

Research Article

Engagement of Panchayat Raj Institution (PRI) Members in Malaria Elimination Efforts in Remote Villages of Odisha, India

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DOI: <https://doi.org/10.24321/0019-5138-202431>

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How to cite this article:

Pardhan M M, Sahoo K C, Rana R, Ranjit M, Pati S. Engagement of Panchayat Raj Institution (PRI) Members in Malaria Elimination Efforts in Remote Villages of Odisha, India. *J Commun Dis.* 2024;56(2):45-52.

Date of Submission: 2024-04-25

Date of Acceptance: 2024-05-24

A B S T R A C T

Introduction: Malaria, a vector-borne disease, caused immense suffering to mankind globally. In 2022, an estimated 249 million malaria cases and 608,000 malaria deaths were reported from 85 countries. The World Health Organisation (WHO) has set the goal to eliminate malaria by 2030. Odisha, an east coast state of the Indian subcontinent is traditionally a high malaria endemic state contributing around 41% of malaria case load to the country in 2016. Maximum malaria cases were reported from the forest-covered mountainous areas of the state which are difficult to access.

Method: In 2017, the state adopted DAMaN (Durgama Anchalare Malaria Nirakaran) to eliminate malaria in remote villages, aligning with the national malaria elimination target. DAMaN's impact is profound, potentially reducing malaria cases by over 95% in 5-7 years. It is a community-based program with strong participation from Panchayati Raj Institutions (PRI) members. A qualitative study involving in-depth interviews of PRI members was conducted in six DAMaN districts, with data analyzed using thematic analysis and MAXQDA software.

Results: The study highlights a significant reduction in malaria cases in villages under the DAMaN initiative over the past five to seven years, due to increased awareness, new interventions, and improved access to healthcare. PRI members, responsible for local governance, are aware of the malaria-related issues and risks in their communities. They expressed relief over the drastic decline in cases, which has alleviated villagers' suffering and deaths.

Conclusion: The PRI members played a key role in achieving the goals of DAMaN by harnessing community participation and leveraging available resources in remote villages. Their contributions underscore the importance of community-driven initiatives.

Keywords: DAMaN (Durgama Anchalare Malaria Nirakaran), PRI (Panchayati Raj Institutions), Malaria, Odisha

Introduction

Malaria, a vector-borne illness, caused an estimated 249 million cases and 608000 malaria deaths in 85 countries in the year 2022.¹ Between 2010 and 2014, the incidence of malaria declined by 70% worldwide, which stayed mostly constant in the following five years.² The battle against malaria is a complex task that demands multifaceted efforts, constant vigilance, innovations and international collaboration.³ In order to move closer to the goal of eliminating malaria, the World Health Organization (WHO) set a target in 2015 for its worldwide Technical Strategy for Malaria 2016–2030 (GTS) to lower the worldwide malaria burden by 90% by 2030.⁴ Malaria continues to be a critical public health challenge in many remotely located rural communities worldwide. The earlier decrease in malaria cases has been attributed to scaling up routine interventions like free distribution of Long-Lasting Insecticidal Nets (LLINs) or insecticide-treated nets (ITN), periodic indoor residual spraying (IRS), prompt diagnosis and treatment of positive cases, and use of artemisinin-based combination therapy (ACTs) therapy for *Plasmodium falciparum* malaria treatment at the community level.^{5–7} Since 2017 the remotely located malaria endemic villages of Odisha have been included under Odisha's innovative malaria programme 'DAMaN' i.e. Durgama Anchalare Malaria Nirakaran.^{8–10} These villages under the DAMaN programme are witnessing fluctuations in malaria trends, reflecting both successes and ongoing challenges in the control efforts. Mass screening and treatment of all positive cases irrespective of fever and vector control measures are the main strategy of DAMaN which is conducted twice to thrice a year in a camp approach. DAMaN is a community-based programme.¹¹ Community-level antimalaria awareness and engagement of the community in malaria prevention and control are important components of the DAMaN programme. Community engagement (CE) is defined as 'a process of working collaboratively with groups of people who are affiliated by geographic proximity, special interests, or similar situations, with respect to issues affecting their wellbeing'.¹² Community engagement has been adopted by lower and middle-income countries (LMICs) to achieve malaria elimination which is in tandem with WHO's Global Technical Strategy for Malaria Elimination, 2016-2030.⁴

