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The Role of Village Malaria Cadres and Consultants in Controlling and Eliminating Malaria in Eastern Indonesia

A narrative report on UNICEF's technical assistance for malaria control and elimination in Indonesia's high-burden provinces

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A Village Malaria Cadre in rural Sumba provides health education on malaria to school children.
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Acronyms and Glossary

ABER	annual blood examination rate
ACT	artemisinin-based combination therapy
ANC	antenatal care
API	annual parasite incidence (the number of confirmed new cases from malaria per a thousand population per year)
CPAP	Country Program Action Plan
CSO	civil society organisation
DHO	district health office
DhP	dihydroartemisinin-piperaquine
Dinas Kesehatan	government health office at the provincial or district level
HF	health facility
HW	health worker
IEC	information, education and communication
IR	implementation research
IDI	in-depth interview
IMNCI	Integrated Management of Neonatal and Childhood Illnesses
JMPR	Joint Malaria Program Review
LLIN	long-lasting insecticidal nets
LMIC	low and middle-income countries
LSM	larval source management
MCH	maternal and child health
NGO	non-governmental organization
NTT	Nusa Tenggara Timur (East Nusa Tenggara)
PHO	Public Health Office
Posyandu	*Pos Pelayanan Terpadu* - community-based integrated health services
Puskesmas	*Pusat Kesehatan Masyarakat* (community health centre)
Pustu	*Puskesmas Pembantu* (local health center, supporting the puskesmas)
RDT	rapid diagnostic test
SBCC	social and behaviour change communication
SSM	supportive supervision and monitoring
UNICEF	United Nations Children's Fund
VMC	village malaria cadre
WHO	World Health Organization

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Executive Summary

Indonesia has made significant efforts to successfully declare over half of its districts malaria-free, yet elimination challenges remain in its highly endemic, terrestrial eastern provinces of East Nusa Tenggara (NTT), Papua and West Papua. These provinces currently make up over 90 per cent of cases in the country. Beyond geographical complexities, risky community behaviours and misconceptions have added more barriers to achieving elimination of malaria in Indonesia by 2030. To accelerate elimination, UNICEF provides a wide range of support, including strengthening community and policy systems through village malaria cadres (VMCs) and embedded consultants in highly endemic provinces.

This report provides an overview of the important role of VMCs, alongside technical assistance from consultants, in malaria control and elimination. A mixed-method approach was adopted for collecting data. A questionnaire was disseminated to VMCs, followed by in-depth interviews with VMCs and malaria consultants – both virtually and in-person – in high, moderate and low endemic regions across NTT, Papua and West Papua between April and March 2022.

The findings revealed positive developments attributed to VMC interventions and consultants' advocacy, along with case studies highlighting community-based innovations. VMCs bring malaria services closer to communities, allowing people to be tested, treated and educated by people they personally know and trust. The cadres, many of whom have previous community health experience, act as a crucial catalyst for early detection and referral while also ensuring drug compliance through routine home visits to patients. These interventions are especially vital for undeserved communities who do not have the financial means or live too far from health facilities to proactively seek care.

The VMCs also become social change agents by promoting prevention measures such as mosquito net use and environmental hygiene, as well as instilling awareness in communities. Deeply held misconceptions and superstitions about malaria are common, with local communities often dismissing the severity of the disease or self-treating with over-the-counter pharmacy medication instead of free treatments provided by cadres or health care workers. These cadres report to and receive supervision from community health workers and are supported by UNICEF's malaria consultants to ensure compliance in standard protocols of malaria diagnosis and treatments.

Technical expertise by consultants is essential in driving change beyond communities, specifically in key stakeholders' perception of malaria to leverage their ownership of impact-oriented, rather than time-bound programmes. At the grassroots level, village funds provide the assistance needed for malaria elimination activities at the village level as well as generating awareness among locals. On a wider scale, advocacy aimed at district and provincial governments is helping to improve budget allocations, planning and regulations for comprehensive and sustainable elimination efforts. A key approach is through strengthened malaria surveillance and data that allows for timely, evidence-based measures to be taken by stakeholders.

This report recommends that the VMC model be rolled out in all malaria endemic regions in Indonesia, as a feasible mechanism that assures universal coverage of malaria services in all unreached communities across the country. While community strengthening is crucial, not only for prompt treatment but also to break existing risky health behaviours, a wider shift in health and policy systems is just as important and requires technical assistance at the local level. A holistic, evidence-informed approach that is tailored to the local context can bring Indonesia a step closer to being malaria-free by 2030.

1. Background

1.1 Introduction

1.1.1 Global Overview Of Malaria

Malaria is a parasitic disease, transmitted by *Anopheles mosquitoes*.[1] Typical malaria symptoms include high fever, shaking chills, and flu-like illness. There are five types of malaria parasites that infect humans. The four common parasites are *Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale,* and *Plasmodium malariae*.[2]

The World Malaria Report (2021) estimates that the annual burden of *P.vivax* malaria is 14.3 million (13.7 to 15 million), which is a bit lower than *P.falciparum* infection at 193.5 million (142 to 254.7 million). These *Plasmodium ovale* and *Plasmodium malariae* are more geographically widespread but their prevalent is rare. Similarly, the zoonotic malaria of *Plasmodium knowlesi* occurs only in forested areas of Southeast Asian region. The contributions of these three minority malarias to the malaria global burden is about <5 per cent.[3]

In the Southeast Asian region, nine countries are malaria endemic regions with three countries accounting for 99.7 per cent of estimated cases in the region- India (83.5 per cent), Indonesia (15.6 per cent) and Myanmar (1.6 per cent).[4]

WHO's latest World Malaria Report (2021), estimated the global malaria cases were 241 million cases with 627,000 malaria deaths; the cases increased by 14 million with 69,000 more deaths worldwide in 2020 during the COVID-19 pandemic. The increase in cases was mostly found in the African region. The disruption of health services caused by COVID-19 has been shown to be indirectly responsible for the increasing number of cases. Malaria-related mortality declined steadily from 2002 to 2015, according to the data. However, malaria mortality increased by 12 per cent in 2020 compared to 2019, with an estimated 47,000 (68 per cent) of the additional 69,000 deaths attributable to disruptions during the COVID-19 epidemic. The African region accounted for approximately 95-96 per cent of the cases and deaths whereas the remaining 2-4 per cent of cases were from the Southeast Asia region.[4]

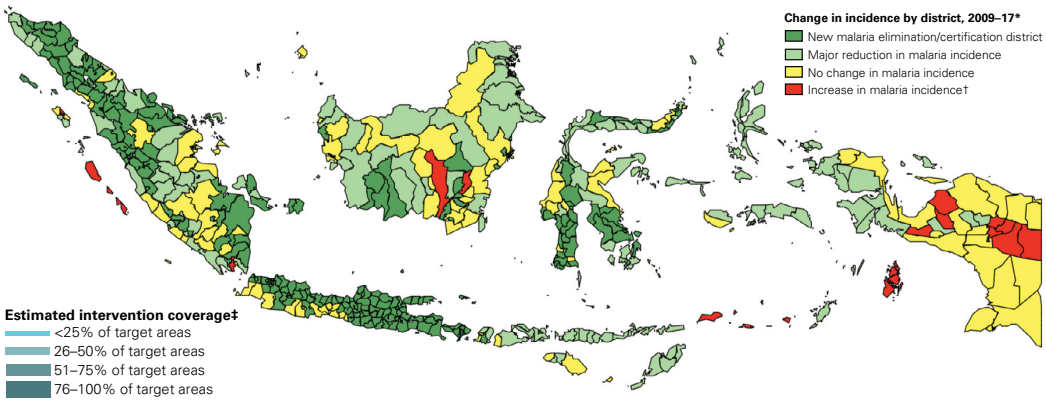
At the same time, several international projects to reduce and/or eradicate malaria have been established and significant progress has been made over the last two decades with the global incidence of malaria dropping from 363 to 225 cases per 1,000 population between 2000 and 2019. However, recent reports tracing the evolution of artemisinin resistance in Southeast Asia's Greater Mekong Subregion adds another challenge to malaria control program efforts.[5]

