Towards Universal Health Coverage in Mali: The Pivotal Role and Limitations of Community Health Workers in the Fight Against Malnutrition 2010-2024

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SUMMARY AND KEYWORDS

Context: Faced with barriers to accessing healthcare, Mali undertook a reform of its community health system in 2010. This study evaluated the contribution of Community Health Workers (CHWs) in the fight against malnutrition in five regions (Kayes, Koulikoro, Sikasso, Ségou, Mopti) in Mali.

Methodology: A cross-sectional analytical study was conducted. It combined a retrospective review (2010-2024) of DHIS2 data and a perception survey (2024-2025) of stakeholders and beneficiaries. Quantitative data from questionnaires were entered and analyzed using SPSS software (version 25.0) . Retrospective modeling was performed using the Lives Saved Tool integrated into Spectrum software, and qualitative interviews were conducted with 385 stakeholders and beneficiaries.

Results: Our study found that the profile of community health workers (CHWs) reveals a high proportion of women (68.24%) and a high level of professional experience (57.85% aged 28 to 38). Clinically, CHWs managed a cumulative total of 142,327 cases of moderate acute malnutrition (MAM) and 520,439 cases of severe acute malnutrition (SAM). While user satisfaction is high (97.92%), accessibility is hampered by a critical lack of transportation (4.6%) and frequent stockouts of essential supplies (62.86% availability). Average coverage of target populations remains limited to 14.42% for MAM and 27.89% for SAM.

Conclusion: The Essential Community Care strategy in Mali has proven its ability to manage simple cases of malnutrition, treating over half a million cases in ten years. Despite the expertise and social commitment of community health workers, coverage remains limited by critical mobility (4.6%) and logistical disruptions. Sustaining these gains requires increased professionalization and a more secure supply chain.

Keywords: ASC, Malnutrition, Mali, DHIS2, Community Health, Resilience.

INTRODUCTION

Malnutrition persists as a major international public health challenge. In 2025, the Joint Estimates of Child Malnutrition (JME) highlight an alarming trajectory: current progress is insufficient to meet the World Health Assembly (WHA) nutrition targets initially set for 2025. This finding jeopardizes the achievement of Sustainable Development Goal (SDG) 2 targets by 2030, underscoring the urgent need to strengthen multisectoral interventions to reverse the trends in the prevalence of undernutrition (1) . Only about a quarter of countries are on track to halve the number of children under 5 suffering from stunting by 2030. More intensive efforts are needed for the world to meet the global target of reducing the number of children suffering from stunting to 90 million by 2030. At the current rate, this target will not be met for 46 million children (1) .

Malnutrition, in all its forms, constitutes one of the most complex global public health challenges of the 21st century. According to the World Health Organization (WHO, 2024), the world is facing a paradoxical nutritional transition where undernutrition coexists with an alarming increase in overweight and obesity (2) . In 2022, the number of overweight adults was estimated at 2.5 billion, of whom 890 million were clinically obese, while 390 million were underweight. This imbalance is just as pronounced among children and adolescents aged 5-19, with 390 million overweight compared to 190 million underweight (2,3) . The 2024 WHO/UNICEF report on child malnutrition reveals that in 2024, 23.2% of children under five (150.2 million) suffer from stunting and 6.6% from wasting (35.5 million overweight). Malnutrition is linked to nearly half of all deaths of children under five (2) . The health situation remains concerning, characterized by persistent morbidity and mortality rates among children under five and women of reproductive age. This situation is exacerbated by major structural deficits, including inadequate health infrastructure, fragile financial resources, and limited availability of essential healthcare services. Adding to this supply crisis is a global shortage of human capital. According to projections by the World Health Organization (WHO), the global health workforce shortage will reach 10 million workers by 2030. (4) This systemic shortage reinforces the need to invest in alternative and resilient care models centered on community actors. To address these challenges, the WHO and several other organizations have encouraged countries to adopt a diversified approach to healthcare delivery, particularly by leveraging the potential of community health workers (CHWs) (4,5) . It is in this context of limited access and critical urgency that the Community Essential Care (CEC) strategy emerged, first globally and then continentally. Recommended by the Alma-Ata conferences and reaffirmed in Astana, this approach aims to delegate simplified medical tasks to Community Health Workers (CHWs) (6) .