Panchayati Raj is a system of rural local self-government in India and has been established in all the states of India by the acts of the state legislature to build democracy at the grassroots level.¹³ It is entrusted with rural development and was constitutionalised through the 73rd Constitutional Amendment Act of 1992. Members of the Panchayati Raj Institutions (PRIs) are the key community stakeholders who reflect on the past and present and provide valuable insights into the evolution of malaria prevalence and

the effectiveness of new programme interventions. PRI members offer perspectives on the DAMaN Programme, highlighting its role in raising awareness, fostering community participation, and assessing its impact on malaria control measures. Their accounts shed light on the programme's strengths, such as increased awareness and access to healthcare services, as well as challenges, including logistical hurdles and the need for sustained engagement. The objective of this study is to understand the perspective of PRI members on the DAMaN Programme, their valuable insights into its perceived benefits, challenges, and the overall impact on malaria prevention and control in their villages which would help in improving the programme in the state of Odisha.

Method

Study Setting

We conducted the qualitative study in six districts of Odisha state situated on the east coast of India. The state lies between 17.7 °N and 22.73 °N latitudes and 81.37 °E to 87.53 °E longitudes and borders West Bengal and Jharkhand in the north, Chhattisgarh in the west, Andhra Pradesh and Telangana in the south. There are 30 districts, 58 subdivisions and 314 blocks out of which 118 are tribal blocks. There are 6798 Gram Panchayatas (GP) with 53845 villages. The urban areas of the state constitute five Municipal Corporations (MC), 45 Municipalities and 62 Notified Area Councils (NAC). Odisha state accounts for 3.5% of the total population of India with a projected population of 47.9 million in 2023. As per the 2011 census, out of approximately 42 million population, around 35 million (83%) are rural with males around 51% and females 49%. Schedule Tribe (ST) 9.6 million (22.9%), Schedule caste (SC) 7.2 million (17.13%). Odisha stands at the third position and as per the SC rank, stands at the eleventh position. The ST and SC population together is 40% of the total population of the state. Population density is 269 as against 382 national average. The sex ratio (female per 1000 male) is 978 against the national average of 940 while the ratio in urban areas remains on the lower side i.e., 934 against the 988 national average. The literacy rate increased substantially in 2011 than that of 2001 i.e., from 63.08 to 73.45 – male literacy is 82.40 and female 64.36. There are 62 tribes in Odisha as recognised by the constitution of the Indian Republic. There are 75 particularly vulnerable tribal groups (PVTG) in India and in Odisha, there are 13 PVTGs spread over 11 districts. The total PVTG population of Odisha is around 0.21 million which is 0.5% of the total population of the state.

Once Odisha was the worst malaria-affected state in India and for several decades it contributed to the highest number of malaria cases and malaria-related deaths in the country. Major parts of the hills and forests of the state

belong to the Eastern Ghat mountain range, which is filled with historic monuments, green-clad scenic beauty rich with minerals and flourished with mining activities and migratory floating population and the forest corridor covers around 33% of the state's areas. These forested and mountainous villages are mostly at high malaria risk due to favourable geo-climatic environments for both malaria vectors and parasites.

Study Design

In this phenomenological study, we engaged with members of the Panchayati Raj Institutions (PRIs), which serve as local self-governance systems, across six tribal-dominated districts in Odisha. These districts include Keonjhar, Anugul, Sundergarh,

Kandhamal, Rayagada, and Kalahandi.

Study Duration

The study was conducted from February 2020 to December 2021.

