The “canary fridge” and pre-referral treatment of severe cases of malaria by community health workers: insights from Burkina Faso

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Abstract

Introduction

Community health workers (CHWs) are crucial for achieving the malaria control goals in Burkina Faso. We assessed the pilot phase of pre-referral treatment for severe malaria cases in the Sahel health region.

Methods

This cross-sectional survey evaluated all CHWs of 25% of health centers implementing the pilot phase of the strategy, assessing their knowledge of the strategy, their ability to recognize symptoms of severe malaria cases, management of medical supplies and data, and their use of "canary fridge" devices for storing the artesunate suppositories. The proportions and means were used to describe the sample.

Results

Among the 177 CHWs surveyed, 83.6% were male, and 36% were aged between 30 and 39 years. Overall, 78% (138/177) of participants were trained and actively implemented the intervention. Most CHWs had an adequate "canary fridge,” and 88% (122/177) reported storing the suppositories correctly. However, approximately 25% (34/138) of the CHWs experienced stock-outs of artesunate. Among the patients who tested positive for malaria, 18.8% (2,238/11,931) were classified as having severe malaria and 69.5% (1,555/2,238) received artesunate suppositories prior to referral to a health facility. However, most CHWs have limited knowledge about the clinical signs of severe malaria.

Conclusion

The implementation of pre-referral treatment for severe cases of malaria by CHWs was effective, but consistent formative supervision was required to achieve optimal

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results. The findings from this evaluation could inform effective scale-up of the intervention.

Keywords: pre-referral, artesunate suppositories, canary fridge, malaria, Burkina Faso

Le “canari réfrigérateur” et la prise en charge pré-transfert des cas graves de paludisme par les agents de santé à base communautaires : expérience du Burkina Faso

Résumé

Introduction
Les agents de santé à base communautaires (ASBC) sont fortement impliqués dans la lutte contre le paludisme au Burkina Faso. Nous avons évalué la phase pilote du projet « traitement pré-transfert des cas de paludisme graves dans la région sanitaire du Sahel ».
Méthodologie
Nous avons évalué les connaissances, les attitudes et les pratiques des ASBC de 25% des centres de santé mettant en œuvre la stratégie, leur gestion des intrants et de l’information sanitaire, leur gestion et leur utilisation du dispositif « canari-frigo » pour le stockage des suppositoires d’artesunate. Les statistiques descriptives ont été utilisées pour caractériser l'échantillon.
Résultats
Sur 177 ASC enquêtés, 83,6 % étaient des hommes et 36 % avaient entre 30 et 39 ans. Au total, 78 % (138/177) avaient été formés et mettaient effectivement en œuvre la stratégie. La plupart des ASC disposaient d'un « canari-frigo » adéquat, et 88% (122/177) stockaient correctement les suppositoires. Environ 25 % (34/138) ont connu des ruptures de stock d'artésunate. Parmi les patients testés positifs au paludisme, 18,8 % (2238/11931) étaient des cas de paludisme grave et 69,5 % (1555/2238) ont reçu des suppositoires d'artésunate avant la référence à un centre de santé. Les ASBC avaient une connaissance limitée des signes de paludisme grave.
Conclusion
le processus et les résultats de la mise en œuvre de la stratégie sont satisfaisants. Des supervisions formatives régulières sont nécessaires pour atteindre les objectifs fixés.

Mots clés : pré-transfert, suppositoires d'artésunate, canari-frigo, paludisme, Burkina Faso

Introduction

According to the World Health Organization (WHO), 249 million cases of malaria were reported globally in 2022, resulting in 608,000 deaths. Four countries in Sub-Saharan Africa (SSA) accounted for nearly half of these cases: Nigeria (27%), the Democratic Republic of the Congo (12%), Uganda (5%), and Mozambique (4%). Additionally, Burkina Faso ranks as the sixth malaria-endemic country, contributing 3.2% to

