty and facing limited healthcare access [7]. They experience high infectious disease rates, like tuberculosis, that are up to 20 times higher than the global average, along with issues of malnutrition and sanitation [7]. In India, where 8.6% of the population is tribal, it is crucial to address the complex burden of diseases—including communicable, non-communicable, malnutrition, mental health, and substance addiction—as well as challenges related to healthcare-seeking behaviors [8]. Therefore, health communication becomes essential for tribal populations, for empowerment, to target the rising prevalence of diseases and to narrow the disparities in health consequences.

The '*Katkaris*', recognized as 'Particularly Vulnerable Tribal Groups (PVTGs)' among the Scheduled Tribes, are among India's most marginalized communities. They are dispersed in various areas of Gujarat and Maharashtra states of India. Among the tribes of India, the *Katkaris* hold the lowest socioeconomic status and educational attainment. While the overall literacy rate among Scheduled Tribes stands at approximately 56%, for the *Katkaris*, it's merely 34%. A significant majority (88%) of *Katkaris* are engaged in manual labour and are landless [9]. According to the key findings of the 2013 Tribal Health Report, the *Katkaris* face challenges such as undernutrition, anaemia, low rates of institutional delivery, high prevalence of tobacco and alcohol addiction, and a greater incidence of tuberculosis compared to the general population of the country. Furthermore, they bear a heavier burden of mortality and morbidity, coupled with extremely limited access to healthcare services [10]. There is a need for culturally sensitive communication to build trust, improve healthcare access, support policy changes, and respond to crises, more community involvement leading to better health among tribal groups [11].

Given this context and the aforementioned discussions, health communication emerges as a critical necessity and a primary intervention for all public health programs targeting this specific group. There is an evident absence of research on the dynamics of health communication within this population. To address the research gap, a qualitative study was designed focusing on the Katkari tribe in western Maharashtra, India, with the following objectives:

1. To understand health communication among the Katkaris, a tribal community in western Maharashtra, using an anthropological method.
2. To understand the challenges in the health communication.
3. To document the needs and strategies for improving health communication among the tribal.

2 Methods

In the context of this study, "Health Communication" refers to how health messages are conveyed, how the community perceives and responds to these messages, and the challenges involved in disseminating, understanding, and receiving them. The goal is to foster better health behaviour change.

2.1 Population setting

The study was done in the ten of the 35 villages selected by the university under its outreach programme as part of its health-promotion initiatives. The program betters' community well-being via sustainable empowerment, promotion of local resources, and eco-friendly activities in the selected villages near the vicinity of the university. According to the community outreach programme's data, these ten villages constitutes tribal hamlets, with approximately 1005 tribal people. The point to be noted is that a rural village in India is made up of different hamlets [12]. In this particular area, there is a mixed population of rural and tribal people, with some hamlets being exclusively inhabited by tribal communities of Katkari.

The *Katkari*, tribe classified as one of India's 75 Particularly Vulnerable Tribal Groups by the Ministry of Home Affairs, India primarily inhabit in the states of Maharashtra (Pune, Raigad, and Thane districts) and parts of Gujarat state. Referred to as *Kathodis*, the *Katkari* community derives its name from the traditional craft of making Katha (Catechu) from *Khair* tree sap. Engaged in diverse activities such as agricultural labor, firewood sales, and fishing, they face challenges like low literacy, health issues, and limited livelihoods, emphasizing need for support. The Katkari community, with a historical focus on rice cultivation, continues to farm on small or leased plots. After harvest, they typically migrate to work as daily labourers in brick kilns or construction sites, returning home around the festival of Holi in March. Facing financial literacy challenges and relying on daily wages without a savings culture, their limited education contributes to restricted opportunities in local industries [9].

