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Research Article

Community Healthcare Providers' Perspective on Malaria Control in Difficult Terrains (DAMaN) in Odisha, India

Madan Mohan Pradhan[1], Krushna Chandra Sahoo[2], Annapurna Patra[3], Nirupama Das[4], Baladeba Nanda[5], Kumuda Chandra Sahu[6], Santosh Bagh[7], Sanghamitra Pati[8]

[1,3]Vector Borne Diseases (VBD), Boudh, Odisha, India
[2,8]ICMR-Regional Medical Research Centre, Bhubaneswar, Odisha, India
[4]Vector Borne Diseases (VBD), Anugul, Odisha, India
[5]Vector Borne Diseases (VBD), Keonjhar, Odisha, India
[6]Vector Borne Diseases (VBD), Kandhamal, Odisha, India
[7]Vector Borne Diseases (VBD), Kalahandi, Odisha, India
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I N F O

Corresponding Author:
Madan Mohan Pradhan, Vector Borne Diseases (VBD), Boudh, Odisha, India
E-mail Id:
drmmpradhan@gmail.com
Orcid Id:
https://orcid.org/0000-0002-6901-5441
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A B S T R A C T

Introduction: Malaria remains a major public health challenge, especially in remote areas with limited healthcare. The WHO-endorsed Mass Testing and Treatment (MTaT) strategy targets high-prevalence regions by screening and treating entire populations. In India, Odisha's DAMaN programme integrates MTaT with health services to combat malaria in tribal communities. This study explores community healthcare providers' perspectives on MTaT under DAMaN.

Methods: The study involved 53 community health workers (CHWs) from five districts, including Accredited Social Health Activists, Auxiliary Nurse Midwives, and Community Health Officers. Data were analysed using thematic analysis.

Results: Three themes emerged: 1) Equity in malaria service delivery among remote, hilly areas and vulnerable tribal populations, 2) Non-malaria service benefits from mass testing and treatment of malaria in remote areas, and 3) Challenges and suggestions for addressing implementation gaps. The DAMaN programme has significantly reduced malaria prevalence and improved healthcare access in remote villages by integrating malaria control with broader health services and fostering community engagement. It has strengthened trust in public healthcare systems and improved health outcomes. However, challenges like infrastructure, workforce limitations, socio-cultural resistance, and resource availability need to be addressed to sustain its impact.

Conclusion: Suggestions for improving scheduling flexibility, increasing camp frequency, incentivising volunteers, and fostering inter-departmental collaboration could further strengthen DAMaN's effectiveness and sustainability.

Keywords: Malaria, Mass Testing and Treatment, DAMaN Programme, Community Healthcare Providers, Implementation Challenges

Introduction

Malaria remains a significant public health challenge globally, despite notable progress in reducing its burden, particularly in the World Health Organization (WHO)'s Southeast Asia Region, including India.[1] While malaria-related mortality and morbidity have declined over the past two decades, it continues to be a global health priority, particularly in remote and rural areas where limited healthcare access exacerbates the risk during transmission seasons.[2,3] In such contexts, innovative strategies are essential to combat malaria and safeguard vulnerable populations.

The Mass Testing and Treatment (MTaT) strategy, as recommended by WHO, is a focused public health intervention designed to reduce malaria transmission in endemic regions.[4] By screening entire populations, including asymptomatic carriers, and promptly treating positive cases, MTaT addresses hidden reservoirs of infection often missed by routine surveillance.[4] This approach is particularly relevant in hard-to-reach areas with high malaria prevalence, where traditional control measures may fall short. However, effective implementation of MTaT requires robust health systems and active community involvement of community healthcare providers (CHWs).[5–8]

In India, the state of Odisha, traditionally a high malaria-endemic region, has adopted the innovative Durgama Anchalare Malaria Nirakaran (DAMaN) programme since 2017.[9–11] DAMaN integrates MTaT with intensive vector control measures, health check-ups for pregnant mothers and young children, and community-driven initiatives to address common health concerns in malaria-endemic villages.[9–11] Conducted biannually in a camp-based approach, DAMaN specifically targets remote, tribal, and hard-to-reach areas during challenging monsoon seasons. The programme's success heavily relies on the active participation of Accredited Social Health Activists (ASHAs), Auxiliary Nurse Midwives (ANMs), and Community Health Officers (CHOs).[5–8]