Africa, and particularly sub-Saharan Africa, remains the region most severely affected by persistent undernutrition (7) . Contrary to the global trend of transitioning to overweight, the African continent is bearing the brunt of the "triple burden" of malnutrition in a context of economic and climatic fragility (8) . In West Africa and the Sahel, structural food insecurity, exacerbated by conflict and market instability, keeps acute and chronic malnutrition indicators at critical levels (9) . UNICEF and WFP reports (2024) highlight that the Sahel remains a permanent emergency zone where global acute malnutrition (GAM) rates regularly exceed the alert threshold of 10%, and even the emergency threshold of 15% in some transboundary areas (10, 11) . Despite bearing a disproportionate burden of global health crises, Africa has developed endogenous resilience models, foremost among them the Essential Community Care (ECC) strategy. A legacy of the 1978 Alma-Ata Conference, the deployment of Community Health Workers (CHWs) at the heart of villages has become the cornerstone of the continent's primary health care systems. This institutional recognition reached a decisive milestone in 2017 at the African Union Assembly, where Heads of State pledged to support the training and integration of an additional two million CHWs continent-wide, thus enshrining their pivotal role in achieving Universal Health Coverage (UHC). Trusted members of their communities, CHWs facilitate community engagement, build trust, and ensure that health and nutrition interventions are culturally appropriate and well-received (12) . Community health workers (CHWs) provide essential primary healthcare services, such as immunization, nutritional supplementation, and maternal and child health care. (13) They often play a crucial role in ensuring access to these services, particularly in rural areas where distances to health facilities are significant (14) . They also provide education on various health and nutrition-related topics, enabling community members to acquire the knowledge and skills needed to improve their health and well-being (13) .

In Mali, the nutritional situation remains a major national security concern. Data from the 7th Demographic and Health Survey (DHS) (2025) show that 25% of children are stunted (height-for-age < -2 SD), of whom 7% are severely stunted (< -3 SD), and 5% are wasted or suffer from acute malnutrition, of whom 1% are severely wasted and 15% are underweight (weight-for-age < -2 SD) (15) . The SMART 2024 national surveys confirm a high prevalence of stunting and wasting; the prevalence of acute malnutrition is 11.6%, of which 2.2% is severe; underweight has a prevalence of 21.1%, with 5.5% being severe; and stunting has a prevalence of 24.8%, with 7.5% being severe. As for overweight and obesity, the prevalence rates are 0.9% and 0.2%, respectively (16) . Despite structural investments, the Malian health system continues to face chronic logistical constraints, a systemic shortage of human resources, and major disparities in geographical access. This situation is further complicated by a climate of residual insecurity which, for more than a decade, has exacerbated the isolation of rural populations and hindered their effective use of Community Health Centers (CSComs). Faced with the inherent limitations of universal health coverage, the Malian state initiated a paradigm shift in 2010 through a profound overhaul of its community health policy, aiming to reposition healthcare services closer to households (17) . This reform dynamic has resulted in a substantial redefinition of the responsibilities assigned to frontline workers. Indeed, as Glenton et al. point out... (2021), community health workers are no longer confined to awareness-raising or information-sharing roles, but now assume simplified clinical roles and essential curative tasks (13) . In Mali, this transition to "active treatment" has made it possible to delegate the management of complex pathologies, such as severe acute malnutrition, to community actors capable of intervening where geographical and security barriers render the conventional healthcare system ineffective. This task-shifting constitutes the major strategic lever for ensuring continuity of care in the country's most vulnerable areas. This strategy relies on the deployment of Community Health Workers (CHWs), resident members of their localities, trained to provide an integrated package of preventive, promotional, and curative care directly within households (17) . The adoption of this strategy is not merely a technical choice, but a necessity for survival. By entrusting community health workers (CHWs) with the diagnosis and treatment of malnutrition, malaria, and respiratory infections, the health system is transitioning towards equity, reducing morbidity directly within households and bypassing financial and geographical barriers (18) . The evolving role of CHWs in Mali, from a simple passive screening relay to an autonomous actor in Integrated Management of Acute Malnutrition (IMAM), represents a major innovation. This decentralization of care is all the more crucial given that geographical distance and insecurity are the main obstacles to child survival. However, few studies have examined the effectiveness of CHWs in managing widespread bitter malnutrition across multiple regions. It was therefore imperative to assess the impact of this community contribution to guide future health policies. The overall objective of the study was to analyze the contribution of Community Health Workers in the management of malnutrition in Mali over the period 2010-2025. Specifically, it aims to assess the evolution of therapeutic coverage, identify the operational challenges related to the transition to active treatment and measure the effectiveness of this community strategy in reducing mortality rates among children under five years of age.