Some evidence suggests that inadequate testing of febrile children and generally poor malaria care, such as providing malaria drugs without blood testing for malaria, receiving more antimalarial drugs than recommended, or receiving delayed malaria treatment, may be a significant impediment to reducing the malaria mortality rate. Without knowing how rampant poor quality of care is, the stated WHO global target of reducing mortality by 90 per cent by 2030 remains unachievable.[6]

1.1.2 Malaria in Indonesia

Malaria continues to be one of Indonesia's most serious public health problems.[4] Indonesia has long success history in malaria research and development, especially in the implementation of environmental management strategies to eradicate malaria vectors in the past. However, little is known about many of these mosquito species as transmission epidemiology is complex in this archipelago country. These factors put more challenges in malaria control program to build targeted and effective control mechanisms.[7]

In 2017, Indonesia achieved a huge milestone in its malaria elimination efforts. There were more than half of the country's districts officially declared malaria-free. This is a significant achievement for Indonesia with its dispersed population (>260 million people and >5,000 inhabited islands), high internal migration, socioeconomic inequality and decentralized governance. In addition, Indonesia has about 25 malaria-receptive Anopheles mosquito species, and the proportion of Plasmodium falciparum and Plasmodium vivax infection were nearly equal.[8,9] Additionally, malaria cases have decreased by more than half in the last decade, from 465,764 cases (API 1.96) in 2010 to 222,085 cases (API 0.86) in 2018; corresponding to a 50 per cent reduction in confirmed cases and a 66 per cent reduction in deaths from malaria.[9] However, malaria case reduction has remained stable since 2014, indicating that the current implementation of elimination program measures is insufficient to drastically reduce the number of cases. According to a recent report from WHO, all countries except Bhutan and Indonesia met the Global Technical Strategy (GTS) 2020 target of more than 40 per cent reduction in case incidence. Similarly, all countries except Indonesia met the GTS 2020 target for reduction in mortality rate by at least 40 per cent, which suggests the presence of loopholes in the health system.[4,10,11]



All endemic areas	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
National Ministerial Decree on Malaria Elimination														
Increased global and domestic financing for malaria														
Introduction and scale-up of artemisinin-based combination therapy														
Laboratory confirmation mandated for all malaria cases														
Quality assurance for diagnosis														
Malaria screening and treatment in pregnant women														
Malaria inclusion into sick child management in endemic areas														
Improved malaria surveillance and reporting														
Cross-district learning and mentorship														
High-transmission areas														
Introduction and scale-up of long-lasting insecticide treated bednets														
Indoor residual spraying in high-risk areas and outbreaks														
Larval control and environmental management														
Low-transmission areas														
Enhanced case investigation														
Transmission foci mapping														
Active surveillance and case finding														
Post-elimination areas														
Malaria screening among migrants														

Figure 1: Changes in malaria incidence and intervention coverage, Indonesia 2004-2017[9]

Various factors have hindered Indonesia's quest for malaria elimination, with COVID-19 further aggravating progress. A cross-sectional study on "Social determinants of malaria in an endemic area of Indonesia" in five of Indonesia's 33 provinces in 2013 found that socio-demographic factors such as participant characteristics, lack of information about the availability of healthcare facilities and unimproved housing had a substantial impact on malaria prevalence in Indonesia. Malaria awareness was two times higher in low endemic settings than in high endemic settings and basic malaria knowledge was nearly four times higher in low malaria-endemic settings than in high endemic settings.[13]

Furthermore, despite the availability of free treatment in public health institutions, the study found that treatment seeking in the private sector was higher than predicted, with much higher expenditures.[14]

1.1.3 Province Contexts

Papua

Malaria incidence is highest in Papua province with Annual Parasite Incidence (API) 64.03. The number of malaria cases in 2019 was 218,280. Among its 29 geographically challenging districts, four are low endemic while the other 25 have high (15) and moderate (10) endemicity. The highest incidence exceeding API of 100 occurred in eight districts: Keerom, Sarmi, Mimika, Kabupaten Jayapura, Boven Digoel, Yapen, Waropen and Asmat.

West Papua

Malaria incidence is second highest in West Papua province with API 7.38. The number of malaria cases in 2019 was 7,079. While West Papua has observed an overall reduction of cases, among its 13 districts three are low endemic while the other 10 have high (4) and moderate (6) endemicity. The four high endemic districts are Manokwari Selatan, Manokwari, Teluk Wondama and Tambrauw. West Papua province has two difficult to reach districts, Tambraw and Maybrat, which makes it difficult to monitor and establish an effective malaria program.

Nusa Tenggara Timur (NTT)

Malaria incidence is third highest in NTT province with API 2.37. The number of malaria cases in 2019 was 12,909. NTT has observed an overall reduction in cases and one of its districts has been certified malaria free. However, among the rest of the 21 districts, 14 are low endemic while the other seven have high (3) and moderate (4) endemicity. The three high endemic districts are all located on the island of Sumba, which contributes about 80 per cent of cases in the province.

Maluku

Malaria incidence is fourth highest in Maluku province with API 0.72. The number of malaria cases in 2019 was 1,302. The province has just eliminated its high endemic district in 2019. Currently the 11 districts have either low (8) or moderate (3) endemicity, but none of the districts have declared malaria free district.

1.1.4 UNICEF Response To Malaria

Indonesia is aiming to achieve malaria elimination by 2030. While the number of malaria free districts is increasing (based on MoH Report in 2021, 347 districts of 514 have been certified malaria free), the number of malaria cases has stagnated in the last three years. Among the remaining non-malaria free districts (196), only 23 remain highly endemic, of which 22 are in Papua, West Papua, and NTT provinces. These provinces contributed to more than 90 per cent of malaria cases in the country. As part of the Country Program Action Plan (CPAP) of the RI – UNICEF cooperation 2021 – 2025[19], UNICEF is supporting the acceleration of malaria reduction in these provinces for the achievement of malaria elimination in Indonesia by 2030. The main purpose of UNICEF technical assistance is to assist the four eastern provinces in meeting their malaria reduction targets and strengthening the policy and community environment in order to implement long-term programming.

Among the 29 districts in Papua, 15 are high endemic, seven have moderate endemicity and seven are low endemic. Among the 13 districts in West Papua, four are high endemic, six are moderate and three are low endemic. In NTT, among the 22 districts, three are high endemic, two are moderate, 14 low endemic and three have been certified malaria free.

UNICEF has been providing assistance through four main activities:

- Provision of province malaria officers and district malaria consultants;
- Partnerships to conduct policy research;
- Partnerships to conduct formative research; and
- Partnerships to conduct implementation research on larval source management.