ASHAs, ANMs, and CHOs form the backbone of the primary healthcare system in these remote areas. ASHAs, incentivised under the National Health Mission, play a pivotal role in organising camps, conducting rapid diagnostic tests (RDTs), raising awareness about malaria prevention, and reporting malaria cases.[6,7] ANMs provide technical guidance, oversee community-level activities, and ensure the delivery of national health programmes, while CHOs manage Sub-Centre–Health Wellness Centres (SC-HWCs), diagnose and treat malaria cases, and refer severe cases to higher facilities. Together, these healthcare providers not only ensure timely malaria detection and treatment but also address broader health challenges, including maternal and child health, in these underserved areas.

Despite its innovative design and promising results, challenges remain in DAMaN's implementation. Issues such as road connectivity, cultural resistance to preventive measures like the use of mosquito nets, and human resource constraints often hinder the programme's effectiveness.[4] Understanding the perspectives of CHWs—who are directly involved in implementing DAMaN—can provide valuable insights into the programme's benefits, operational challenges, and areas for improvement.[8] This study explores the experiences and perspectives of ASHAs, ANMs, and CHOs on the DAMaN programme in Odisha, India. It aims to identify the perceived benefits of the programme, highlight implementation gaps, and gather suggestions to enhance its effectiveness. Furthermore, the study seeks to understand the broader health impacts of DAMaN, offering insights into its role in malaria elimination and its contributions to overall community health in remote, malaria-endemic regions.

Methods

Study Design, Settings and Participants

This study employed a qualitative design to explore the perspectives of community healthcare providers on the Mass Testing and Treatment (MTaT) strategy under the DAMaN programme in Odisha, India. The DAMaN programme operates across 23 of Odisha's 30 districts, targeting areas with high malaria endemicity. For this study, five districts—Keonjhar, Kandhamal, Kalahandi, Boudh, and Anugul—were selected to represent diverse regions of the state. These districts were chosen to capture a broad range of malaria transmission dynamics and healthcare accessibility challenges. All five districts are malaria-endemic, with significant reductions in malaria indicators over time. The Annual Parasite Incidence (API) in these districts ranged from 8 to 38 in 2016 and declined to 0.07 to 5 in 2021. Similarly, the proportion of *Plasmodium falciparum* (Pf%), the most severe malaria-causing parasite, remained high, ranging from 77% to 88% in 2016 and increasing slightly from 84% to 89% in 2021.[10]

The participants in this study were drawn from diverse blocks and health sub-centres within these districts, ensuring a comprehensive representation of perspectives from regions with distinct malaria control challenges. Detailed participant characteristics are summarised in Table 1. The study included 53 community health workers (CHWs) from five districts in Odisha, encompassing Accredited Social Health Activists (ASHAs), Auxiliary Nurse Midwives (ANMs), and Community Health Officers (CHOs). Participants varied widely in age, education, and experience, offering diverse insights into their roles in malaria control under the DAMaN programme.

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The ASHAs (n = 36) primarily held high school or upper primary education levels, with malaria control experience ranging from 0 to 18 years. They demonstrated a strong understanding of the DAMaN initiative, vector control measures, and non-malaria healthcare services. The ANMs (n = 14) were typically trained in nursing and had extensive professional experience, with many serving in malaria control for over a decade. They were integral to supervising and guiding ASHAs while ensuring programme implementation at the community level. The CHOs (n = 3), mostly nursing graduates, had relatively less experience (1–2.5 years) in malaria control programmes but brought advanced training and leadership skills, contributing to the effective management of Sub-Centre–Health Wellness Centres (SC-HWCs).

Participant ages ranged from 24 to 63 years, with an average of 7.5 years of experience in malaria control programmes and participation in 3–36 training sessions on malaria. All participants demonstrated knowledge of the DAMaN programme, vector control strategies, and broader non-malaria services, reflecting their preparedness and capacity to address both malaria and other health challenges in their communities. This diverse group of CHWs, with their varying roles, educational backgrounds, and field experiences, highlights the multifaceted workforce underpinning the success of DAMaN in remote and underserved malaria-endemic areas. Their perspectives provide critical insights into the programme's operational strengths, challenges, and areas for improvement.