Participants

A total of 19 PRI members participated in our study, offering valuable insights into their perceptions and experiences related to malaria control efforts in their communities. For a comprehensive understanding of the participants, their detailed characteristics are provided in Table 1.

Table 1. Participant's Characteristics

Block	GP	Village	Number of Years as PRI Member	Age (Years)	Gender	Education (Standard)	Distance from SC (km)	No. of HH	No. of People			
									SC	ST	Gen	Total
Kishor Nagar	Handapa	Nuakholaregeda (forest, foothill, stream)	2 (new)	32	M	> 10th	5	44	0	205	05	209
Kishornagar	Kandheikulia	Charakhaman (near forest, natural drain)	2 (new)	26	M	> 10th	8	40	0	155	96	281
Athamalik	Sanahulla	Ghodabandhuni (near forest and natural drain)	2 (new)	35	F	9th	6	260	198	575	427	1200
Bhawanipatna	Jugasahi patina	Mundaguda (hilltop village)	3 (new)	38	F	10th	17	18	0	110	0	110
Bhawanipatna	Mianga Padar	Jugasahi Patana (near forest and hill)	4 (new)	30	F	9th	8	36	0	201	0	201
Narla	Barisinga	Barisinga (near river)	4 (new)	30	F	> 10th	3	248	0	0	0	975

Tumudibandha	Karukudama	Danungia	0	24	F	5th	7	30	0	All	0	174
Tumudibandha	Jharipasi	Theripasi (near forest and steam)	1 (new)	24	F	10th	2	118	Y	Y	0	868
Kotagada	Durgapanga	Bhaluguda (near forest)	3 (new)	26	F	< 5th	33	23	33	101	00	134
Tumudibandha	Bilamal	Kranjkana (near forest, foothill)	2 (new)	32	F	5th	8	32	0	All	0	164
Kotagada	Durgapanga	Niliguda (near forest)	3 (new)	42	F	5th–10th	18	62	80	143	32	254
Tumudibandha	Karukudama	Danungia (near forest, foothill, stream)	2 (new)	24	F	5th	7	30	0	All	0	174
Tumudibandha	Jharipasi	Theripasi (near forest and steam)	1 (new)	24	F	10th	2	118	Y	Y	0	868
Harichandanpur	Barei goda	Sanajimei	22 (old and new)	40	M	9th	6	14	0	62	0	62
Harichandanpur	Badapalashpal	Majhisahi	5 (new)	27	M	10th	3	15	0	85	0	85
Harichandanpur	Bareigoda	Badajamei	7 (new)	38	M	10th	14	30	0	142	0	142
Hrichandanpur	Badaplash pala	Nola Juanga Sahi (near forest)	5 (new)	27	F	10th	5	42	0	112 PVTG	0	230
Ramanaguda	Parikhil	Tarlin (forest and foothill)	1 (new)	52	M	5th	17	85	0	344	41	385
Kashipur	Sakarda	Rail near forest	2 (new)	46	M	< 5th	10	135	0	490	30	520

GP: Gram Panchayat, PRI: Panchayat Raj Institutions, SC: Scheduled Caste, HH: Household, ST: Scheduled Tribe, Gen: General, Km: Kilometer, PVTG: Particularly Vulnerable Tribal Group

Data Collection Methods, Data Management and Analysis

Written consent was obtained from the participant PRI members for face-to-face interviews. Interviewers used open-ended questions in Odia language for the interview and interviews were conducted in the local language. Each interview lasted an average of 20 minutes, with a range of 15 to 30 minutes. The interviews were carried out by trained research scholars involved in the study. For data management and analysis, the recorded interviews were transcribed verbatim and translated into English.

Thematic analysis was then employed, starting with the selection of the unit of analysis, which involved identifying meaning units from the interview transcripts that pertained to the aim of the study. These meaning units were condensed and coded, with similar codes grouped and collapsed into subcategories and categories. Categories represent groups of related codes, while themes were identified to illustrate the underlying meaning of the text. The coding process was facilitated using MAXQDA software. The findings were reported following the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines.