2. Methodology

This study was conducted during April and March 2022 following a mixed-method study approach. Data collection took place from 14 February to 22 March 2022. Since early 2020, movement restrictions as a result of the COVID-19 pandemic posed numerous changes for the study methodology. The sample included district malaria consultants and village malaria cadres (VMCs) from three different locations of Indonesia. In the initial stage, all district malaria consultants from Papua, West Papua and Nusa Tenggara Timur (NTT) were interviewed virtually. At the second stage, purposive sampling of VMCs from the three specified locations was undertaken. Sampling was done in a way that VMCs from areas of high, moderate and low endemicity were included in the study. VMCs were interviewed in-person in order to assess the role of VMCs in malaria elimination while also gathering their personal experiences. All selected VMCs were interviewed based on a developed questionnaire. This approach focused on contextual triangulation so as to understand the phenomenon better and come up with valuable recommendations for accelerating malaria elimination actions in the future.

2.1 Sampling

Since this study was conducted with the objective of assessing the role of district malaria consultants and village malaria cadres in malaria control activities, the sampling strategy was concentrated in areas that had direct support from UNICEF. Hence, areas with different levels of malaria endemicity (low, moderate, high) were selected to provide comparable results on actions of both district malaria consultants and village malaria cadres. The final three clusters selected were Papua, West Papua and Sumba, Nusa Tenggara Timur.

In-Depth Interviews (IDIs)

All the district malaria consultants (i.e., 13) were interviewed virtually either via Zoom or, in case of unavailability of internet connection, by phone calls. Interviews were conducted in the presence of provincial malaria consultants to reduce and clarify any possible ambiguities due to language barriers between the interviewer and the interviewee.

Similarly, a total number of 15 interviews were conducted with VMCs from selected areas. From Papua and West Papua, two locations (sub-clusters) were identified and two VMCs were taken from each sub-cluster. Similarly, from Nusa Tenggara, three sub-clusters were identified and VMCs were interviewed from all selected sub-clusters as illustrated in the table below. Sample specific IDI guide and protocol was used for the data collection.

Sample specifications	Papua	West Papua	Sumba, NTT	Total
District Malaria Consultants	10	2	1	13
Village Malaria Cadres (VMCs)	2+2 (4)	2+2 (4)	2+2+3 (7)	15

Table 1: Interviews with village malaria cares in Papua, West Papua and NTT

2.2 Study Design

This study used both pre-developed questionnaires and IDIs to collect data. The study followed a mixed-method approach to gain in-depth information from the samples and highlight the innovative practices in their working areas. Contextual triangulation was done to further understand the data and findings. In addition, this study was used as an opportunity to provide supportive supervision and monitoring to VMCs to motivate their invaluable efforts in the community for malaria control and elimination.

2.3 Setting

The study was purposely conducted in three different locations of Indonesia based on the level of malaria endemicity and high intervention status of UNICEF:

Selected clusters	Number of selected locations
Papua	2 locations
West Papua	2 locations
Sumba, NTT	3 locations

Table 2: Study location in target provinces

2.4 Data Collection Methods

2.4.1 Survey questionnaire

A standard set of questionnaires was developed for both district malaria consultants and VMCs to record the sociodemographic factors of participants, influencing factors affecting malaria actions and other relevant information. The questionnaire was developed in English and translated into Bahasa. The English version of the questionnaire was translated and back translated before field testing. The questionnaire for VMCs was divided into the following sections:

Part I: Sociodemographic characteristics of the respondents

This section collected data in nine sociodemographic areas including age in years, sex (male or female), marital status, educational level, type of occupation, average yearly family income, related job experience and length of time as a volunteer.

Part II: Knowledge regarding malaria control and elimination

This section consisted of 12 questions regarding processes for rapid diagnostic tests (RDT), long-lasting insecticidal nets (LLINs) and treatment and referral guidelines for malaria. Positive and negative statements were mixed in with the questions with "yes," "no," or "don't know" as the available responses. Respondents were given a "1" for a correct answer, but a "0" for a wrong answer or a "do not know" response.

Part III, IV, V and VI consisted of questions related to the perception of the roles and functions of VMCs, family support, community support and motivation factors. This section followed a qualitative approach in order to allow the respondents to explore their role as a malaria cadre and be able to self-evaluate their progress to date. Interviews were carried out in the local language and Bahasa Indonesia. The responses were audio recorded and translated into English for further analysis.

2.4.2 In-depth interviews

IDIs were conducted with malaria consultants and VMCs. Depending on the available time frame, information provided by malaria service beneficiaries, *posyandu* staff and local stakeholders was collected so as to triangulate the collected data. Along with information provided by the participants, photographs were also taken after collecting informed consent.

2.4.3 Interview protocol/guide

For malaria consultants

IDIs were conducted individually, with only the participant and provincial malaria consultant present at the time of the interview. Considering the present pandemic scenario, the interviews were conducted virtually through internet or telephone calls. The interview guide (a semi-structured IDI) was prepared in English and translated to Bahasa Indonesia. Trained human resources personnel from the regions and country offices conducted the interview. The interviews were carried out for 14 days, with about two interview sessions taking place per day. The research team carried out a debriefing session after completion of all interviews to further optimize the documentation process. Meanwhile, short debriefing sessions were conducted at regular intervals to screen for ambiguities, inaccuracies, content clarity and comprehensiveness of the questions.

The interview tool was divided into four distinct sections to allow interviewees an in-depth reflection on their scope of work and highlight best practices in their working areas.

Section 1: Technical expertise

The questions in this section focused on the technical capacity of the malaria consultants in relation to their scope of work. Knowledge of malaria surveillance and treatment compliance i.e., the two major pillars for malaria control and elimination, was assessed. Any unique approaches adopted by the interviewees have been highlighted.

Section 2: Capacity building

The role of malaria consultants in strengthening the community networks through existing health systems was assessed in this section. While taking an in-depth look at the activities performed by the consultants for capacity building of VMCs, health workers at district level (*puskesmas* outreach), a special focus was given to the activities that contributed to leveraging local resources for sustainability of malaria control and elimination activities.

Section 3: Experiences

This section dwelled on the experiences of malaria consultants. Based on the consultants' experience, their work motivation and self-evaluation were documented in this section.

Section 4: Challenges

This section focused on the challenges faced by malaria consultants during program implementation at different levels as well as ways forward.

3. Findings

3.1 Synthesis of Findings from In-Depth Interviews with District Malaria Consultants

This chapter includes a summarized narration of responses from district malaria consultants obtained through in-depth interviews. The interviews took place from 14 to 22 February 2022. Findings have been divided into four distinct sections (*see Table 3*).

Section I: Technical expertise to discuss support provided by UNICEF through malaria consultants for malaria control and elimination. This section also provides preliminary information on how major interventions undertaken for malaria surveillance is provided. This includes information on planning of technical assistance activities, responses regarding how access is provided to the very core of vulnerable populations such as pregnant women and children, as well as how compliance to malaria diagnosis and treatment protocol is maintained.

Section II: Capacity building for malaria control discusses the support provided by malaria consultants for strengthening community systems and sustainability for malaria control. This section highlights community initiatives, coordination mechanisms between VMCs and health facilities and the involvement of consultants in planning process at different levels.

Section III: Experience as malaria consultant provides information on the experience of working with local governments and communities along with analysis of possible changes needed to leverage more resources for malaria elimination.

Section IV: Challenges faced for program implementation/intervention discusses challenges faced by the malaria consultants at different levels, from the grassroots level to district level and at the provincial level.

Table 3: Summary of findings from in-depth interviews with malaria consultants

Technical expertise

1. For strengthening malaria surveillance, malaria consultants support data collection, visualization and interpretation of cases and malaria situations in their area, including epidemiological data analysis and validation. Support to healthcare workers for accurate data reporting through SISMAL is also provided, in coordination with public health centres, along with support for inspection of the environment, vector and breeding sites of mosquitoes.