Table 1.Characteristics of Participants

District	Block	Health Sub-Centre	Designation	Age (Years)	Education	Experience in Malaria Control Programme (Years)	Total Number of Trainings on Malaria	Involved in DAMaN (Years)	Knowledge of DAMaN	Knowledge of Vector Control	Knowledge of Non-Malaria Service
Keonjhar	Harichandpur	Bareigoda	ASHA	30	High school	4	3	6	Yes	Yes	Yes
Keonjhar	Harichandpur	Bareigoda	ASHA	32	High school	10	5	6	Yes	Yes	Yes
Keonjhar	Harichandpur	Bareigoda	ASHA	40	High school	11	5	6	Yes	Yes	Yes
Keonjhar	Harichandpur	Bareigoda	ASHA	35	High school	8	4	6	Yes	Yes	Yes
Keonjhar	Harichandpur	Tangriapal	ASHA	44	High school	8	4	8	Yes	Yes	Yes
Keonjhar	Harichandpur	Billa	ASHA	42	High school	5	4	4	Yes	Yes	Yes
Kandhamal	Khajuripada	Mudrukumpa	ANM	40	Nursing	13	10	8	Yes	Yes	Yes
Kandhamal	Khajuripada	Mudrukumpa	ANM	43	Nursing	14	3	7	Yes	Yes	Yes
Kalahandi	Bhawanipatna	Pokharighat	CHO	26	Nursing	1	2	7	Yes	Yes	Yes
Kalahandi	Bhawanipatna	Junasaipatana	ANM	44	Nursing	11	3	7	Yes	Yes	Yes
Kalahandi	Bhawanipatna	Jugasaipatana	ASHA	33	Upper primary	10	3	7	Yes	No	Yes
Kalahandi	Bhawanipatna	Jugasaipatana	ANM	24	Nursing	10	4	7	Yes	Yes	Yes

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Kalahandi	Bhawanipatna	Jugasaipatana	ASHA	32	High school	10	4	6	Yes	Yes	Yes
Boudh	Boudh	Rugudikanpa	ASHA	63	Upper primary	7	2	3	Yes	Yes	Yes
Boudh	Boudh	Rugudikanpa	ASHA	32	High school	0	5	8	Yes	Yes	Yes
Boudh	Boudh	Ambajhari	ASHA	24	High school	3	1	3	Yes	Yes	Yes
Boudh	Boudh	Ambajhari	ASHA	35	High school	10	2	3	Yes	Yes	Yes
Boudh	Boudh	Ambajhari	ANM	36	High school	7	7	8	Yes	Yes	Yes
Boudh	Boudh	Ambajhari	CHO	26	BSC nursing	1	1	1	Yes	Yes	Yes
Boudh	Boudh	Tilipanga	CHO	36	BSC nursing	1	2	1	Yes	yes	Yes
Boudh	Boudh	Tilipanga	ASHA	37	High school	17	8	4	Yes	Yes	Yes
Keonjhar	Harichandpur	Tangriapal	ASHA	36	High school	7	5	7	yes	yes	Yes
Boudh	Boudh	Tikarpada	ASHA	41	Upper primary	3	3	3	Yes	Yes	Yes
Boudh	Boudh	Rugudikanpa	ASHA	46	Upper primary	5	3	4	Yes	Yes	Yes
Boudh	Boudh	Baghipada	ASHA	37	High school	4	5	6	Yes	Yes	Yes
Kandhamal	Khajuripada	Sudukumpa	ASHA	30	High school	7	3	8	Yes	Yes	Yes
Kandhamal	Khajuripada	Sudukumpa	ANM	40	Nursing	13	10	8	Yes	Yes	Yes
Kandhamal	Khajuripada	Sujukumpa	ANM	43	Nursing	14	3	6	Yes	Yes	Yes
Boudh	Harbhanga	Chatrang	ASHA	37	High school	5	10	5	Yes	Yes	Yes
Boudh	Harbhanga	Kharbhuin	ASHA	34	High school	11	1	7	Yes	Yes	Yes
Boudh	Harbhanga	Talagaon	ASHA	29	High school	7	3	7	Yes	Yes	Yes
Boudh	Harbhanga	Talagaon	ASHA	32	High school	5	3	7	Yes	Yes	Yes
Boudh	Harbhanga	Talagaon	ASHA	40	Upper primary	8	3	8	Yes	Yes	Yes
Boudh	Harbhanga	Kharbhuin	CHO	30	Nursing	2.5	3	2	Yes	Yes	Yes