2.2 Study design

The study adopted qualitative design involving in-depth interview (IDI) technique. The interview guide included open-ended questions on the different sources of health communication, the process of disseminating health information, experiences of challenges in the health communication, needs and strategies in the alignment to the tribal culture to improve the health communication. The cultural context was explored using anthropological perspective interviews with the key informants (term explained in Table 1) and tribal villagers of the respected area. A total of 22 in-depth interviews were taken by two medical social workers (MSW); social workers of the outreach initiative, who work in the community on different health issues. Participants were selected through purposive sampling. The ten villages fall under two Primary Health Centres staffed by two Medical Officers (MOs). Six ASHA workers (out of ten available for interviews), along with available Gram Panchayat members and tribal community members, were chosen for the interviews. Data was collected in the month of March–April 2024. After achieving theoretical saturation, the stage where researchers have gathered sufficient data to fully understand the phenomenon being studied [13] the interviews were discontinued. The characteristics of the respondents has been given in Table 1 of results section. Pilot testing of the interview guide was administered before the data collection to assess its usefulness, precision, and cultural relevance. This phase was done on a small sample, to identify and address probable issues, checking the interview's flow and timing. The MSWs were mentored in qualitative data collection. The interviews were recorded, transcribed, and translated into English. The qualitative data was then input into MAXQDA (version 11) for analysis. The data were analysed using Bruan and Clarke thematic analysis method [14]. Thematic qualitative analysis systematically finds recurrent patterns, themes, and concepts within data, revealing insight into participants' experiences and perspectives. This process included understanding the data, coding the content, and arranging them into themes, eventually creating meaningful narratives. This type of analysis imparts flexibility and rigor, reflecting nuanced interpretations of the data.

2.3 Ethical considerations

The study obtained approval from the University's Independent Ethics Committee as per the letter issued in the month of February 2024. All the norms were followed as per the guidelines of Declaration of Helsinki. Respondents who were able to read and write have given written informed consent, in comparison to those who weren't literate gave thumb impressions. Respondents were briefed about the study. Identifiers from the data were removed and it were password-protected in the electronic participant database.

3 Results

3.1 Characteristics of the respondents

There were two Medical Officers from the Primary Health Centers (PHCs), six ASHAs, seven-gram panchayat members, including one Gram Panchayat Head (Sarpanch), and five tribal individuals from various villages. The MOs held Bachelor of Ayurvedic Medicine and Surgery (BAMS) degrees. ASHAs were educated up to higher secondary level. Among the five tribal respondent, three were illiterate, and two had studied up to secondary level. Except the MOs and ASHA, participants were engaged in farming, daily wage labour, and small-scale businesses such as fishing and self-help group activities.

Table 1 Characteristics of the respondents

Sr. no	Code	Respondents	Sex	Age	Education	Occupation	No. of Years of experience working (Tribal)
1	RIHM1	Medical Officer	M	43	BAMS	Medical Officer	6
2	NANM1	Medical Officer	M	48	BAMS	Medical Officer	8
3	AND1	ASHA	F	53	9	ASHA	13
4	NAN1	ASHA	F	43	10	ASHA	9
5	NAN2	ASHA	F	43	10	ASHA	15
6	NAN3	ASHA	F	35	10	ASHA	15
7	RIH4	ASHA	F	30	10	ASHA	10
8	NAN6	ASHA	F	25	10	ASHA	3
9	AND2	Sarpanch	M	32	12	Business	2.5
10	AND3	GP member	M	24	7	Daily wages	NA
11	RIH1	GP member	F	35	Not literate	Daily wages	NA
12	ANDS1	GP member	F	42	Not literate	Farming	NA
13	BHD1	GP member	F	55	Not literate	Farming, fishing	NA
14	RIH2	GP member	M	30	10	Daily wages	NA
15	RIH3	GP member	F	45	9	Farming	NA
16	ANDS2	GP member	M	45	12	Buisness	NA
17	ANDS2	Secretary-GP	M	50	12	Farming	NA
18	NAN4	Community	F	53	Not literate	Farming	NA
19	NAN5	Community	M	45	9	Farming	NA
20	BHD2	Community	F	28	8	Farming, Self Help Group Activities	NA
21	BHD3	Community	F	40	Not literate	Daily wages	NA
22	AND3	Community	F	55	Not literate	Farming	NA