2. Planning is done after thorough data analysis, observation of the environment for vectors and understanding of the district context, in coordination with health stakeholders. Identification of areas for improvement is done and technical assistance activities are planned accordingly in most of the districts.

3. Access to vulnerable groups including pregnant women and children was increased through door-to-door mobilization of VMCs. It is ensured that every pregnant woman undergoes at least one malaria test during antenatal care (ANC) followed by distribution of LLINs and counselling and treatment based on results. For children, if they have symptoms of malaria, they are tested and provided with LLINs. In addition, some districts have integrated malaria programs with other sectors, such as maternal and child health (MCH), in order to improve access. Most districts are yet to integrate with MCH programs but many have linked vulnerable groups with VMCs. In Asmat, activities to ensure coverage of ANC have been prioritized so that more women can be tested for malaria during their regular check-ups. Additionally, information for data synchronization between integrated management of neonatal and childhood illnesses (IMNCI) systems and SISMAL was provided to the health workers which helps measure the feasibility and impact of an integrated program approach. In high endemicity districts of Kota Jayapura, all the children in IMNCI service, regardless of the presence of symptoms, are screened for malaria and *posyandu* screen women who do not visit *puskesmas* for their ANC.

4. Active case finding is ensured and monitored through *puskesmas* officers who then assess the activity of VMCs. To supervise the cadre, district officers visit *puskesmas* on a regular basis (usually every month) and provide technical assistance about malaria services. Case finding through 'Pulsing' mobile health calls have also been done in some districts.

5. Compliance to standard protocols for malaria diagnosis and treatment is ensured through regular technical assistance to puskesmas. In addition, support to district officers for procurement of RDT/ LLINs, based on the demand from the field (as informed by VMCs) and SISMAL, is done to make sure that service delivery is not hampered by stock limitations and the delayed supply of essential items. Similarly, networking with private health facilities, army clinics to ensure surveillance of migrating populations and compliance with malaria treatment protocol has been done in Jayawijaya. In Sumba, standard operating procedures (SoP) in the form of a brief algorithm was shared with puskesmas officers so that they are always reminded to provide malaria services as per the protocol.

Capacity building for malaria

1. Strengthening of community systems and sustainability is done through coordination with relevant stakeholders to help understand the context, health service acceptance and expectations of the local community. Meetings with informal bodies like community leaders, police and religious leaders have been conducted regularly.

In Jayawijaya, malaria socialization was undertaken during meetings of police wives and interaction with village leaders. As a crucial part of the community system, village leaders learned how to analyse malaria situations in sub-districts, conduct migration surveillance and refer suspected cases. Through rigorous advocacy in Mimika, village malaria cadre will now be recruited through the Village Fund and will provide support in malaria control and elimination activities along with other health interventions.

2. Community activities conducted in the districts ranged from environmental sanitation programs to awareness generation activities.

"In Keerom, some activities in the village are an initiative of the stakeholders and the community people. Every Friday, Saturday and Monday, they usually do some activities to reduce breeding by cleaning the breeding sites. The whole village works together to make the environment less risky and even plant rosemary as mosquitoes do not like it." – Malaria Consultant, Keerom.

"In Sarmi, UNICEF and Bongo Timur health center have jointly developed the 'Malaria School Program'. So far, around 300 students have benefitted from the program that supports the village malaria program to help community people adopt healthy behaviours in the village." – Malaria Consultant, Sarmi.

"In Yappen, different communities conduct mobile teaching and provide awareness on malaria to children of Yappen with a slogan – *Kitong Bisa*." – Malaria Consultant, Yappem.

3. Coordination between VMCs and *puskesmas* is ensured through regular meetings. Verbal reporting via telephone calls is opted for in cases where it is difficult to gather reports every month. VMCs provide monthly updates to *puskesmas* and also receive guidance. In Manokwari, joint supervision of inactive cadres is done to identify any problems and resolve them together.

4. Involvement in planning processes takes place in joint meetings with government and DHO for annual planning of malaria programs for the next fiscal year. Assistance is provided to produce intensive regulation on environmental mitigation measures, malaria control interventions, forecast essential logistics and supplies and assess the human resources and budget needed to execute planned activities to achieve the set target in the five year plan. Similarly, many districts have participated in the planning process from the very grassroots level, i.e., at village level for advocacy and communication on the importance of malaria control. In Kyainui village, the village head allocated two million rupiahs for malaria activities.

5. Supportive supervision and monitoring plans are scheduled on a regular basis where guidance is provided to VMCs to examine blood by conducting tests correctly as well as monitoring patients for drug compliance and other relevant issues.

Experiences as malaria consultant

1. The experience of working with local governments varied from one district malaria consultant to another. In general, the district malaria consultants had constructive experiences but emphasized the need for accelerated reforms to achieve malaria elimination by 2030. For many areas in Papua, malaria is not a serious health problem which affects the overall planning and budgeting of malaria activities. The deeply rooted superstitions and thoughts of local people and governments are sometimes frustrating for the district malaria consultants and yet have motivated them to tackle the problem more extensively.

2. Malaria activities at present are not enough. Most of the districts still need to mobilize more resources and budget for malaria control and elimination. The presence of UNICEF consultants has aided the local government to understand the problem, but the efforts need to be amplified to control and eliminate malaria from the villages and to ensure greater impact.

3. A change in perspective and perception of malaria needs to be changed to leverage more effort and budget for malaria control and elimination activities. More support is needed for putting regulations in place to mitigate malaria, the allocation of sufficient budget for strategic interventions and increased political commitment, motivation and focused activities on health promotion need to be prioritized.
The present scenario also suggests the need for innovation; the plans need to be achievable and for this they need to be based on the situation of every health facility and their functionality. In order to understand the real scenario and find the best solutions, mutual understanding of stakeholders and the community about malaria, coordination between HF, DHO and stakeholders for unified action against malaria through the use of data needs to be done. Health programs need to be impact-oriented and not taken as a project with a limited timeframe. In some districts, coordination between malaria cadre, *posyandu* cadre and *puskesmas* need to be ascertained so that malaria activities are not looked upon as UNICEF's work but as the responsibility of the *kampung* and district.

Challenges faced

Challenges mentioned were:

1. Existing high endemicity status of malaria.
2. High number of breeding sites for mosquitoes.
3. Risky health behaviours among people.
   i.e., not using long sleeved clothes during evening and night-time, leaving the house at night, improper use of LLIN.
4. As mentioned by *Keerom*, "The problem of Papuan people is that many of them do not show any symptoms but are positive. Without symptoms the people feel healthy, do not take malaria seriously and keep on working."
5. Low drug compliance among patients.
6. Geographical diversity and unavailability of telephone/internet connections and essential transportation services in some areas.
7. Perception of people about malaria. Many people perceive malaria as just a fever that will go away in a few days and not as a major health issue.
8. High turnover of malaria officers in the *puskesmas*.
9. Low commitment at the village, district and regional level.
10. Tedious procedures to access health budget for malaria from *puskesmas* (in some HFs).
11. Difficulty in case finding and regular supervision due to scattered population settlement.
12. Weak health system and inadequate budget for malaria activities.



Village malaria cadres and UNICEF consultant check on students' health.
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3.2 Synthesis of Findings from In-Depth Interviews with VMCs

This chapter provides a brief overview of the sociodemographic factors of the respondents followed by their knowledge on malaria control and elimination, experiences of support mechanisms and motivation factors. The findings are presented in a way that not only reflect the knowledge of VMCs but also their innate experiences as community health workers.