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Boudh	Harbhanga	Chatrang	ANM	45	Nursing	7	4	7	Yes	Yes	Yes
Boudh	Harbhanga	Adenigarh	ASHA	44	High school	18	6	10	Yes	Yes	Yes
Boudh	Harbhanga	Adenigarh	ASHA	37	High school	9	6	9	Yes	Yes	Yes
Boudh	Harbhanga	Adenigarh	ASHA	35	High school	9	5	9	Yes	Yes	Yes
Boudh	Harbhanga	Adenigarh	ANM	54	Nursing	24	8	7	Yes	Yes	Yes
Boudh	Harbhanga	Talagaon	ANM	58	Nursing	34	34	7	Yes	Yes	Yes
Boudh	Harbhanga	Talagaon	ANM	59	Nursing	35	35	7	Yes	Yes	Yes
Boudh	Harbhanga	Talagaon	ANM	60	Nursing	36	36	8	Yes	Yes	Yes
Anugul	Palhada	Iti	ASHA	40	High school	10	4	10	Yes	Yes	Yes
Anugul	Kishornagar	Damur	ANM	35	BSC	12	3	7	Yes	Yes	Yes
Anugul	Atthamalik	Sanhula	ASHA	42	High school	17	3	4	Yes	Yes	Yes
Anugul	Atthamalik	Spaghera	ASHA	51	High school	3	3	3	Yes	Yes	Yes
Anugul	Anugul	Balanga	ANM	32	Nursing	12	3	6	Yes	Yes	Yes
Anugul	Kishornagar	Landriakata	ANM	57	Nursing	35	5	7	Yes	Yes	Yes
Anugul	Kishornagar	Angapada	ANM	40	Nursing	14	6	7	Yes	Yes	Yes
Anugul	Kishornagar	Parsumal	ANM	35	Nursing	14	4	7	Yes	Yes	Yes

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The ethical committee of the Indian Council of Medical Research (ICMR), Regional Medical Research Centre, Bhubaneswar approved (ICMR-RMRCB/IHEC-2019/032 dated 16/10/2019) the study. Additionally, the Health and Family Welfare Department of the Odisha state government has approved this research. Written consent was obtained from all participants.

Data Collection, Management and Analysis

The study explored the CHWs' experiences, perceived benefits, operational challenges, and suggestions for improving malaria control and prevention efforts. The qualitative approach enabled an in-depth understanding of the role and contributions of community health workers in implementing the DAMaN programme, while also identifying barriers and opportunities for enhancing its impact in remote, high-transmission areas.

We conducted face-to-face in-depth interviews (IDIs) with participants using open-ended questions to elicit detailed responses. The interviews were carried out in the local language to ensure comfort and comprehension, lasting an average of 20 minutes, with durations ranging from 15 to 30 minutes. Trained staff with experience in the malaria control programme facilitated the interviews, ensuring a nuanced understanding of the participants' perspectives. This study was conducted from April -August 2024.

All interviews were audio-recorded, transcribed verbatim, and subsequently translated into English for analysis. The data were analysed using thematic analysis,[12] with open coding performed using MAXQDA software to identify key themes and insights. The study adhered to the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines,[13] ensuring methodological rigour and transparency in the reporting of findings.

Results

Three themes emerged: 1) Equity in malaria service delivery among remote, hilly areas and vulnerable tribal populations, 2) Non-malaria service benefits from mass testing and treatment of malaria in remote areas, and 3) Challenges and suggestions for addressing implementation gaps.

Theme 1: Equity in Malaria Service Delivery among Remote, Hilly Areas and Vulnerable Tribal Populations

The DAMaN programme has made significant strides in promoting equitable access to malaria prevention and treatment, particularly in remote and hilly regions inhabited by vulnerable tribal populations. These areas, often characterised by limited healthcare infrastructure and challenging terrain, have benefited immensely from DAMaN's targeted interventions. Respondents emphasised the programme's ability to bridge the healthcare gap by reaching underserved communities with critical services such as malaria screening, diagnosis, and treatment.