the global incidence (1). Malaria is a heavy burden on children under five years of age and remains the leading cause of morbidity, hospitalization, and mortality. In 2022, it accounted for 37.8% of outpatient visits, 63.2% of hospitalizations, and 18.2% of deaths (2). As a top public health priority, Burkina Faso has made significant efforts to control the malaria burden, especially among children under five years and pregnant women. Interventions such as artemisinin-based combination therapies (ACTs), mass distribution of insecticide-treated nets (ITNs), seasonal malaria chemoprevention (SMC), indoor residual spraying in select districts, and community-based malaria management have contributed to a substantial reduction in the malaria burden over the past decade. The proportion of children aged 6-59 months who tested positive for malaria using microscopy has decreased from 66% in 2010 to 14% in 2021 (3). Reaching malaria control goals remains challenging despite progress, owing to suboptimal intervention effectiveness. The inadequate performance of the health system and poor quality of healthcare services, especially those related to malaria, diminish the impact of proven interventions (4–7). The country remains committed to optimizing current interventions and actively seeks innovative solutions to accelerate progress towards its malaria control goals. In 2024, the country introduced malaria vaccination across seven health regions and piloted several control measures (8). Community health workers (CHWs) piloted the pre-referral treatment of severe malaria cases in the Sahel region from 2018 to 2020. This study seeks to provide valuable insights into the pilot's implementation to support its potential scale-up across the country.

Since 2009, CHWs have been involved in malaria case management by testing and treating malaria cases in communities and villages located more than 5 km from the nearest health center.

In 2018, the National Malaria Control Program launched a pilot strategy in the Sahel region to manage severe malaria cases using artemisinin suppositories in remote villages situated over 5 km from a health center. This strategy, recommended by the WHO for malaria-endemic countries, targets complex factors contributing to malaria-related deaths in children under five (9). Its aim is to improve access to live-saving interventions for hard-to-reach and underserved populations. In 2018, 44% of the Sahel region's population lived more than 10 km from a health facility, and children under five years of age numbered 259,766, representing 18.6% of the population (10). Geographical inaccessibility

has worsened since 2015 due to escalating security issues, particularly in the Sahel region. By the end of 2019, 55 health centers were closed, and 35 were operating with minimal capacity, affecting 693,000 people. The security crisis led to the displacement of 212,000 people into 31 other health facility catchment areas (11). This community-based strategy aims to reduce the malaria-related burden in under five and foster greater community engagement in health issues, ultimately improving adherence to health interventions.

I. Methods

Study setting: The Sahel health region

The Sahel Health region is located between the 13th and 15th northern parallels. It is bordered to the north by the Republic of Mali, to the northeast by the Republic of Niger, to the south by the East and North-Central regions, and to the west by the north region. It comprises four health districts covering 650 villages, distributed across four urban and 22 rural communes. The average annual rainfall varies between 400 and 600 mm, with a rainy season lasting for three months (June to August) (12).

The Sahel health region is comprised of four districts: Djibo, Dori, Gorom-Gorom, and Sebba. In 2018, 44% of the population lived more than 10 km from a health facility. The number of children under five years of age was estimated to be 259,766, representing 18.6% of the population (10).

Design and Sampling

This was a cross-sectional survey of CHWs and an analysis of quantitative data on their implementation. The questionnaires covered CHWs' sociodemographic data, management of "canary fridge" and CHW skills to i) recognize severe signs of malaria, ii) classify children with fever, iii) administer suppositories, iv) monitor the child's progress, and v) managing artesunate suppositories stocks and data collection tools. We randomly selected 25% of the health centers (Center de Santé et de Promotion Sociale) in the health region, proportionate to the number of health facilities per district. All CHWs in villages beyond 5 km of the sampled health center were surveyed.

Description of the pre-referral treatment of severe cases of malaria by CHWs

- **Guidelines for the pre-referral treatment of severe malaria cases**

The pre-referral treatment of severe malaria cases uses artesunate suppositories. The protocol is a 100 mg suppository for children aged 2–36 months and two 100 mg suppositories for those aged 37–59 months. After the suppository is administered, parents are immediately referred to a health center for adequate and complete treatment. The pilot stage of pre-referral treatment involved four districts of the Sahel health region in villages beyond 5 km from a health facility (13).

- **Implementation process and field work**

The intervention's pilot stage was intended to last 30 months, starting on October 1, 2018, under the coordination of the National Malaria Control Program (NMCP). Activities are cascaded from the central level to the community health workers (CHWs). The main activities included training, supervision, monitoring, data management, data collection, health information, and drug and input supplies.

The NMCP was responsible for coordinating the implementation, mobilizing resources, preparing the necessary documents for implementation, acquiring inputs, monitoring, evaluating, and capitalizing on the pilot phase.

Under the NMCP, the Sahel Regional Health Directorate was tasked with coordination at the regional level, support of the districts, and monitoring and evaluating the intervention.

The district headquarters were expected to plan field activities, train responsible peripheral health facilities, manage the various inputs, handle data management and transmission to the regional health directorate, monitor and evaluate, and ensure pharmacovigilance.