Sociodemographic factors

With consideration of the COVID-19 situation and numerous travel restrictions, 15 VMCs were selected and interviewed. The age of the respondents ranged from 25 to 64 years of age. Most of the selected VMCs were female, married and had completed secondary level education; 93.33 per cent worked in an agricultural-related occupation, aside from their work as a village malaria cadre. Before becoming a VMC, the majority of respondents (66.66 per cent) had significant health-related employment experience and worked as *posyandu* cadre. More than 73 per cent of respondents worked as a VMC for more than eight months, with the time span ranging from four months to three years.

Influencing factors

A. Knowledge regarding malaria control activities

Almost all of the study's respondents correctly stated that the malaria RDT should be stored in the coolest spot possible (where the temperature is less than 40°C), along with the drops of buffer solution to be inserted in the RDT. More than 90 per cent of malaria participants (93.33 per cent) correctly answered the questions about the time period for reading findings and concluding the results based on the bends occurring in the RDT. When asked about the prescription of antimalarial medications, most of the respondents were aware that severe or complicated malaria cases should be referred to the nearest hospital or health facility. However, only 80 per cent of respondents were confident about the referral of malaria positive pregnant women and children under one year of age. The majority of respondents agreed that severe malaria patients need to be referred immediately. There was also confusion regarding the referral of patients with severe vomiting, abnormal bleeding and generalized convulsions.

Furthermore, all respondents were aware that using LLINs was the most efficient approach to avoid mosquito bites and that sleeping beneath an LLIN was the greatest way to avoid malaria. Surprisingly, only 30 per cent knew that the effectiveness of LLINs was longer than one year. Most of the respondents stressed that LLINs are generally damaged before one year of age due to rats, animals and other factors. Meanwhile, 100 per cent of respondents stated that LLINs cannot induce skin irritation and respiratory tract infections, especially in children (*see Table 4*).

Table 4: Correct knowledge about malaria activities (n=15)

Knowledge statements	Correct answer	
	n	%
Malaria Rapid Diagnostic Test (RDT)		
Keep RDTs in cool place of your residence (within 1°-40° C)	15	100
Place 4 drops of buffer solution into the buffer well perpendicularly	14	93.33
Read RDT results after 30 minutes	14	93.33
Prescribing antimalarial medicines		
*RDT (-)ve patients - Malaria medicine should be prescribed	15	100
Referral guideline		
Severe or complicated malaria - referred	14	93.33
Pregnant women and baby under one year of age - referred	12	80
*Severe malaria cases – no need to refer as it can be treated by volunteers	14	93.33
*Severe vomiting, abnormal bleeding, generalized convulsions – should be treated before referral	6	40
Long lasting insecticide treated nets (LLINs)		
Using LLINs is the most effective way to prevent mosquito bites	15	100
Sleeping under LLINs is the best way to prevent malaria	15	100
*Sleeping under LLINs can cause itchiness of skin and respiratory tract infections among children	15	100
*LLINs can be effective for one year only	5	33.33

**Negative questions*

B. Perception of roles and functions of VMCs

Role of VMCs in the community:

> "The role of cadres brings services closer to the community. I went to people's homes, asking what they felt (fever, nausea, vomiting, chills) and if there were any complaints, we immediately checked with an RDT. I often recommend sleeping with mosquito nets and cleaning the home environment from garbage. For example, on coconut shells, if you can't burn them, stack them so they won't collect rainwater. Every rainy season, there are lots of puddles, a breeding ground for mosquitoes. We live near the Ratenggaro beach estuary. There was an incident where the estuary was closed, the water rose, and white mosquitoes increased in the village around 1997. Now, every time the estuary is covered with sand, mosquitoes still breed a lot. Every time we check, we always find malaria positive people in the community. The problem here is that many people tend to buy drugs such as paracetamol and dexamethasone at kiosks. As a cadre, I always advise residents not to buy medicine at the kiosk. I suggest that they don't take medicine from *warung* but call us or visit us if there are any symptoms."
>
> ***- VMC, Sumba, NTT***

Most of the village malaria cadres were aware of their roles and responsibilities. Despite numerous tasks at hand, the cadres were generally able to list their activities without any confusion. One VMC from Sumba shared her duties. "My role is to carry out home-visits, conduct RDT, provide medicines to malaria positive people and monitor that they take the drugs. I also advise the positive people to go to *puskesmas*, when necessary, and I re-examine them afterwards." In addition, VMCs reiterated their **role as social change agents**. "There is awareness-raising provided that can help people who are still unaware about malaria. I counsel them and provide information about malaria boldly, because it is the responsibility of the cadres."

"We are there to serve the community!"

The cadres considered their work as an important responsibility to eradicate malaria from their communities. They played a significant role in connecting the local people with health services by working as a catalyst to raise awareness, motivate and encourage people to seek health care services. Furthermore, being a member of the same community, this sense of responsibility was observed among the VMCs. Their role started from primarily being a responsible community member to diagnosis, treatment, referral, surveillance and monitoring activities for malaria elimination.

How do you feel while working as a VMC?

"I am happy, because I can serve the people including my family, my husband and my children."

Most of the responses echoed this statement from one of the respondents. With additional responsibilities as a cadre, many initially felt nervous and anxious, but gained confidence with time and practice. "At the beginning of undertaking malaria blood tests, my hands were shaking," stated on of the VMCs. "After several blood tests, my hands were no longer shaking. I was also nervous when talking to the community. But after visiting a couple of houses, I wasn't nervous anymore because I was used to it." The cadres were proud of their work and often linked their happiness with being able to witness improvement in the health and health behaviours of the community. One of the cadres said, "I am the happiest when a positive patient turns out negative during a follow-up test (visit)."

However, it was sometimes difficult for some cadres to be accepted by the local community right away. One of the cadres recalled, "We often have to deal with illiterate villagers or those who have only finished elementary school. In the beginning, they used to run away from us. But, after giving an explanation and counselling them, the residents finally agreed to be examined. We are excited because the community is starting to accept us. I am very grateful because not everyone gets the opportunity to become a cadre." Many cadres also pointed out that trust from villagers makes them happy and excited to serve the community.

When asked about the community's reaction when cadres first visited them, many cadres found it challenging. People believe they are strong enough and malaria will go away after a few days. Malaria was seen as something that happened every day, as something that happened to every generation and this made the people less concerned about its severity. This led to mixed reactions from the community when the cadres first visited them.

> "Initially, after returning from training, I wanted to check for malaria at a resident's house. I heard that one of the resident's children had a high fever and went to check on him. The child's parents were away and his grandmother was working in the garden. Considering the child's situation, I did the examination right away instead of waiting for his parents. The result was positive for P. *falciparum*.
>
> One of the neighbours went to tell the grandmother that someone drew blood from her grandson. She was horrified and came with a stick to beat me. Angrily, she asked me to take responsibility if her grandson died. I gave the medicine to the child. The child got better after some days and the grandmother is not angry with me anymore.
>
> Many people were like that in my village. They did not cooperate at first. They did not want their child to be tested because they feared that their child would catch the (COVID-19) virus. But after much explaining, they are okay to be tested now. **Those hands that pushed me away in the beginning now asked to be examined for malaria**."
>
> ***- VMC volunteer***

With the presence of VMCs, community people are more aware about malaria. Local people prefer personal contact and trusted local people as their source of information, so the presence of VMCs has provided an optimal linkage between the health system and community. One of the cadres happily stated, "There has been a change. In the past it seemed that people did not understand hygiene and how malaria occurs. People ran away at the sight of health workers. Now, if they are sick with chills, they ask me where the RDT device is. They ask me for nets and take advice from me. Even when someone in their neighbourhood is sick, they call me to come for an examination."