"By this programme, we are able to provide service in difficult-to-reach villages and detect malaria and treat malaria-affected people." (CHO)

The use of Rapid Diagnostic Tests (RDTs) has enabled the timely identification of malaria cases, including asymptomatic infections, which are often overlooked in conventional healthcare settings. The provision of free medications has been a game-changer for economically marginalised tribal populations, ensuring that financial barriers do not hinder access to lifesaving treatments.

"We are doing malaria blood tests and medicines are given free. DAMaN saves people from malaria." (ANM)

Furthermore, DAMaN camps offer a platform for comprehensive health services, addressing not only malaria but also broader healthcare needs, such as antenatal care, child health monitoring, and screenings for common diseases. This integrated approach has significantly improved healthcare equity in areas that traditionally lack access to even basic health services. By prioritising these vulnerable populations and addressing systemic barriers to care, DAMaN exemplifies a model of equitable healthcare delivery that aligns with the principles of social justice and inclusivity.

The DAMaN (Durgama Anchalare Malaria Nirakaran) programme has been transformative in addressing malaria in remote, hard-to-reach areas. Respondents widely acknowledged its role in significantly reducing malaria cases through timely detection and treatment. The use of Rapid Diagnostic Tests (RDTs) has been particularly effective in identifying and managing asymptomatic malaria cases. Additionally, the programme's provision of free medicines has enhanced accessibility in regions with limited healthcare facilities.

"We are doing malaria blood tests, and medicines are given free. DAMaN saves people from malaria." (ASHA)

Health workers and ASHAs highlighted that the programme has brought healthcare services closer to underserved communities, earning them respect and trust. ASHAs, in particular, noted their enhanced community status and growing confidence due to their active role in malaria control and their involvement in other health activities, such as antenatal care, growth monitoring of under-five children, and screening for non-communicable diseases.

DAMaN camps, described as having a festive atmosphere, have increased community participation and acceptance. However, ASHAs reported challenges, including navigating remote areas during adverse weather and overcoming resistance due to traditional beliefs. Despite these obstacles, they expressed satisfaction in observing tangible reductions

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in malaria cases and gaining opportunities to enhance their knowledge and skills in disease management.

Theme 2: Non-Malaria Service Benefits from Mass Testing and Treatment of Malaria in Remote Areas

Community health workers (CHWs) emphasised that while the primary objective of DAMaN is to reduce the malaria burden, its implementation has yielded significant non-malaria health benefits for underserved communities. The programme's holistic approach extends beyond malaria by addressing broader health challenges in these remote areas. Through regular visits by health workers and mobile medical units, communities now have access to essential services, including immunisations, maternal healthcare, and treatment for common illnesses.

"Health check-up of pregnant mothers and children is done. We take care to improve their health conditions". (ASHA)

Mobile health teams equipped with diagnostic kits and medicines have improved access to healthcare in areas previously lacking basic infrastructure. Additionally, the training provided to local health workers has enhanced their ability to manage a wider spectrum of health issues, empowering them to address not only malaria but also other community health concerns. This capacity building ensures sustainable improvements in local healthcare delivery.

Screening for non-communicable diseases (NCDs) such as hypertension, diabetes, and anaemia has been integrated into the programme, strengthening its contribution to overall community health. This comprehensive approach bridges gaps in healthcare services and significantly improves the well-being of the population. By reaching these underserved regions, DAMaN has helped reduce disparities in healthcare access between tribal and urban areas, bringing critical services closer to the communities in need.

In addition to direct healthcare services, community awareness campaigns for malaria prevention, such as promoting the use of insecticide-treated bed nets and hygiene practices, have inadvertently reduced the prevalence of other communicable diseases like diarrhoea, typhoid, and respiratory infections. These campaigns also highlight the importance of nutrition and help in improving the health of children and pregnant women. The active participation of tribal communities in these initiatives fosters a sense of ownership and trust in healthcare systems, encouraging proactive health-seeking behaviour.

Moreover, women, often the primary caregivers, have been particularly empowered through DAMaN. Increased knowledge about disease prevention, nutrition, and the importance of timely treatment has enhanced their ability to safeguard their families' health.