METHODOLOGY

Type and framework of the study

This was a cross-sectional study with an analytical aim. It used a mixed methodological approach combining, on the one hand, a retrospective literature review covering the period from 2010 to 2024 and, on the other hand, a cross-sectional analysis of routine data collected between 2024 and 2025.

The geographical scope of the study encompassed the first five administrative regions of Mali, namely Kayes, Koulikoro, Sikasso, Ségou, and Mopti. The analysis focused specifically on health areas engaged in the implementation of the Essential Community Care (ECC) strategy, in order to assess the direct impact of the deployment of Community Health Workers (CHWs) on health indicators.

Study period

The research was conducted over a 36-month period, from September 2022 to August 2025. Quantitative data were acquired by extracting programmatic indicators archived in the national district health information soft-

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ware (DHIS2). This database allowed for the creation of a time series from 2010 to 2024, supplemented by the results of large-scale national surveys conducted over the 2024-2025 biennial period to ensure triangulation of the findings.

Study population and sampling

The study population consisted of children aged 0 to 59 months residing in the areas served by the Community Health Workers (CHWs). Inclusion criteria were: children diagnosed with moderate malnutrition (MAM) and/or severe acute malnutrition (SAM) without complications; and monthly activity reports from the CHWs validated by the Community Health Centers (CSComs) and entered into the DHIS2 system. All key actors involved in the implementation of community health systems at their respective levels of intervention (national, regional, district, health area). The study targeted three groups of actors involved in the community health system: Community health workers operating within essential care sites, beneficiaries, and strategic and operational actors. The study included key stakeholders in the implementation of community health services (CHS) at all levels of the health pyramid (health areas, districts, regions, and the national level), as well as representatives of technical and financial partners (TFPs). The data collected from 4,230 community health workers (CHWs), 119 key stakeholders in the implementation of CHS at all levels of the health pyramid (health area, district, regional, national, and TFPs), and 266 community beneficiaries **(** users residing in the coverage areas of CHW sites).

For sampling, an exhaustive approach was applied to community health worker (CHW) data in the DHIS2 database for cases of acute malnutrition (AMM) and severe acute malnutrition (SAM) managed by CHWs. This approach was also applied to the mapped list of CHWs. Simple random sampling was used to select CHWs for the surveys. The minimum CHW sample size was calculated based on the CHW population coverage rate in 2023 (28.44%), resulting in n=313 plus 10% to reach n=344. Purposive (or targeted) sampling was used for the selection of key actors participating in the in-depth interviews, taking into account their involvement in the SEC program.

Data collection

The data were collected from three complementary sources: routine data extracted from DHIS2, reports from the SEC annual reviews , the mid-term evaluation report of the SEC National Strategic Plan 2020-2025, and structured interviews. for the A qualitative component was conducted with a sample of community health workers and other stakeholders to identify operational challenges in insecure areas. Survey data collected via Kobo Collect was exported to Excel for verification, cleaning, and preparation.