Peripheral health center managers were responsible for strengthening the skills of CHWs, managing inputs and data from CHWs, monitoring, supervising, and documenting the intervention. The CHWs, key stakeholders in the pilot stage, were assigned to oversee the supplies, receive sick children, consult, administer treatment according to national guidelines, refer cases, collect and transmit data, and report adverse effects related to artesunate suppositories.

Capacity building was conducted in a cascade manner, with biannual supervision by the regional health directorate and NMCP to district teams, quarterly supervision from district teams to health centers, and monthly supervision from health centers to CHWs.

Cross-cutting activities include communication and community mobilization (14).

- **The “canary fridge”: logistics for the storage of artesunate suppositories**

To ensure quality, artesunate suppositories must be stored at temperatures between 15 and 25°C. However, in the Sahel region, average temperatures below 25°C were only recorded in December and January. To address this challenge, the project implemented an innovative local logistics solution: the "canary fridge". This cooling system, based on evaporative cooling, allows for the storage of various products, such as food, medicines, and water, without the supply of electricity. This is an advantageous system in resource-limited areas.

The "canary fridge" was built with a double clay pot with sand placed between the two layers (see Figure 1). The sand was kept moist by regular watering to maintain the cooling effect, and the entire structure was placed in a specially adapted room. These "canary fridge “ were handcrafted by local artisans, and provided to all CWHs involved in the project

Data Analysis

Quantitative data analysis was performed using the Stata version 14 software. Descriptive statistics, including means and proportions, were used to summarize the data.

Ethical Considerations

All opinions and information collected from the respondents were treated with strict confidentiality and anonymized, making it impossible to trace any statements or data back to an individual participant. Informed consent was obtained from all interviewees for participation in the survey. The study proposal was approved by the National health research ethics committee (deliberation N° 2020-3-050).

II. Results

Characteristics of the CHWs

The pilot phase of pre-referral for the treatment of severe malaria cases was initially planned for three districts but was ultimately extended to all four districts within the health region. However, only 574 out of 723 villages located more than 5 km from a health facility implemented this strategy. Some villages did not have CHWs (for security reasons), and their skill levels were inadequate.

In total, 177 of 224 CHWs from 27 of 30 health centers were surveyed, representing 79% of the targeted CHWs. Males accounted for 83.6% of the CHWs, the 30-39 years age-group was the most represented. Additionally, 15% of CHWs had no formal education, and 81.3% worked for a maximum of five years as CHW. Table I provides details of the CHWs by district.

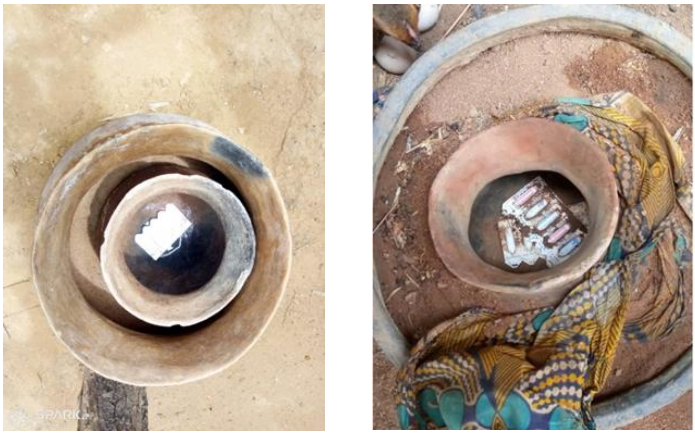
Table I. Characteristics of the study population (N = 177)

Variables	N (%)	Mean ± SD
CHWs per health district		
Health District of Djibo	60 (33.9)	
Health District of Dori	45 (25.4)	
Health District of Gorom-Gorom	51 (28.8)	
Health District of Sebba	21 (11.9)	
Sex		
Female	29 (16.4)	
Male	148 (83.6)	
Age group (years)		33.32 ± 9.91
18-29	73 (41.2)	
30-39	64 (36.2)	
≥ 40	40 (22.6)	
Education		
None	27 (15.3)	
Primary	86 (48.6)	
Secondary	64 (36.2)	
Experience as CHWs (years)		5.02 ± 4.37
< 1	2 (1.1)	
1-5	142 (80.2)	
6-10	20 (11.3)	
11-19	7 (4.0)	
≥ 20	6 (3.4)	