The programme's infrastructure for malaria surveillance, including health camps and data collection systems, has been leveraged to monitor and address outbreaks of other diseases, such as dengue. The distribution of bed nets and education on their proper use have instilled habits of preventive care and environmental cleanliness, benefitting public health at large.

These non-malaria benefits illustrate how focused disease-control initiatives like DAMaN can holistically improve public health in marginalised areas, creating a ripple effect of better healthcare access, awareness, and resilience in vulnerable communities.

Theme 3: Challenges and Suggestions for Addressing Implementation Gaps

While DAMaN has achieved considerable success, community health workers (CHWs) highlighted several challenges that could impact its sustainability and effectiveness. One of the most pressing issues is inadequate road connectivity, which hampers access to remote villages and limits the consistent delivery of healthcare services.

"Steps should be taken for good road communication. Improved road connectivity is a critical need to bridge the gap between health services and underserved populations." (CHO)

Another recurring concern is the timing of health camps, which often clashes with villagers' daily routines. Many CHWs shared that greater flexibility in scheduling, such as conducting nighttime sessions, could boost participation. Moreover, some respondents advocated for more frequent DAMaN camps—ideally every three months—to ensure continuity in healthcare delivery and better follow-up on cases.

Human resource constraints and logistical challenges also emerged as significant barriers. CHWs reported feelings of burnout due to the vast coverage required, particularly during challenging seasons like summer and monsoons. Limited personnel and stretched resources make it difficult to sustain the programme's high standards. Additionally, supply chain issues, such as shortages of essential medical supplies, have affected the smooth functioning of the programme.

Traditional beliefs and cultural practices in certain areas further complicate implementation. For instance, the use of mosquito nets during hot and humid months was described as impractical by many villagers, reducing their adoption despite awareness efforts. To address this, respondents suggested indoor residual spraying as an alternative during these periods to ensure effective malaria prevention.

Despite these challenges, the programme has made strides in fostering community engagement, which CHWs believe

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is vital to its success. Awareness initiatives about malaria prevention, including the use of Long-Lasting Insecticidal Nets (LLINs) and environmental cleanliness, have created a sense of responsibility among villagers.

"People are aware of the DAMaN programme. DAMaN has saved people from malaria." (ANM)

The role of DAMaN volunteers has been instrumental in organising camps, liaising with community leaders, and raising awareness. However, respondents emphasised the need to incentivise these volunteers for follow-up activities outside of the camp setting. Such incentives could ensure continuous monitoring of malaria cases and improve the overall effectiveness of the programme. Collaboration with other government departments was another suggestion to enhance programme outcomes.

"If other departments can collaborate with the health department, DAMaN can be more successful." (ANM)

Integrating resources and efforts across departments could enable a more comprehensive approach to addressing the interconnected health and socio-economic challenges in remote areas. By addressing these implementation gaps, DAMaN can strengthen its impact and ensure sustainable health outcomes in the communities it serves.

Discussion

The DAMaN programme has demonstrated significant success in reducing malaria prevalence and improving healthcare access in remote, hard-to-reach villages. By integrating malaria control with broader health services and fostering community engagement, the programme has strengthened trust in public healthcare systems. Positive feedback from community members highlights its effectiveness in reducing malaria cases and improving health outcomes. However, challenges related to infrastructure, workforce limitations, socio-cultural resistance, and resource availability must be addressed to sustain and enhance its impact. As one participant aptly noted, "DAMaN is a very good government programme. People in hard-to-reach villages are benefitted being relieved from malaria." With continued support and strategic improvements, DAMaN has the potential to further transform health services in these underserved communities.

DAMaN has successfully bridged healthcare gaps in remote and hilly regions, reaching underserved tribal populations with limited infrastructure. By deploying targeted interventions such as Rapid Diagnostic Tests (RDTs) and providing free medications, the programme has effectively reduced malaria disparities in these communities.[4,6–8] The use of RDTs ensures timely detection, including of asymptomatic cases, while the provision of free medications eliminates financial barriers to treatment. This approach is crucial in addressing systemic inequities faced by economically and socially marginalised tribal communities, ensuring they receive essential healthcare services that would otherwise be inaccessible due to geographic, financial, and infrastructural constraints.[8–10]

Incorporating non-malaria health services such as antenatal care and child health monitoring within malaria intervention camps has proven to be highly beneficial in improving overall community health. By addressing multiple health needs in a single visit, DAMaN has effectively reduced barriers to healthcare access, especially in remote areas where health infrastructure is limited. This integrated healthcare approach not only enhances the immediate impact of malaria control but also promotes broader health improvements, including maternal and child health.[14–16] Through this holistic model, DAMaN fosters equity and inclusivity, ensuring that vulnerable populations receive comprehensive care, regardless of their geographical or socio-economic status.