Medical Officer of Primary Health Centre: The Medical Officer, Primary Health Centre/ Urban Primary Health Centre (PHC/UPHC) will primarily play a clinical role in case detection, management, referral and follow up with some managerial and public health roles. The ANM and ASHA reports to the MO

ASHA: An Accredited Social Health Activist (ASHA) is a community health worker employed by the Ministry of Health and Family Welfare (MoHFW) as a part of India's National Rural Health Mission (NRHM)

Gram Panchayat: The Panchayati Raj Act defines a Gram Panchayat as a basic unit of local administration in India, and the primary institution for governing villages: A Gram Panchayat is a political institution that acts as the cabinet for a village of group of villages [31]

Sarpanch: It is a designation and he/she is the elected Gram Panchayat head of a village and serves his/her duty in the village level statutory institution called "Gram Panchayat"

Secretary of Gram Panchayat: The Secretary of the Panchayat is a non-elected representative, appointed by the state government, to oversees the activities

Members of Gram Panchayat: The Gram Panchayat is divided into wards and a Ward Member or Commissioner represents each ward, also referred to as a Panch or Panchayat Member, whom the villagers directly elect. The number of members usually ranges from 7 to 31; occasionally, groups are larger, but they never have fewer than seven members. One-third of seats of the Panchayat are reserved for women. Seats are also reserved for Scheduled Castes/Tribes

3.2 The themes are described in the sections below

3.2.1 Theme 1. ASHA plays a pivotal role as the primary source of health communication. Television and Android smartphones play supplementary roles

The MOs reported that the source of health communication primarily involves the Ministry of Health and Family Welfare, (MoHFW) it flows from the MoHFW to the Primary Health Centres (PHCs) and the sub centres then to ASHA,

who imparts health education to the community. During emergencies the PHCs directly give messages to the Gram Panchayat heads for disseminations and during COVID-19 pandemic mobile health vehicles were engaged to spread health messages across villages. ASHAs are instrumental in imparting health education in the tribal community in context to pregnancy care, sanitation, hygiene, vaccination, adolescent health, menstrual health, infections, anaemia and nutrition. The information is passed on in the local language Marathi (local), which the tribal population understands, even when they speak a different dialect of Marathi. While they are viewed as the primary source of health information, they often function by coordinating with other intermediaries such as Multipurpose Workers (MPWs), Auxiliary Nurse Midwives (ANMs), Anganwadi Workers (AWWs), and members of the gram panchayat (village council). Television plays a vital role in the community for knowing updates on news, weather details. In the villages on an average there are 1–2 TV sets available. Certainly it has created an impact on the lifestyle, improved personal hygiene and dietary intake; consumption of sprouts and leafy vegetables and awareness of health risks (e.g., adverse effects of chewing tobacco) among a small percent of people. Most respondents revealed that the Katkaris don't have access to tech gadgets and smartphones, a few young people who can afford the technology uses them so digital communication is not feasible with this community. Though ASHA have created WhatsApp groups to convey important health related messages it is used by limited people. Overall, though the influence of TV and smartphones is restricted the tribal exhibit a keen interest in online messages about vaccination, health check-ups, and government schemes, actively participating in vaccination drives and screening camps. The community voiced out their preference for attending meetings to understand health related information especially government schemes rather than using the digital platform. Instead of social media the community trust ASHAs for health-related matters. ASHA reported that only approximately 20% of the community members adhere to the instructions provided in the health education sessions.

(Themes wise verbatim are given in annexure 1).

3.2.2 Theme 2. Challenges in the process of health communication

The respondents expressed that culture influences the tribal community's health behaviour, it is profound and persistent. The community feels a 'cultural disconnect' when trying to adapt to things from the mainstream society. Their distinct (unique) cultural identity sets them apart from mainstream culture, leading to hesitancy in embracing health messages and reluctance to abandon their traditional rituals and customs. In this way they reflect "Cultural Resilience" by adhering to their own cultural practices. They prioritize their cultural traditions over accepting the norms where they have to access healthcare or overcoming addictions.