Domain of activity	
Malaria	170 (96.1)
Malnutrition	154 (87.0)
Immunization	101 (57.1)
Sensitization	176 (99.4)
CHWs working with another organization	
No	79 (44.6)
Yes	98 (55.4)
Knowledge of the preferred treatment strategy	
No	31 (17.5)
Yes	146 (82.5)

Logistics for storage of artemisinin suppositories: the “canary fridge"

One of the objectives of the survey was to assess the storage logistics of artesunate suppositories. The results revealed that in almost 97% (134/138) of cases, the use of the “canary fridge” was appropriate and met the required standards, ensuring proper storage of the suppositories. Additionally, 88% (122/138) of the CHWs had a designated space for placing the “canary fridge”. However, some “canary fridges” were found to be in poor condition, compromising their appropriateness for storing the suppositories. The quality of the two categories of “canary fridge” is illustrated in Figure 1.



(A) (B)

Figure 1: Proper (A) and inadequate (B) storage of the suppositories

Management of inputs (suppositories, gloves)

Among the CHWs implementing the strategy, 56% (77/138) reported receiving supplies based on need, whereas approximately 30% (41/138) were supplied on a monthly basis. At the time of the survey, 82 CHWs (59.4%) had no artemisinin suppositories in stock, while one-quarter had experienced stockouts prior to the survey. Gloves were available to 61% of the CHWs, although 35% had at least one glove stockout over the preceding eight months. Stock records were maintained by approximately 64% of the CHWs (Table II).

Table II: Management of the inputs (supply, storage, records, stock out) (N = 138)

Items	N (%)
Periodicity of the provision of the suppositories	
As needed	77 (55.8)
Weekly	1 (0.7)
Monthly	41 (29.7)
Quarterly	11 (8.0)
Six-monthly	8 (5.8)
Availability of artesunate suppository in stock the day of the survey	
Yes	56 (40.6)
No	82 (59.4)
Experienced stock-out of the artesunate suppository before the survey	
Yes	34 (24.6)
No	104 (75.4)
Availability of gloves in stock	
Yes	84 (60.9)
No	54 (39.1)
Stock out of gloves	
Yes	49 (35.5)
No	89 (65.5)
Availability of stock management sheet/booklet	
Yes	88 (63.8)
No	50 (36.2)

Results of the Implementation of Pre-referral Treatment of severe malaria cases by CHWs

Over 8-months of implementation period, CHWs across the four districts received 19,812 patients, of whom 12,395 (62%) were suspected malaria cases. In total, 23,357 RDTs were performed, corresponding to 188% of the expected testing rate. Among suspected cases, 11,931 RDTs were positive (96.3%). Of these, 2,238 (18.8%) were classified as severe malaria cases, and 1,555 (69.5%) were treated with artesunate suppositories (Table III).

Table III: Results of the implementation of pre-referral treatment of severe malaria cases malaria by CHWs

Health Districts	Number of children seen by ASBC	Total number of malaria cases	Number of RDTs performed	Number of positive RDTs	Number of severe cases	Pre-referral treatment
Djibo	15,575	9,185	16,784	8,491	1,774	988
Dori	330	305	2,881	1,376	145	88
Gorom-Gorom	3,121	2,359	2,635	1,592	214	386
Sebba	786	546	1,057	472	105	93
Total region of Sahel	19,812	12,395	23,357	11,931	2,238	1,555

Capacity building (strategic and formative supervision)

Of the 177 CHWs surveyed, 146 (82.5%) were aware of the pre-referral treatment strategy and 138 (95%) were implementing it in their village. Nearly all CHWs involved in the implementation had received training on the strategy (99%), and 88.4% had received at least one supervision visit during 8-months period.

CHWs' knowledge regarding the signs of severe malaria and associated danger signs exhibited considerable variability. A substantial proportion of CHWs demonstrated a lack of familiarity with the critical indicators of severe malaria: 85.9% did not recognize lethargy, 79.7% were unaware of convulsions, 44.6% failed to identify respiratory difficulties, and 38% were uninformed about severe pallor (Table IV).

The most commonly recognized danger signs were persistent vomiting (90%) and inability to drink alcohol (89%).