The festive atmosphere of DAMaN camps has played a crucial role in fostering higher community involvement and trust in the healthcare system.[6] These camps, often described as lively and welcoming, have encouraged active participation from local populations, enhancing their acceptance of malaria control efforts and broader health services.[8–11] The informal, community-centred approach has helped break down barriers, making healthcare feel more accessible and less intimidating. To further enhance community engagement, strategies such as tailoring service timings to align with villagers' daily routines—offering evening or weekend sessions—could improve attendance and ensure that more people benefit from these vital services.

The DAMaN programme exemplifies the empowerment of frontline health workers, including Accredited Social Health Activists (ASHAs), by enhancing their skills, confidence, and community status.[17] Their active involvement in malaria detection, treatment, and broader healthcare services has fostered trust and respect within communities, creating a ripple effect of improved healthcare accessibility and participation.[18–20] The programme's inclusive approach highlights the importance of empowering grassroots health workers in bridging gaps in healthcare delivery, particularly in underserved regions. As a model for equitable healthcare delivery, DAMaN addresses systemic health inequities by prioritising vulnerable tribal populations in remote, hilly terrains. Its integration of malaria control with broader health services, such as maternal and child healthcare, aligns with global principles of health equity and social justice.[6] By bringing essential services to marginalised communities, DAMaN showcases a replicable framework for addressing health disparities in similar settings worldwide. However, challenges remain in sustaining and scaling the

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programme. Difficult terrains and socio-cultural resistance, such as the reluctance to use mosquito nets, hinder the programme's reach and effectiveness. Operational barriers, including workforce burnout, logistical constraints, and resource shortages, also threaten its long-term impact.[10–12] Policy recommendations, such as incentivising ASHAs and volunteers for follow-up activities, improving road and transportation infrastructure, and addressing traditional beliefs through targeted community engagement, are critical for overcoming these obstacles. By addressing these challenges, DAMaN can ensure its sustainability and scalability, furthering its transformative impact on health equity in marginalised regions. Its success offers valuable lessons for developing similar community-driven health initiatives in other underserved areas.

Implication for Policy and Practice

The success of DAMaN demonstrates the value of equity-focused, integrated healthcare initiatives in addressing health disparities in marginalised communities. Its model of combining targeted disease control with broader health services offers a replicable framework for other regions with similar socio-economic and geographic challenges. Policymakers and public health programmes can draw insights from DAMaN's approach to enhance healthcare access, promote community participation, and achieve long-term health outcomes in vulnerable populations.

Conclusion

The DAMaN programme has significantly enhanced equitable access to malaria prevention and treatment services in remote and underserved tribal populated areas of Odisha. Through targeted interventions, such as Rapid Diagnostic Tests (RDTs), free medication, and health camps, the programme has addressed systemic healthcare barriers and reduced malaria prevalence. Beyond its primary focus, DAMaN's integrated approach has provided non-malaria health benefits, including maternal and child health services, immunisations, and screenings for non-communicable diseases, improving overall community health and resilience. However, challenges such as poor road connectivity, resource limitations, and cultural barriers hinder the programme's full potential. Suggestions for improving scheduling flexibility, increasing camp frequency, incentivising volunteers, and fostering inter-departmental collaboration could further strengthen DAMaN's effectiveness and sustainability.

Authors' Contribution: MMP conceptualized the study. Data collection was carried out by the VBD consultants of Boudh, Keonjhar, Angul, Kandhamal, and Kalahandi, while Annapurna compiled the data and created the datasheet. KCS analyzed the data provided the interpretations, and drafted the manuscript. MMP prepared the initial manuscript draft. SP oversaw the execution of the project, secured funding, and revised the manuscript.

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