Variables of interest

The main variables analyzed were related to clinical performance name the cure rate, case fatality rate, dropout rate, coverage such as the number of children screened compared to the expected target, availability of inputs (ATPE) and time evolution (Comparison of indicators between the passive screening phase (2010-2015) and the active treatment phase (2016-2025).

Statistical processing and analysis

Data processing was performed using SPSS software (Version 25.0) . Statistical analyses included descriptive analysis presenting sample characteristics as frequencies and means with their 95% confidence intervals (95% CI). Correlation analysis was also conducted between nutritional outcomes and working conditions (particularly the availability of locomotion).

Modeling

Data collection and modeling using the Lives Saved Tool (LiST)

The modeling procedure took place in three distinct phases:

Consolidation of baseline indicators: A standardized template in Microsoft Word was developed to compile coverage indicators by region. This table allowed for the establishment of initial baseline levels (2010) and final performance levels (2024) for each intervention in the Community Health Workers' (CHW) curative care package. Data were extracted from reliable official sources, including national surveys (MICS 2010, EMOP 2024, SMART 2024, EDSM-V and EDSM-VII 2024) and the Health Statistical Yearbooks (SLIS).

Projection configuration in Spectrum: Specific projection files were created within the Spectrum software (LiST version) for each study region as well as at the national level. For each scenario, the baseline coverage (2010) and the targets achieved (2024) were manually entered into the LiST module from the previously consolidated dashboard.

Trend analysis and interpolation: To simulate the annual evolution of coverage between the two time frames (2010-2024), we applied linear interpolation for each indicator. This method allowed us to estimate constant annual increases and to calculate, through mathematical modeling, the number of deaths averted and the impact on child survival attributable to the increased coverage of community services.

Ethical considerations

The study received approval from the Biomedical Research Ethics Committee (CERB) of the Faculty of Medicine and Odonto-Stomatology (FMOS/USTTB) . Data anonymity was strictly maintained in accordance with current health data protection regulations. Access to routine DHIS2 data was subject to prior authorization from the National Health Directorate. For field surveys, informed consent was obtained from each participant (community health workers, healthcare professionals, and patients) before any interview. Respondent anonymity and data confidentiality were strictly preserved in accordance with the principles of the Declaration of Helsinki.

RESULTS

Sociodemographic profile and community integration of ASCs (Table 1)

Analysis of the characteristics of community health workers (CHWs) highlights a high proportion of women in the role, with a prevalence of 68.24%. The workforce is mature, with the majority of workers (57.85%) in the 28-38 age bracket, and socially stable (80% married). In terms of prior skills, a significant proportion (67.89%) had prior experience within the healthcare system as midwives or nursing assistants.

However, two critical indicators raise concerns: firstly, a secondary education level is predominant (67.47%), which facilitates the adoption of digital tools (DHIS2); secondly, a weak geographical connection is observed, with only 10% of staff originating from their assigned villages. Finally, operational continuity of service is generally ensured, although 3.10% of sites were identified as non-functional during 2024.

Table 1: Distribution of ASCs according to socio-demographic and socio-economic characteristics

Variables	Number (n)	Proportion (%)
Sex		
Female	**2731**	**68.24**
Male	1271	31.76
Age		
≤ 18 years old	16	0.4
18 to 28 years old	1039	25.96
28 to 38 years old	**2315**	**57.85**
38 to 48 years old	494	12.34
48 to 58 years old	104	2.6
≥ 58	34	0.85
Profile at the time of recruitment		

Midwife/Caregiver	**2717**	**67.89**
Health worker	545	13.62
Not a healthcare worker	740	18.49
Marital status		
Bride)	**3202**	**80.00**
Divorced	120	3.00
Bachelor	680	17.00
Education level		
First cycle	98	2.45
Second cycle	1105	27.61
Secondary	**2700**	**67.47**
Superior	99	2.47
Native of the village, ASC site		
Yes	**400**	**10.00**
No	3602	90.00
ASC website functionality		
Yes	3878	96.90
No	**124**	**3.10**

Accessibility, perceived quality and service performance (Table 2)

The evaluation of the logistics component reveals that the availability of supplies remains a major challenge, with 62.86% of key stakeholders and beneficiaries reporting a consistent supply of medications at community health centers (CHCs). Conversely, affordability is a strength of the strategy; consultation fees and the cost of medications were deemed acceptable by 81.30% and 86.75% of users, respectively.