Table IV: Knowledge of the strategy and the signs of severe malaria cases by CHWs

Items	n (%)
Knowledge of the strategy	
Knowledge of strategy (N = 177)	
Yes	146 (82.5)
No	31 (17.5)
Strategy implemented in the village (N = 146)	
Yes	138 (94.5)
No	8 (5.5)
Have you received training (N = 138)	
Yes	136 (98.6)
No	2 (1.4)
Number of trainings (N = 136)	
1 training	68 (50.0)
More than 1 training	68 (50.0)
Have you been supervised (N = 138)	
Yes	122 (88.4)
No	16 (11.6)
Have you undertaken any community mobilization events? (N = 138)	
Yes	128 (92.8)
No	10 (7.2)
Knowledge of the signs of severe cases of malaria	
Lethargy (general tiredness, inactivity) (N = 177)	
Yes	25 (14.1)
No	152 (85.9)
Seizures or history of seizures (N = 177)	
Yes	36 (20.3%)
No	141 (79.7)
Difficulties of breathing (N = 177)	
Yes	98 (55.4)
No	79 (44.6)
Severe pallor (the palms of the hands and soles of the feet are white) (N = 177)	
No	110 (62.2)
Yes	67 (37.8)
Hemoglobinuria (urine coca cola) (N = 177)	
No	143 (80.8)
Yes	34 (19.2)

Knowledge of the danger signs	
Unable to drink or breastfeed (N = 177)	
No	19 (10.7)
Yes	158 (89.3)
Vomits everything he consumes (N = 177)	
No	18 (10.2)
Yes	159 (89.8)
Convulsions (current or recent) (N = 177)	
No	95 (53.7)
Yes	82 (46.3)
Lethargy (N = 177)	
No	127 (71.8)
Yes	50 (28.2)

Data and health information management

Almost all CHWs surveyed, including those who were neither trained nor implementing the strategy, reported a one-month reporting cycle (Table V). However, around 8% (11/138) indicated submitting reports outside the expected timeframe of the 24th to 30th of each month. In addition, 12.3% (17/138) had never submitted a report, and the promptness of report submission over the 8-month period was approximately 45.5% (55/121). Overall, 38 out of 138 (27.5 %) CHWs reported having received counter-referral during this period.

Table V: Health data and information management by the CHWs

Items	n (%)
Periodicity of reporting (N = 177)	
Monthly	176 (99.4)
Quarterly	1 (0.6)
Transmission delay (N = 138)	
Between 24th -30th of the month	127 (92.0)
Other	11 (8.0)
Reports transmitted during the 8 months (N = 138)	
Yes	121 (87.7)
No	17 (12,3)
Number of reports transmitted over 8 months (N = 121)	
Less than 8 reports	61 (50.4)

8 reports and more	60 (49.6)
Timeliness of reports (N = 121)	
Less than 8 reports	66 (54.5)
8 reports and more	55 (45.5)
Counter references received (N = 138)	
Yes	38 (27.5)
No	100 (72.5)

III. Discussion

Our study aimed to evaluate the effectiveness of a pre-referral treatment strategy for severe malaria in children under five in the Sahel health region. Although initially planned for three districts, this strategy was implemented across all four districts in the region. The CHW profile has several challenges: women were underrepresented, a significant proportion lacked formal education, few had prior experience, and nearly one-quarter were over 40 years old. These socio-demographic characteristics have been shown to negatively affect the performance of CHWs (15,16). Despite efforts to recruit CHWs with a minimum education level, some villages lacked candidates who met this criterion. This highlights a key limitation of community-based strategies, particularly those that require the ability to follow written protocols or complete reporting tasks.

Our results also revealed significant shortcomings, particularly in reporting information and the implementation of the intervention. Notably, the number of rapid diagnostic tests (RDTs) exceeded the total number of patients, suggesting that RDTs were used systematically rather than according to clinical indications. This highlights the poor adherence to the recommended guidelines. For instance, only 70% of suspected severe malaria cases received pre-referral treatment despite the protocol. Several plausible factors may explain this deviation: a lack of awareness or understanding of the pre-referral treatment guidelines, limited knowledge of severe malaria signs, or stock shortages of artesunate suppositories. These challenges are consistent with previous studies, which have reported low adherence to clinical guidelines among CHWs, both in malaria management and other health interventions (17–21). In our study, many CHWs failed to recognize key danger signs, including lethargy (85.9% unaware), convulsions

(79.7%), respiratory distress (44.6%), severe pallor (62.2%), and cola-colored urine, which is a sign of hemoglobinuria (80.8%). Such knowledge gaps can compromise the effectiveness of the strategy, potentially leading to delays in managing severe malaria or other life-threatening illnesses (22,23). Moreover, inadequate knowledge may lead to inappropriate use of suppositories, increasing the risk of treatment failure, and targeted and regular supervision tailored to the specific needs and weaknesses of each CHW could help improve adherence to guidelines and overall intervention effectiveness (24–26). However, our results indicate that planned monthly supervision was not consistently conducted, and nearly half of the CHWs implementing the strategy received training only once during the 8-month period.