Some cadres remembered the surprised look on villagers' faces when they were able to do RDT. Community people appreciated the fact that the service is free and cadres visited them in their home. Enthusiasm in the community for environmental mitigation to control malaria - to get tested and take medicines as advised - has increased with time and rigorous efforts from the VMCs. A young VMC from Sumba shared that villagers welcome him in their house.

Another cadre smiled and said, "I follow-up at the houses with positive cases. I have even visited them three or four times. Villagers like to gather whenever I visit. In our culture, we offer something to the guests. One of the villagers jokingly asked me to not visit his house anymore because he was out of sugar."

C. Family and Community Support



In the beginning, people used to run away from me because they thought I was a COVID-19 vaccine officer. They were afraid of being vaccinated. I explained that I came to check for malaria. They don't run away anymore. They even come to visit me whenever any of them are sick with chills and request a malaria test. People in my community are certainly getting more aware about malaria and are open to adopting healthy behaviours.

- Yohana, VMC, Sumba

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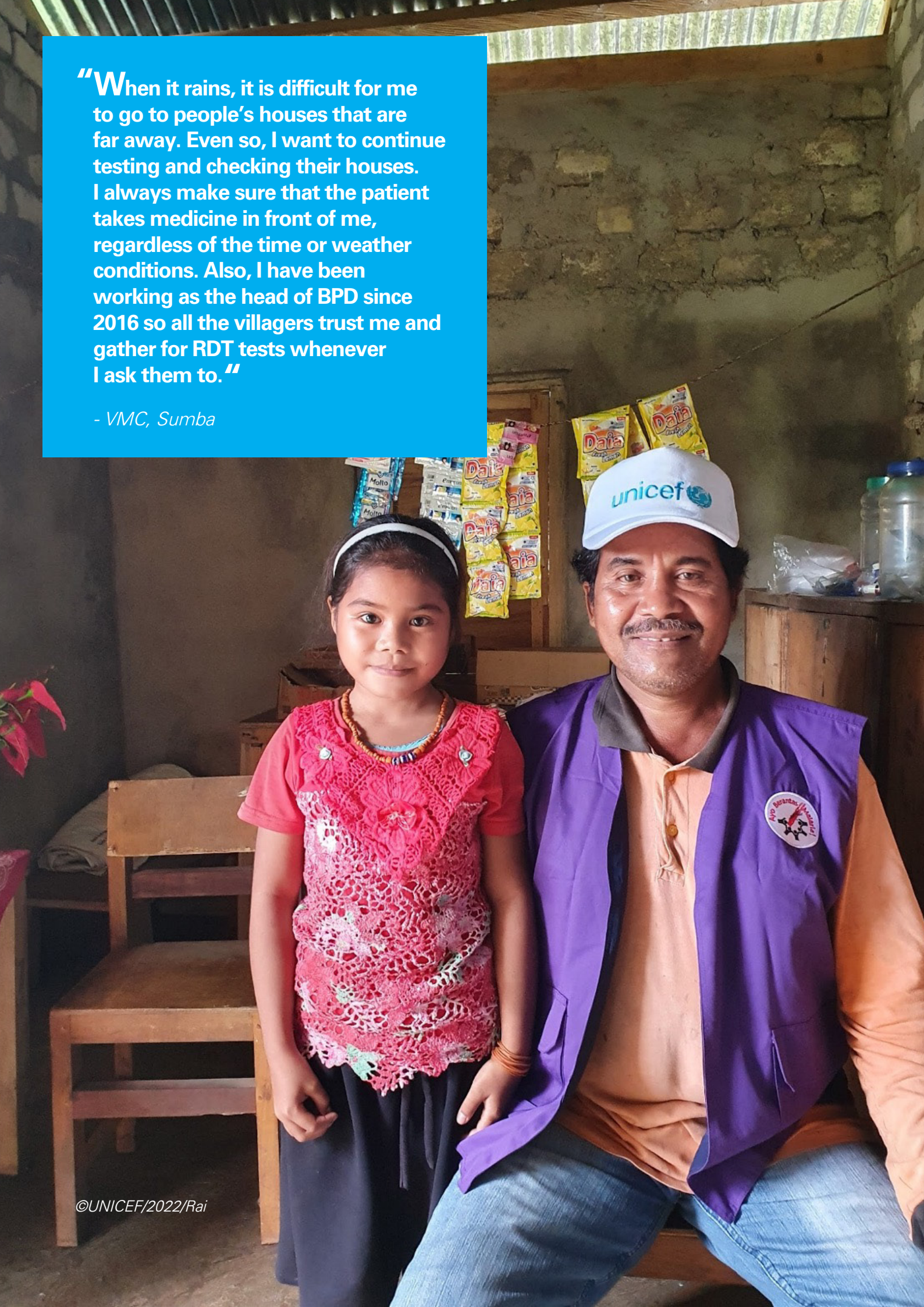

"When it rains, it is difficult for me to go to people's houses that are far away. Even so, I want to continue testing and checking their houses. I always make sure that the patient takes medicine in front of me, regardless of the time or weather conditions. Also, I have been working as the head of BPD since 2016 so all the villagers trust me and gather for RDT tests whenever I ask them to."

- VMC, Sumba

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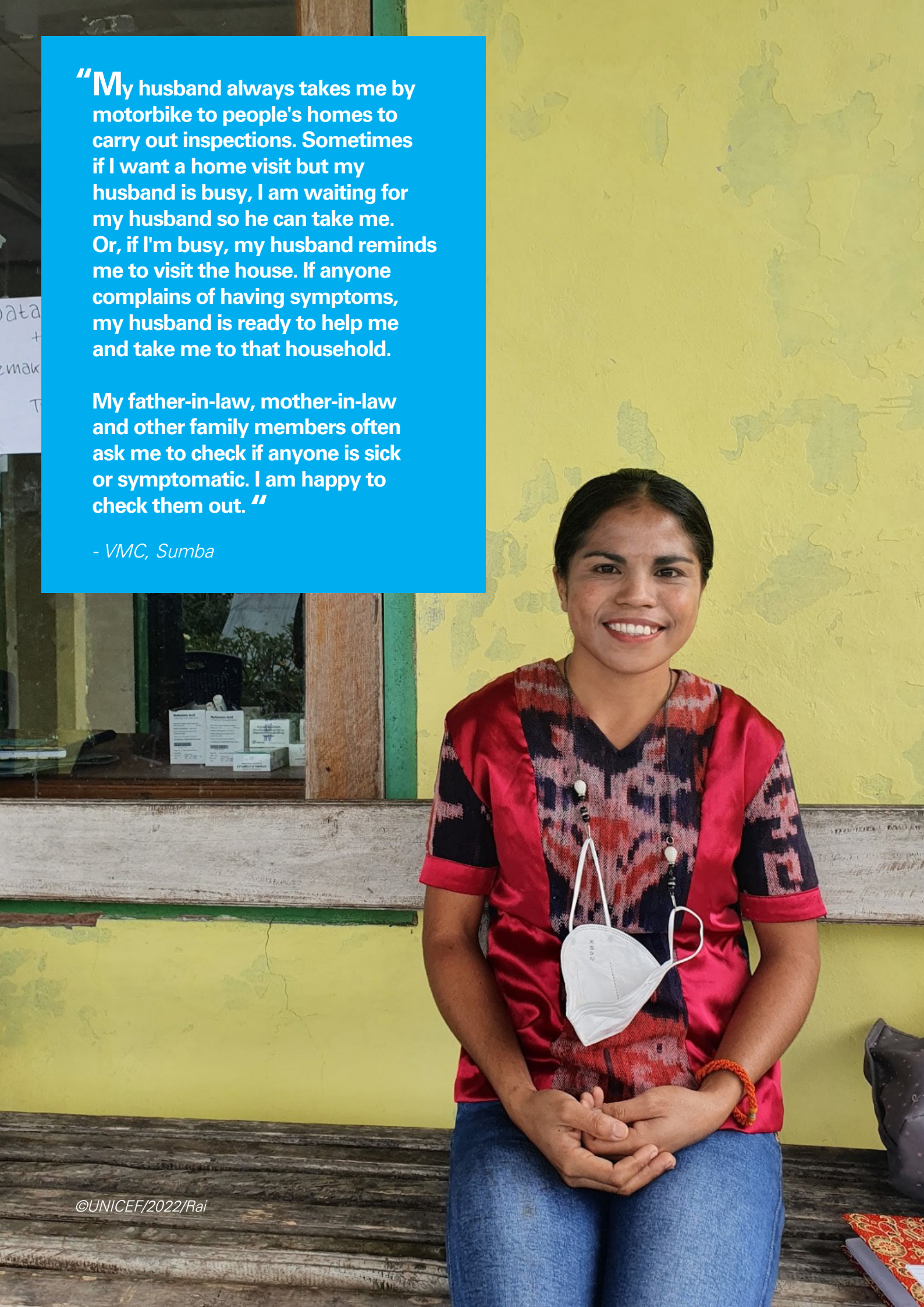