In terms of overall satisfaction, the services offered by community health workers (CHWs) enjoy strong public support, with 97.92% positive opinions (66.75% "very satisfied" and 31.17% "satisfied"). Finally, adherence to the care protocol is considered satisfactory, with 67.23% of key stakeholders believing that the package of activities assigned to the workers is fully implemented in the field.

Table 2: The opinion of stakeholders and users on the service provided by the ASCs

Variables	**Effectiveness**	**Proportion (%)**
Drug availability at the ASC website		
Always	**242**	**62.86**
Often	103	26.75
Rarely	40	10.39
Opinion on the consultation fee		
Acceptable	**313**	**81.30**
Dear	2	0.52
No Opinion	69	17.92
Opinion on the cost of medicines		
Acceptable	**334**	**86.75**
Dear	5	1.30
No Opinion	46	11.95
Level of satisfaction with the performance of the ASC		
Very satisfied	**257**	**66.75**
Satisfied	120	31.17
Not satisfied	8	2.08

The actors' opinion on the level of execution of the ASC package, n = 119		
Entirely	**80**	**67.23**
Partially	27	22.69
Insufficiently	4	3.36
I don't know	8	6.72

Gender dynamics, professional relationships and job satisfaction (Table 3)

Analysis of community perception reveals an interesting duality regarding gender dynamics. While a large majority of users (78.95%) state that the sex of the agent does not influence technical competence, a marked socio-cultural preference (75.19%) among respondents suggests that female community health workers (CHWs) enjoy greater social acceptance. In terms of performance, 58.65% of beneficiaries have a very favorable opinion of the overall quality of services.

Regarding governance and the work environment, 53.01% of respondents considered professional relationships between community health workers (CHWs) and other stakeholders in the system (supervisors, Community Health Center (CHC) agents) satisfactory. Finally, a difference in perception was noted between users and technicians: 67.29% of those implementing the service reported being satisfied with their own performance, reflecting a sense of personal effectiveness despite the challenges they faced in the field.

Table 3: Community perceptions of the ASC and its service

Variables	**Effectiven**	**Proportion (%)**
Appreciation of the work of the ASCs		
Very good	**156**	**58.65**
Good	98	36.84
Fair	12	4.51
Does the male or female gender of the ASC affect its work?		
Yes	32	12.03
No	**210**	**78.95**
Don't know	24	9.02
ASC rating based on whether male or female		
Man	66	24.81
Women	**200**	**75.19**
Quality of relationship between stakeholders and ASC		
Very good	117	43.98
Good	**141**	**53.01**
No opinion	8	3.01
User satisfaction level with the work of the ASCs		
Moderately satisfied	74	27.82
Satisfied	**178**	**67.29**
Not satisfied	5	1.88
I don't know	8	3.01

Working conditions and logistical environment of ASCs (Figure 1)

Analysis of material working conditions reveals a marked contrast between fixed infrastructure and mobility. In terms of facilities, a large majority of staff benefit from access to housing (80%) and a dedicated work environment (87.7%), demonstrating an effort to institutionalize sites at the village level.

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However, mobility is the major logistical bottleneck: only 4.6% of the agents surveyed reported having a functional means of transportation. This critical shortage of vehicles severely hinders agents' ability to travel for supervisory activities, referral of serious cases, and active searches for those lost to follow-up.