It was found that the tribal community maintains a sceptical attitude toward government healthcare services, including a few tribal preferring home deliveries than hospital care. ASHA consistently faced challenges in persuading the population to opt for institutional deliveries. Despite health warnings and occurrence of tragic incidents, such as a death of women with oral cancer due to tobacco chewing addiction the community remains stubborn to their addiction habits, particularly tobacco use and alcoholism. The negative attitude was also observed during the COVID-19 pandemic, the community exhibited a lack of positive response to health initiatives, such as screening, testing, and vaccination. Their engagement often depends on expectations of monetary benefits from the government.

The findings revealed that the community trusts people who have supported them continuously including the brick kiln owners and agriculture landlords where they go for daily wage labour, and ASHA. ASHA reported that the community maintains privacy while sharing information related to health with external people such as clinicians or paramedical workers, prefers to keep distance, fostering a sense of isolation. These behavioural pattern affects the health communication. Another challenge is the community's belief in the knowledge passed down from their ancestors..

3.2.2.1 Subtheme 1. Health communication challenge: bridging the gap between understanding and action Addressing health-related behaviors within community involves more than just conveying information. Despite a shared understanding of concepts in local and national languages like Marathi and Hindi, translating this knowledge into consistent behavioural change remains a formidable challenge. One prevalent hurdle is the need for constant reinforcement. While community members comprehend health instructions, implementing practices such as proper handwashing before meals demands persistent reminders. The challenge lies in motivating individuals to consistently adhere to these crucial health practices. Motivation becomes a pivotal factor in shaping behaviour. Addition-

ally, a significant obstacle is faced when dealing with health messages related to preventive measures. These messages are often overlooked until they escalate into serious, chronic, or symptomatic conditions. The challenge in health communication is to find effective strategies that not only convey information but also instil lasting motivation for proactive health behaviours.

3.2.2.2 Subtheme 2. The barriers of language, social isolation, deep seated misconceptions significantly hinder process of health communication Communicating effectively with tribal presents a multifaceted challenge, with language barrier emerging as a significant hurdle. It is challenging for tribal communities to grasp health messages provided to them in the local language of Marathi, without a detailed explanation in their own dialect. They are bilingual, though they understand and speak Marathi, they are comfortable in their '*Katkari*' language. Illiteracy poses a significant challenge in health communication, as tribal struggle with reading and writing may have difficulty understanding written health materials, including instructions for medication or preventive measures. ASHAs and MOs reported that the community struggle to recall dates and specific symptoms, requiring them to employ probing techniques and relate information to other events for verification. The language barrier, coupled with low confidence due to limited exposure, impacts effective communication and trust-building with ASHAs and clinicians. Interestingly, they are in possession of knowledge about traditional medicines, home remedies which are often kept as secrets and not disclosed to outsiders. Even not shared to the clinician during medical visits if these remedies are being employed for treatment. ASHAs expressed a need to build strong connections through frequent visits to reinforce the health communication.

The Sarpanch, 'Gram Panchayat Head' highlighted that this community is isolated, as globalization has minimal impact on them, leaving them largely unaffected by external influences. He voiced significant concerns about the limited outreach of both the Government and the NGOs to the tribal community, which undoubtedly exacerbates their isolation.

Unconventional health beliefs include considering alcohol as a protective measure against infections, even attributing it greater nutritional value than milk. Conceptions about dietary practices regarding consumption of raw vegetables with stomach upset, hot and cold concept of foods (foods possessing hot and cold properties) inclination towards eating meat of different animals in different health conditions and trying varied organic jungle vegetables. These rigid concepts of the tribal affects the acceptance of the health messages.