Ethical Approval

This study is part of the doctoral study conducted under the Indian Council of Medical Research (ICMR)-Regional Medical Research Centre, Bhubaneswar which was approved by the ethics committee of the institute (reference number ICMR-RMRCB/IHEC-2019/032 dated 16/10/2019) and was also approved by the Odisha state government's ethical committee of Health and Family Welfare Department.

Results

Four themes emerged: 1) Perception of Past and Present: Malaria Trends in The village Over the Last 6-7 Years, 2) PRI Members' Perspective Regarding DAMaN Programme: Awareness, Participation, and Impact, 3) DAMaN Programme: Community Perspectives, Challenges, and Benefits, and 4) Towards Malaria Elimination: Village Perspectives and Community Contributions.

Theme 1: Perception of Past and Present: Malaria Trends in Villages Over the Last Five Years

Several participants provided insights into the historical and status of malaria prevalence in their respective villages over the past five to seven years. The consensus among respondents is a notable decrease in malaria cases compared to the past, indicating a positive trend in malaria control efforts. The participants expressed optimism about the progress made in malaria control efforts over the last five to seven years. The consensus indicates a significant reduction in malaria cases attributed to increased awareness, government interventions, and

improved access to healthcare services. However, some respondents highlighted the importance of sustaining these efforts to achieve further reductions and eventual elimination of malaria from their villages.

Significant Reduction in Malaria Cases: Participants reported a substantial decrease in malaria cases compared to six to seven years ago. Previously, almost every household had individuals affected by malaria, but now, to their knowledge, there are no malaria cases being reported. Many respondents emphasised that the number of malaria patients has drastically reduced, indicating an overall improvement in malaria control.

Impact of Awareness and Government Programmes: Participants attributed the decline in malaria cases to increased awareness and various government interventions. Awareness programmes, distribution of mosquito nets, and initiatives like the DAMaN programme were cited as effective strategies in reducing malaria cases over these years. Government efforts, coupled with community participation in malaria prevention activities, have contributed to the improvement in malaria control.

Shift in Treatment-Seeking Behaviours: Previously, people relied on traditional practices like Jhada Phunka for treating fever, but now, they seek medical treatment and undergo blood testing for malaria diagnosis. There has been a shift towards seeking medical assistance for fever, leading to early detection and appropriate treatment of malaria cases.

Improved Access to Healthcare Services: Participants noted improvements in healthcare service delivery, including increased availability of malaria testing facilities and mass treatment in inaccessible areas. Accessible healthcare services have facilitated early diagnosis and prompt treatment of malaria cases, reducing malaria transmission.

Theme 2: PRI Members' Perspective Regarding DAMaN Programme: Awareness, Participation, and Impact

The PRI members exhibited a comprehensive understanding of the DAMaN programme aimed at malaria elimination in their respective villages. The PRI members' active involvement and advocacy played a pivotal role in raising awareness, promoting participation, and ensuring the success of DAMaN programmes in their villages. Their efforts have contributed significantly to reducing malaria transmission and improving overall health outcomes within their communities.

Awareness and Understanding: PRI members demonstrated familiarity with the DAMaN programme, highlighting its objectives and activities. They acknowledged the comprehensive nature of DAMaN camps, where malaria testing & treatment and various health check-ups like testing haemoglobin, sugar, blood pressure measurement and

measurements of weight, height & MUAC are conducted. Village meetings and door-to-door campaigns are organised by PRI members to inform and educate villagers about the benefits and importance of participating in DAMaN camps.

Active Participation: PRI members actively participated in DAMaN activities, including organising village meetings, encouraging villagers to attend DAMaN camps, and assisting health staff during the camps. They played a crucial role in mobilising community members and ensuring their participation in blood testing and other health check-ups conducted during DAMaN camps. PRI members collaborated with ASHA and Anganwadi workers to reach out to every household, emphasising the significance of malaria testing and preventive measures such as using mosquito nets and supporting indoor spraying.