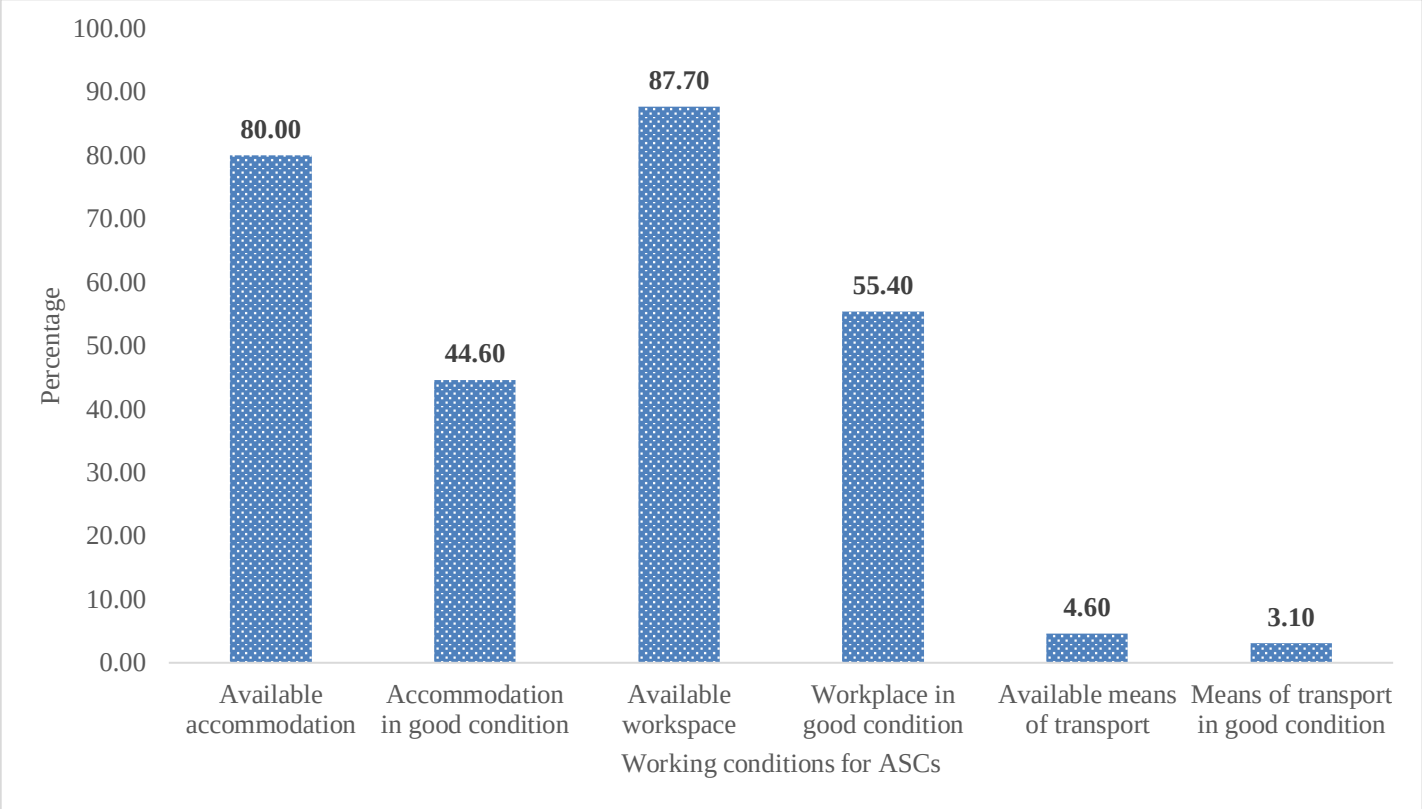

Figure 1: The opinion of the ASCs on their working conditions at the village site.

Clinical performance of community health workers in the management of moderate acute malnutrition (MAM)

Analysis of routine data from 2016 to 2024 reveals a massive increase in clinical activity by community health workers (CHWs). A total of 142,327 cases of moderate acute malnutrition (MAM) were treated. The volume of activity followed a continuous upward trajectory, rising from 2,697 cases in 2016 to a record high of 33,204 cases in 2023, before a slight decrease in 2024 (26,380 cases). Geographically, the Ségou region stands out as the major center of activity with 56,487 cases (39.7% of the cumulative total), followed by Koulikoro and Mopti.