Despite a high level of knowledge about the strategy and its implementation, the management of inputs was inadequate, with varying supply provision periodicity from monthly to as needed. These shortcomings might explain the observed input shortage rate of nearly 40% over 8 months. On the survey day, almost three out of the four CHWs did not have any artesunate suppositories. Input shortages are a significant bottleneck that should be the focus of supervision and feedback from healthcare professionals overseeing CHWs. However, the high availability of suppositories has been reported elsewhere (27). Instead of allowing CHWs to manage supplies according to guidelines, it is important for health facility workers to conduct weekly stock assessments via mobile phones (28). Through these phone calls, CHWs can benefit from capacity building and feedback on patients referred to health centers (29–33).

Stock shortages and poor supply management among CHWs may compromise the quality of care and erode community trust in their services. To improve the storage and management of artesunate suppositories using the "canary fridge," it is essential to standardize practices and establish local guidelines that define minimum operational requirements. This would help to reduce disparities in usage and ensure consistent preservation standards. Specific models of the "canary fridge" should be identified, and artisans should be selected based on their ability to meet defined manufacturing specifications.

In addition, setting the minimum criteria for CHW selection, such as a basic level of education and capacity to complete and submit monthly reports, is critical (34). Robust data collection and reliable health

information systems are key to monitoring the effectiveness of prereferral treatment strategies. These data allowed for the identification of training gaps and helped target areas for supervision and support.

Our findings revealed that nearly 8% of CHWs submitted reports outside the expected timeframe (24th–30th of each month) and 12% failed to submit any reports over the 8-month period. Furthermore, many reports were submitted late or incomplete. Strengthened support from health centers is essential to improve CHW performance in the management of severe malaria with artesunate suppositories. Developing clear operational guidelines and tailored training materials will be crucial for optimizing outcomes and preparing for the potential scale-up of the strategy.

Several challenges must be addressed to enable successful scale-up and sustainability of the pre-referral treatment strategy for severe malaria.

The first challenge is maintaining CHW motivation and ensuring optimal use of the “canary fridge” under often difficult working conditions. The effectiveness of the strategy may be compromised because many CHWs operate under constraints that reduce their performance and the intended impact of the intervention. In Burkina Faso, CHWs typically receive 19 days of initial training and earn a modest monthly salary of XOF 20,000 (approximately $33), with an additional stipend of XOF 3,000 (~$5) during mass health campaigns(35). Many CHWs also rely on other income-generating activities such as farming, herding, craftsmanship, or trading. They often have limited formal education, and rarely benefit from regular supervision or refresher training, which can undermine their effectiveness. Despite these constraints, demand for CHWs continues to increase.

The second challenge lies in strengthening CHWs’ capacity to manage malaria cases, accurately report their activities to health facilities, and promote timely care-seeking behavior in the community. Ensuring appropriate storage conditions for artesunate suppositories is essential for preserving the treatment quality. This requires ongoing support through regular supervision and refresher training by healthcare professionals. Additionally, promoting peer learning by sharing best practices among experienced CHWs who maintain good storage conditions could help improve their overall performance.

The third major challenge is to sustain a strategy in the context of persistent insecurity. In conflict-affected areas, this intervention can offer alternative means of care delivery. However, this requires addressing critical issues, such as maintaining a reliable supply chain to reach CHWs in remote or unstable areas, ensuring continuity of care despite population displacements or supply interruptions, and mitigating the risk that CHWs may be stigmatized or targeted due to their affiliation with the health system.

In the context of ongoing insecurity, the pre-referral treatment strategy should be integrated as a core component of the institutionalized and operational community health system. To enhance its effectiveness and sustainability, the strategy must be adapted to include resilience measures for CHWs along with flexible and context-sensitive guidelines and standards, particularly regarding reporting timelines, supply chain management, supervision, and monitoring. Beyond addressing geographical barriers, priority implementation should focus on districts that are affected by security challenges. Additionally, equipping CHWs with mobile phones or digital tools should be considered essential for facilitating communication, data reporting, and remote support.

Conclusion

Pre-referral treatment for severe malaria is both effective and essential in the context of insecurity in Burkina Faso. Regular capacity building and support for CHWs are critical to ensure optimal implementation. The lessons learned and best practices identified during the pilot phase provide a strong foundation for scaling up strategies and improving health outcomes.

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Competing interests

All authors declare no conflict of interest.

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