Impact and Outreach: The DAMaN programme's impact was evident as PRI members noted a reduction in malaria cases in their villages. Free medicine and timely treatment for common illnesses were appreciated by the PRI members which could contribute to improved health outcomes. PRI members observed increased awareness among villagers regarding malaria prevention and early disease detection, leading to a proactive approach to seeking medical assistance for fever and undergoing malaria testing and treatment. Collaborative efforts between PRI members, health staff, Accredited Social Health (ASHA) and Anganwadi workers facilitated the effective implementation of DAMaN activities and maximised outreach, particularly in remote and inaccessible areas.

Theme 3: PRI Members' Perspective Regarding DAMaN Programme: Community Perspectives, Challenges, and Benefits

The PRI members emphasised the importance of continuing the DAMaN programme to sustain the progress made in malaria control and improve overall community health. Despite challenges, the programme's benefits were evident in reducing malaria prevalence, increasing healthcare access, and fostering community awareness about preventive measures. Continued collaboration between government health authorities, PRI members, and community stakeholders will be crucial for the sustained success of DAMaN in malaria elimination efforts. The PRI members shared their insights on the DAMaN programme, reflecting on community perspectives, challenges faced, and the benefits accrued:

Community Perspectives: The DAMaN programme was widely regarded as beneficial and essential for malaria elimination by PRI and community members alike. Villagers appreciated the comprehensive nature of DAMaN camps, which not only focused on malaria testing and treatment but also addressed other health concerns. Despite the

absence of ASHA workers in some villages, DAMaN was seen as instrumental in raising awareness about health issues and providing accessible healthcare services.

Challenges Faced: Challenges such as poor road conditions, limited accessibility to remote villages, and fear of wild animals were identified, particularly in forested and hilly areas. Encouraging participation from all villagers, especially peasants and daily wage earners, during DAMaN camps posed logistical challenges due to conflicting work schedules. Overcoming misconceptions and traditional beliefs regarding blood testing and treatment required continuous education and community engagement efforts.

Benefits of DAMaN Programme: The DAMaN programme was credited with significantly reducing malaria cases in villages, with many PRI members noting a noticeable decline in malaria transmission. Villagers appreciated the convenience of receiving free health check-ups, malaria testing, and treatment at the village level, eliminating the need for costly and time-consuming trips to medical facilities. Increased awareness about malaria prevention, early detection, and the importance of using mosquito nets was observed among villagers, leading to proactive health-seeking behaviours.

Theme 4: Towards Malaria Elimination: Village Perspectives and Community Contributions

The PRI members emphasised the importance of collaborative efforts between villagers, government agencies, and healthcare workers to achieve malaria elimination goals. By fostering community engagement, raising awareness, and implementing targeted interventions, villages can work towards creating malaria-free environments and improving overall health outcomes. The PRI members provided insights into their strategies and perspectives on achieving malaria elimination at the village level, emphasising community involvement and awareness-raising efforts.

Community Awareness and Engagement: PRI members recognised the importance of raising awareness among villagers about malaria prevention strategies, such as using LLIN, maintaining cleanliness, and seeking timely medical assistance. Door-to-door visits, along with ASHA, were suggested as effective means to educate villagers about malaria prevention measures and the importance of blood testing in case of fever. Encouraging community cooperation, particularly in keeping the surroundings clean and preventing water stagnation, was highlighted as essential for the malaria elimination drive.

Challenges and Suggestions: Challenges such as poor road connectivity, inadequate distribution of LLIN, and the absence of ASHA in some villages were noted. These issues need the attention of government intervention.

Suggestions included the need for more frequent DAMaN camps, ideally in every two to three months interval to maximise the benefits of malaria testing and treatment. PRI members proposed engaging dedicated personnel, such as village-level malaria workers, to focus specifically on malaria control activities and ensure sustained efforts towards the elimination efforts.