Table 4: Number of cases of moderate acute malnutrition managed by community health workers per year and per region.

Year	Kayes	Koulikoro	Sikasso	Ségou	Mopti	Total
2016	29	0	1450	794	424	**2,697**
2017	56	106	1333	4609	1416	**7,520**
2018	3204	1363	1121	3232	2189	**11,109**
2019	3441	2458	1972	3498	2665	**14,034**
2020	1853	2140	971	4995	3237	**13,196**
2021	1234	1720	679	5693	4277	**13,603**
2022	1655	5414	861	8562	4092	**20,584**
2023	1767	9306	2450	13738	5943	**33,204**
2024	1,567	5,439	1,673	11,366	6,335	**26,380**
Total	**14,806**	**27,946**	**12,510**	**56,487**	**30,578**	**142,327**

Contribution of CSAs and target coverage

The contribution of community health workers (CHWs) to the overall management of moderate acute malnutrition (MAM) is significant, with an average proportion of care provided at 23.00% across the five regions. This contribution peaked in 2023, when CHWs absorbed 34.00% of the MAM-related morbidity burden. However, regional disparities are marked: Ségou (31.22%) and Sikasso (30.22%) have the highest average contributions, while Kayes (11.89%) has the lowest.

Table 5: Percentage of cases of moderate acute malnutrition managed by ASCs per year and per region.

Year	Kayes	Koulikoro	Sikasso	Ségou	Mopti	Average
2016	0.00	0.00	7.00	4.00	5.00	**3.00**
2017	1.00	1.00	13.00	25.00	13.00	**13.00**
2018	22.00	14.00	30.00	21.00	21.00	**21.00**
2019	22.00	34.00	40.00	41.00	19.00	**28.00**
2020	18.00	31.00	36.00	34.00	23.00	**27.00**
2021	12.00	33.00	29.00	33.00	24.00	**26.00**
2022	12.00	28.00	31.00	36.00	24.00	**27.00**
2023	11.00	34.00	46.00	47.00	31.00	**34.00**
2024	9.00	25.00	40.00	40.00	28.00	**28.00**
Average	**11.89**	**22.22**	**30.22**	**31.22**	**20.89**	**23.00**

ASC target coverage rate for MAM

Regarding the target coverage rate, the overall average performance stands at 14.42%. Here again, Ségou stands out with superior efficiency (26.11%), contrasting with the regions of Kayes, Koulikoro and Sikasso which struggle to cross the 10% threshold.

Table 6: Coverage rate (in percentage) of moderate acute malnutrition targets achieved by ASCs per year and per region.

Year	Kayes	Koulikoro	Sikasso	Ségou	Mopti	Average
2016	1.00	0.00	46.00	28.00	18.00	**19.00**
2017	0.00	1.00	6.00	23.00	8.00	**8.00**
2018	21.00	7.00	5.00	18.00	14.00	**13.00**
2019	25.00	15.00	11.00	22.00	19.00	**18.00**
2020	15.00	15.00	6.00	35.00	26.00	**19.00**
2021	8.00	9.00	3.00	32.00	27.00	**15.80**
2022	8.00	22.00	3.00	36.00	20.00	**17.00**
2023	3.00	15.00	4.00	22.00	11.00	**11.00**
2024	3.00	9.00	3.00	19.00	12.00	**9.00**
Average	**9.33**	**10.33**	**9.67**	**26.11**	**17.22**	**14.42**

Clinical performance of community health workers in the management of severe acute malnutrition (SAM)

Community health worker (CHW) activity in managing severe acute malnutrition (SAM) has seen unprecedented expansion over the study period, with a cumulative volume of 520,439 cases treated. The timeline reveals a dramatic increase: from 6,170 cases in 2016, the system reached 77,757 cases in 2024, marking almost constant growth despite a slight stabilization between 2019 and 2021. The regions of Sikasso (126,393 cases) and Ségou (119,002 cases) constitute the main intervention hubs, while Kayes recorded the lowest volume (47,706 cases), falling below the regional average.