"My husband always takes me by motorbike to people's homes to carry out inspections. Sometimes if I want a home visit but my husband is busy, I am waiting for my husband so he can take me. Or, if I'm busy, my husband reminds me to visit the house. If anyone complains of having symptoms, my husband is ready to help me and take me to that household.

My father-in-law, mother-in-law and other family members often ask me to check if anyone is sick or symptomatic. I am happy to check them out. "

- VMC, Sumba

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D. Motivation Factors

Availability of test kits, IEC materials, essential equipment and medicines

The majority of malaria cadres interviewed said that provision of the RDT kit is sufficient for them. The RDT kits are provided on a monthly basis to the cadres, based on the set target for home-visit and malaria testing by the *puskesmas*. As reported by the cadres, there have been a few stances when RDT kits were insufficient or delivered late.

One of the cadres said, "If I do not have sufficient medicine, I can't do the examination. People can rage and be angry if this happens. I need to keep the people's trust." Meanwhile, many cadres requested a sufficient supply of masks, gloves and hand sanitizer.

Motivation to work as VMC

For many cadres, the motivation to work as a VMC was not just driven by financial interest. Some of the cadres related to the sufferings of malaria on a personal level and hence wanted to fight against it. A cadre recalled the time when her son was down with malaria and how her child suffered. Many of them wanted to help the community and took this as an opportunity to serve them. One of the cadres summarized her motivation to work as a VMC as follows:

> "I want to be a cadre for the experience. Secondly, I can **serve the community**, even if it is only limited to checking for malaria and providing malaria medicine (if the test result is positive). The community is also happy; there have never been any complaints about me. There are people in this community who don't even have five thousand rupiahs. If you are sick and have to go to the *puskesmas*, the money is not enough. It's hard here. As a malaria cadre, I bring health services to them. I feel very helpful to the community which motivates me to continue my work as a cadre."

Similarly, the cadres contact their supervisors frequently, especially when they have questions regarding the protocol. Some reported that their supervisor calls them and visits them to see how they are doing and guides them on the correct way to do the rapid diagnostic test (RDT) and to make reports.

Challenges and solutions

The majority of cadres interviewed mentioned movement issues, especially during the rainy season, and unavailability of telephone network services as core challenges. Since Indonesia is very diverse, ethnic communities speak local dialects and this has sometimes posed challenges for the cadres. Additionally, it is very difficult to change the behaviour of the local people and make them understand about malaria. Reporting and recording were found to be perplexing for one of the cadres. A cadre also reported a delayed incentive payment even after reporting one of the challenges.

In relation to the challenges mentioned, the majority of the cadres emphasized the need for good mobile phones and a motorbike if possible. One cadres mentioned that without a good phone she cannot participate in the cadre WhatsApp group and receive vital information and knowledge. Likewise, timely payment of incentives, prompt delivery of kits and medicines and additional incentives (if possible) were further recommendations provided by cadres.



"I conduct home visits, identify and track malaria through RDT on residents with symptoms, and provide information about malaria and its prevention. During home visits, neighbours come together and listen to information. After one person was tested for malaria, he told the others that there was no pain and the other residents wanted to be tested as well. This change excites me to work with the community."

- VMC, Sumba

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A home visit to a malaria positive case by a village malaria cadre, UNICEF and *puskesmas* Kori team.
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3.3 Case Studies

Trimka: Spreading smiles in rural Sumba, Nusa Tenggara

During UNICEF and the district health office's joint supportive supervision of Kori Health Centre in mid-January 2022, a paediatric malaria-positive patient was found. Jimi, a four-year-old male child from Kampung Radabonu, Wailabubur village looked pale and tested positive for malaria (*Plasmodium Falciparum*). The child was accompanied by his mother who also looked pale and unwell. The mother was also tested and, like her child, the RDT came out to be positive for *Plasmodium Falciparum*. According to the malaria protocol, the mother was given anti-malarial drugs.

Meanwhile, since the child's condition was deteriorating, he was referred to Waitabula Caritas Hospital for further treatment. On microscopic examination for malaria at the hospital, the child tested negative but was diagnosed with anaemia, a condition in which one lacks enough healthy red blood cells to carry adequate oxygen to the body's tissues. The child was admitted to the hospital for management, including a blood transfusion. On a follow-up visit two days later, the child's condition was improving.

In close coordination with the district officers, health centres and malaria cadre, UNICEF visited the child after he was discharged from Waitabuwa Caritas Hospital. The child lives in a traditional Sumbanese house at the top of a hill. Two mosquito nets were installed in the house and no mosquito breeding sites were found around the house.

Two days before going to the puskesmas, the child visited a village malaria cadre with symptoms of fever, paleness and lack of appetite. Imelda Mone, the village malaria cadre, provided anti-malarial drugs after confirming that the child was malaria positive through RDT. But the child's condition did not change and hence the parents took him to the puskesmas. It was advised that the child be monitored until day 28, starting from the positive diagnosis from village malaria cadre. Following this advice, the village malaria cadre frequently followed up the child's health progress and provided counselling and advice to the family during the home-visits.

In mid-March, during an in-depth interview with VMCs, UNICEF visited Jimi again. The child was in good health, active and cheerful. The malaria cadre conducted a RDT which was negative. Though the child could not speak Bahasa Indonesia, he conveyed his gratitude by saying "***trimka***", which translates to "*thank you!*".

This recovery and positive change in a child's health was all possible due to the rigorous efforts of village malaria cadres like Imelda and the combined, accelerated effort of *puskesmas*, the district health office and UNICEF. By working for the community they live among, village malaria cadres have not only increased access for people to malaria health services but also provided the awareness to seek healthcare services from malaria cadres and *puskesmas* when they are sick.

Hence, VMCs can be a crucial catalyst for early detection, referral and most importantly to bring about change and smiles to the faces of children like Jimi, their faces filled with gratitude and genuine ***trimka/ terima kasih!***

This story reiterates the importance of eliminating malaria, especially among children. Malaria can only be eliminated through multi-faceted efforts and rigorous, collaborative community and family-based actions.

Acknowledgement: Information for this case study was collected by UNICEF consultants Dece Mary Natalia and Rensat Tino with the support of health workers from *Puskesmas* Kori and village malaria cadres.