Strategies for Malaria Elimination: Strategies outlined by PRI members included promoting the use of cloth-made mosquito nets, conducting DDT spray, and utilising resources like the Gaon Kalyan Fund for malaria-related activities. Emphasis was placed on community-driven initiatives, such as self-help groups inspecting mosquito net usage and encouraging DDT spray to control mosquito populations. Leveraging existing community structures like Ward Members, ASHA workers, and Gaon Kalyan Samiti members was highlighted as crucial for disseminating malaria prevention messages and ensuring community participation.

Discussion

As per the WHO document, malaria is a life-threatening illness caused by Plasmodium parasites, spread to people through the bites of infected female Anopheles mosquitoes. It is preventable and curable. Community participation plays an important role in malaria prevention and control at the community level.^{14,15} and community engagement is crucial in assuring sustainability and implantation of vector control interventions.¹⁶ Community participation is very essential for malaria control in remotely located areas having poor reach to healthcare services due to inherent physical difficulty. It encourages community members to be self-aware regarding the problems faced in their community living, seek solutions for better living and give attention to the underprivileged section.¹⁷⁻²⁰ It has been noticed in malaria studies that even people having a good understanding of the malaria risk in the population may not take steps for self-protection and protection of vulnerable households.²¹

The findings of this study highlight the positive trend in malaria control efforts in villages under the DAMaN initiatives over the last five to seven years with a significant reduction in malaria cases attributed to increased awareness, new intervention, and improved access to healthcare services. PRI members are responsible for the local-level governance. The interview findings show that they are aware of their local problems due to malaria and the risk to their villagers. PRI members have shown their concern about the peoples' sufferings and deaths due to malaria that occurred in their villages before the DAMaN programme and have expressed relief as there has been a drastic decline in malaria cases year by year. Participants noted a shift in the treatment-seeking behaviours of the

local people towards medical assistance for fever, leading to early detection and appropriate treatment for malaria cure.

It is well understood that the PRI members play a crucial role in raising awareness, promoting community participation, and ensuring the success of the DAMaN programme aimed at making the remote villages malaria-free. The programme's impact was evident as malaria cases drastically reduced, healthcare access increased and community awareness about malaria preventive measures enhanced. PRI members loudly expressed some critical non-medical concerns as hurdles for malaria elimination, e.g. poor road connectivity and limited accessibility to remote hamlets and emphasised the need for continued collaboration between government authorities, PRI members, and community members. They showed keen interest in sustaining the progress made in malaria control and working towards malaria-free villages. Their voices highlight the importance of community engagement, the need for improved access to healthcare services, and the ongoing efforts to address the barriers to effective malaria control.

Conclusion

At the community level, PRI members are key community stakeholders in malaria control efforts. Looking towards the future, PRI members express their aspirations for malaria elimination in their villages. Their contributions underscore the importance of community-driven initiatives, such as raising awareness, promoting preventive measures, and advocating for improved healthcare infrastructure. By harnessing community participation through the active support of PRI members and leveraging available resources, the remote villages under the DAMaN programme can strive towards the goal of malaria elimination and improved health outcomes for all the residents.

The findings cemented based on Consolidated Criteria for Reporting Qualitative Research guidelines show the concern and interest of the PRI members to make their village malaria-free using the available resources and enhancing community participation.

Authors' Contributions

Madan Mohan Pradhan conceptualised the study and collected data. Krushna Chandra Sahoo analysed the data and wrote the interpretations. Ramakanta Rana compiled the data and prepared it as per the submission guidelines of the journal. Manoranjan Ranjit drafted the manuscript. Sanghamitra Pati executed the project, raised the funds and edited the manuscript.

Acknowledgement

The authors thank the generous support of the Vector Borne Disease (VBD) consultants of the following six districts: Keonjhar, Anugul, Sundargada, Kalahandi, Rayagada, and

Kandhamal and the VBD Technical Supervisors (VBDS) of the blocks who facilitated conducting the face-to-face interviews with the PRI members at their doorsteps.

Source of Funding: None

Conflict of Interest: None

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