3.2.2.3 Subtheme 3. Confidentiality challenge in health communication: navigating non-verbal channels The ASHAs reported that maintaining confidentiality is a concern when communicating sensitive information like a positive report of Tuberculosis (TB) or leprosy or pregnancy status results. This challenge often necessitates a reliance on non-verbal communication methods within a group or in a house setting, incorporating sign and body language. They have to ensure that these non-verbal cues effectively convey the required information while preserving the confidentiality of individuals involved. The ASHAs and community are skilled in using specific gestures and body language to convey messages, demonstrating proficiency non-verbal communication. The community takes pride in their ability to maintain secrecy using their own code language.

3.2.3 Theme 3. Strategies to reduce the barriers-trust and action

To overcome barriers in building trust with community, one effective strategy is to leverage personal connections formed during emergencies. These connections often serve as a foundation for establishing trust and rapport with the community. Incentivizing communication emerges as another potential strategy to improve engagement and participation. However, it's important to exercise caution when contemplating direct monetary rewards because of concerns regarding misuse of it i.e. for addiction purpose. Instead, exploring alternative incentives becomes essential to encourage active involvement in health messages and promote positive health outcomes within these unique and isolated communities. Moreover, it's crucial to recognize that these communities often respond promptly when health messages are tied to tangible outcomes. For instance, linking health messages to consequences, such as the withholding of medication at Government hospitals for individuals engaging in harmful behaviors like excessive drinking, can serve as a powerful catalyst for behavioural change. This linkage between action and consequence reinforces the importance of adopting healthier behaviors and motivates individuals to make positive changes for their well-being.

4 Discussion

This qualitative research explored the process and challenges of health communication in a tribal community of western Maharashtra, India. The role and significance of vertical healthcare systems in the process of communication is found, ASHA serving as a primary conduit for health communication, with television and smartphones in supplementary roles. The challenges within the realms of culture of tribal, language barriers, isolation from mainstream society, holding misconceptions, transfer of knowledge to action and issues with maintenance of confidentiality in conveying the messages is highlighted and strategies of trust and action emerged.

ASHA working with tribal may or may not belong to the tribe, they are recruited from the same or neighbouring villages, making a ground for connect and rapport, which facilitates her role. This role of health educator is defined in the guidelines of National Health Mission, (NHM) and studied extensively [15].

Television could prove as an effective platform for health communication provided that it has accessibility to the tribal people. The scarce numbers of TV sets in the villages reflects lack of accessibility similar to a study among Sabar tribes of Odisha [16]. Comparatively, in Chhattisgarh (central India), the Gond tribe have been influenced by active health awareness programs broadcasted via television and radio [17]. However, studies reveal varying television viewing habits among tribes, with some using it for entertainment rather than for education. There is a huge potential to formalize television's role in social upliftment of the tribal, as reported among tribes of Madhya Pradesh [18]. Developing and implementing culturally tailored television programs aimed at delivering health messages can aid cultural exchange and help mitigate socio-economic disparities. There is a potential for future research on the dimension of tribal needs in context to use of Television for health communication. The results show that use of smartphones among the tribal and its utilization for health education was restricted. Women didn't had smartphones but most men and young adults had them. They enjoyed entertainment and social media platforms like WhatsApp, Instagram, and Facebook. Similar findings were found in Jharkhand where tribal individuals lacked access to smartphones, posing a limitation in promoting mHealth app interventions that were executed in villages to improve maternal health awareness. Despite lower literacy levels compared to villages receiving traditional health education, the intervention successfully increased awareness about antenatal care among pregnant women [19]. Another study conducted in different region of Jharkhand, revealed that one-third of the surveyed tribal population had smartphones primarily for communication and entertainment purpose [20]. In contrast, tribal from central India, exhibited a higher smartphone penetration, with around 80% having access to smartphones, but using for entertainment purposes only [21]. The findings and discussion directs to a strategy to the government to upgrade technology in terms of accessibility in this community to improve the public health outputs.