Creating independent malaria cadres amid the challenges of Tebu Rawa

Mappi Regency consists of 15 districts, 162 villages and two urban villages. The area is 28,518 km² with 60 per cent of the area consisting of swamps and large rivers with a population density per village of 3.62 people/km² concentrated along 14 rivers. In every district, there is a *puskesmas* and, in remote villages, there is also a *pustu (puskesmas pembantu)*, but they have limitations in providing health services to the community.

Given these geographic conditions, strategies are needed to provide health facilities to serve people in remote villages that are difficult to reach.

For the malaria program, village malaria cadres were recruited and spread over several villages with high malaria endemicity, as an extension of the health service or *puskesmas*. However, these cadres had minimal and very limited capacity. Therefore, they needed to be accompanied by health workers (HWs).

Many of these cadres lived in faraway villages with difficult access that required high transportation expenses, so the assistant health care provider developed a strategy of group mentoring to boost the capacity of the VMCs.

Cadres whose work areas were close together gathered in a village. The health workers provided directions and explanations on VMC procedures. After the training, the cadres and the health workers conducted home visits together.

The first stage was self-introduction, conveying the purpose of the activity and providing information about malaria. The cadres carried out malaria checks for people who had symptoms of malaria. If the result was positive for malaria, the cadre provided treatment according to the standards in the cadre manual. Patients were required to take medicine in front of the cadre to ensure that the medication was taken. Cadres and patients formed an agreement for taking medication the next day.

After the socialization activities, case findings and treatment of malaria positive patients were completed and the cadres gathered again and shared lessons from the home visit experience. The cadres also learned how to fill out the reporting format from the home visits.

The next stage was to conduct a joint evaluation. Every cadre was obliged to express their opinion, even if it is only a few words. The goal was to train cadres to speak in public. The last stage was planning the next activity. The decision was made to accompany the cadres who were not yet able to work independently.

For cadres who were ready to work independently, the assistant health workers continued to monitor the reports submitted by cadres every month. In order for the report to be entered in the *puskesmas* report (SISMAL) on time, the assistant health workers joined together with the pusling (puskesmas keliling) officer. The Pusling Officer provided support by picking up reports from malaria cadres as well as delivering incentives and helping with cadre logistics in preparation for the next month's activities.

With this strategy, the assistant health workers were able to generate a pool of competent village malaria cadres. At present, of the six malaria cadres who have been assisted since October 2021, there is only one cadre who still needs assistance in carrying out treatment. The malaria cadres are now not just competent but have been accepted by the community as they live among them and speak the same language.

UNICEF hopes to achieve 100 per cent high quality reporting in 2022 along with an increase in service delivery to community people through home visits this year.



Tebu rawa (swamp sugar cane) is a group of plants that live in swamps that resemble banana trees. It has large stems and long but not sturdy roots. Swamp sugar cane grows to cover the entire surface of the river in some areas, making the routes difficult to pass. ©UNICEF/2022/Benji





Socialization carried out by malaria cadres regarding environmental hygiene, mosquito breeding places, symptoms of malaria, the impact of malaria and the COVID-19 pandemic during home visits using local language (above and below). ©UNICEF/2022/Benji



Houses (Bevak) on the riverbank. ©UNICEF/2022/Benji



Acknowledgment: This case study was collected from a malaria consultant in Papua and reflects his thoughts.

4. Conclusion

This study was conducted in order to assess the role of village malaria cadres for malaria control as well as technical assistance provided by UNICEF in tackling malaria through malaria consultants in Indonesia. Numerous positive developments could be witnessed due to the advocacy of malaria consultants and interventions from village malaria cadres in the community. While there have been numerous efforts and exemplary practices in the field, malaria elimination is not possible unless there is radical change in the community's perception of malaria. The deeply rooted misconceptions about the disease need to be addressed and an awareness regarding the severity of malaria should be instilled in local community people. For this, implementation of tailored socio-behaviour change communication activities should be undertaken.

Malaria is a disease that can be tackled only through cohesive efforts for vector control, environmental sanitation, timely diagnosis, treatment and smooth delivery of healthcare services. Malaria consultants, as technical experts on malaria, can be a source of knowledge for the government health system and support in guiding health and non-health actors to adopt strategic approaches for malaria elimination.

Furthermore, the VMC model needs to be rolled out in all malaria endemic regions of Indonesia, with better support, integration and coordination to bring about a paradigm shift in Indonesia's malaria elimination efforts.

The importance of development and acceptance of evidence-based integrated models should be advocated by the malaria consultants and taken up by the government. Similarly, village malaria cadres are a crucial force to change risky health behaviours. The VMCs play an important role in malaria diagnosis and management, especially in hard-to-reach areas. To eradicate malaria in Indonesia's dynamic context, in addition to further hindrance brought about by COVID-19, these VMC networks must be enhanced as they are the only mechanisms that may assure universal coverage of malaria services in all underserved communities across the country.

5. Recommendations

Tailored approaches should be developed based on the context of the district, including malaria epidemiology, power hierarchies, gender and community dynamics among villagers, and existing beliefs to directly target people's perception of malaria for viable change at the community level.

After the assessment and interaction with both malaria consultants and VMCs, a gap in the **implementation of social and behaviour change communication (SBCC) activities** was identified. The current interventions are largely focused on malaria diagnosis, treatment, management, recording and reporting while minutely addressing awareness-raising and health education. To decrease the caseload of malaria in the first place, risky behaviours associated with malaria need to be reduced and healthy behaviours need to be adopted, which calls for strategic SBCC activities in the future.

Situational analysis of social determinants of health, especially in the case of malaria, needs to be undertaken. Understanding of significant players in malaria prevalence and transmission is crucial. Hence, program interventions should utilise all possible players to accelerate the efforts of malaria elimination in the country.

Malaria interventions need to be integrated within the health system for sustainability. One beneficial integration can be the combined and coordinated efforts from *posyandu* (cadres) and VMCs. Since both parties work in the same community, this integrated approach will not only make access easier for the local community but also ensure continuous contact between the existing health system, community and VMCs. An increase in accountability of all the three domains; healthcare providers, beneficiaries and health managers/administrators balances the supply and demand[15], thus ensuring maximum efficiency and utilization of health services.

There have been visible changes in communities. It is often possible to create a ripple effect from one small change. Hence, **change needs to be acknowledged and replicated** into neighbouring villages or communities through frequent community engagement and participation.

Regular coordination of VMCs, as well as malaria consultants, with *puskesmas*/district health offices and regional health actors for interventions should be further prioritized. In addition to strengthening the information system, the accurate or right provision of test kits, medicines and equipment is possible only through this coordination.

Regular, supportive supervision and monitoring (SSM) of the VMCs by *puskesmas* and regional bodies can further encourage them to serve the community.

Integration with the MCH program needs to be initiated from the beginning. Malaria is also listed under the CB-IMNCI program. Instead of having a separate lens towards the malaria program, MCH interventions should be taken hand in hand with malaria control activities. This can ensure an increase in the number of beneficiaries from vulnerable groups and also contribute to strengthening the malaria data/ trends on women and children.

Capacity building of all actors involved in malaria control and elimination should be done on a regular basis.

Further investment in **research and development** is required, mainly for implementation and operational research to implement and scale up interventions.[16]

To conclude, best practices should be continued while permitting room for innovation, collaboration and cross-sectoral coordination. Community engagement and participation plays an important role in successful communicable disease control and elimination campaigns.[17] Hence, **local people should always be involved** to tackle the issues in their community. While doing so, the motivation of VMCs through incentives and recognition also needs to be considered.

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