The study's findings underscore the significant influence of culture on the reception of health messages within tribal communities. While tribal individuals attentively listen to these messages, they remain steadfast in preserving their cultural norms and practices. This cultural adherence often manifests as resistance to abandoning addictive behaviors, getting vaccinated, or seeking medical treatment, resulting in suboptimal health-seeking behaviours in spite of persistent dissemination of health education messages by ASHA. This behaviour is rooted in the anthropological theories of "Ethnocentrism," and "Culture Resilience" which highlights the community's inclination to prioritize its own culture and the reluctance to embrace health messages due to characteristic traits such as lack of openness [22]. They portrayed their culture's capacity to maintain and develop cultural identity and critical cultural knowledge and practices. This study becomes a pioneer to study analysis of how culture influences the reception of health communication.

As discussed above illiteracy and local dialect barriers lead to misreading or misunderstanding of the health messages among the tribal. An article specifically addressed the dominance of the "Dominant Language" over the "Minor language" within healthcare settings. In this context, all health communication content is developed and disseminated in Marathi (local language written and spoken in Maharashtra) rather than in the local dialect of the tribal community [23]. Corroborated by a study that reported that educational materials provided by government entities and NGOs often fail to effectively reach tribal communities due to high illiteracy rates and limited understanding of tribal languages among stakeholders [24]. Globally and nationally, lack of access to health information in native languages acts as a barrier for tribal impeding their ability to make informed decisions regarding their health [25]. In Bengal the elderly members of tribal communities, especially those who speak their local language Santhali, frequently encounter challenges in effectively communicating their health issues to the doctors and nurses affecting healthcare [26]. Addressing language barriers in healthcare across India necessitates a political dedication to offering non-discriminatory health services, particularly to marginalized groups like illiterate tribal [27]. Literacy acting as a barrier in health communication is a well-established evidence. There are reports of successful interventions that

has showed that education enhances health literacy, enabling informed decisions, better access to healthcare, and adoption of healthy behaviours for improved well-being [28].

In addition, seclusion from the main stream act as a barrier having effect on health communication, access to health services, exacerbating health disparities and reducing overall well-being. Given the minimal physical distances between tribal hamlets and rural villages in this study, encouraging cultural blending, inclusivity, and mutual acceptance could undoubtedly be beneficial. Currently, there is a lack of research in this specific area, although other studies have highlighted isolation as a significant obstacle in the health-seeking behaviour of tribal communities [29].

Tribal and ASHA following gestures and code language to maintain confidentiality in the communication is the naïve finding of this research study. There is no research to confirm or contrast the finding. The strategies of cultural sensitivity and engagement of the community in developing the content of health messages, can be integrated into celebrations of cultural occasions. Two states, Rajasthan and Tamil Nadu, demonstrated creative approaches to reach their target populations. In Rajasthan, health messages were effectively disseminated through live performances by local folk artists. This approach led to entertainment and cultural expressions to engage tribal communities actively. In Tamil Nadu, a blend of traditional and modern communication methods was employed. In addition to posters and hoardings, radio jingles and videos featuring popular film stars were used to communicate health messages to tribal communities, such innovation reduces the gaps in the health communication [30].

The finding regarding the myths and misconceptions surrounding diet, alcohol consumption, and other health-related factors reinforces the theory of "Ethnocentrism." Additionally, it illustrates their articulation of needs and strategies to enhance health communication within their context. Comprehensive multisite surveys across India can identify tribal health communication barriers, aiding policy formulation for improved health communication strategies.

5 Conclusion

The study has a limitation of lack of generalizability and no potential for replication because of the nature of the qualitative design. Culturally tailored strategies involving local engagement, traditional art forms, multimedia approaches, incentives for health workers, and prioritizing language diversity are essential. Combining these approaches can enhance health communication and improve health outcomes for Indian tribal communities.

Author contributions MG conceptualized, implemented, analyzed and developed the draft of the article, RP contributed to the implementation and reviewed the draft, RT reviewed the draft critically and gave input.

Data availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing interests The authors declare no competing interests.

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