Table 7: Number of cases of severe acute malnutrition managed by community health workers per year and per region

Year	Kayes	Koulikoro	SIKASSO	SEGOU	MOPTI	**Total**
2016	704	-	3,711	820	935	**6,170**
2017	2,601	1,373	6,755	10,898	6,169	**27,796**
2018	8018	10,945	13,913	11,877	10,918	**55,671**
2019	8,692	16,693	21,219	12,981	11,447	**71032**
2020	7,667	17,428	17,334	13,548	12,674	**68,651**
2021	5,454	16,274	15,042	15,694	15,094	**67,558**
2022	5,992	17,353	16,842	16,474	16,300	**72,961**
2023	4,396	15,997	16,632	16,289	19,529	**72,843**
2024	4,182	16,810	14,945	20,421	21,399	**77,757**
Total	**47,706**	**112,873**	**126,393**	**119,002**	**114,465**	**520,439**

Relative contribution and coverage rate of MAS targets

The average contribution of community health workers (CHWs) to the management of severe acute malnutrition (SAM) in the study areas is 6.89%. There is an upward trend, peaking at 9.00% in 2024. Regional disparities show that Mopti (9.67%) and Ségou (9.56%) optimize the role of CHWs more in the management of the severe form compared to Kayes (3.22%).

Table 8: Percentage of severe acute malnutrition cases managed by ASCs per year and per region .

Year	**Kayes**	**Koulikoro**	**Sikasso**	**Ségou**	**Mopti**	**Average**
2016	1.00	0.00	2.00	1.00	1.00	**1.00**
2017	2.00	1.00	4.00	8.00	7.00	**4.00**
2018	6.00	6.00	6.00	9.00	9.00	**7.00**
2019	5.00	9.00	9.00	10.00	9.00	**8.00**
2020	5.00	10.00	9.00	11.00	10.00	**9.00**
2021	3.00	9.00	7.00	11.00	12.00	**8.00**
2022	3.00	9.00	8.00	11.00	12.00	**8.00**
2023	2.00	9.00	8.00	11.00	13.00	**8.00**
2024	2.00	9.00	8.00	14.00	14.00	**9.00**
Average	**3.22**	**6.89**	**6.78**	**9.56**	**9.67**	**6.89**

MAS target coverage rate by ASCs

Regarding coverage performance, the average rate of achievement of target objectives is 27.89%. This performance fluctuated, although it showed notable peaks in 2019 (42.00%) and 2020 (40.00%). At the end of the period, the Mopti region stood out with a coverage rate of 53.00% in 2024, significantly exceeding the overall average.

Table 9: Coverage rate (in percentage) of severe acute malnutrition targets reached by ASCs per year and per region.

Year	**Kayes**	**Koulikoro**	**Sikasso**	**Ségou**	**Mopti**	**Average**
2016	2.00	0.00	9.00	2.00	3.00	**3.00**
2017	11.00	5.00	23.00	39.00	25.00	**21.00**
2018	23.00	26.00	31.00	30.00	31.00	**28.00**
2019	29.00	46.00	54.00	37.00	38.00	**42.00**
2020	26.00	48.00	44.00	39.00	42.00	**40.00**

2021	10.00	24.00	21.00	24.00	27.00	**21.00**
2022	14.00	33.00	30.00	33.00	37.00	**30.00**
2023	11.00	32.00	31.00	34.00	47.00	**31.00**
2024	11.00	35.00	29.00	44.00	53.00	**35.00**
Average	**15.22**	**27.67**	**30.22**	**31.33**	**33.67**	**27.89**

Analysis of the impact and evolution of the coverage of community interventions on the survival of children under five years of age in Mali, using the Lives Saved Tool (2010-2024).

Lives saved through community interventions (LiST modeling)

Estimates generated by the Lives Saved Tool (Table 10) demonstrate the life-saving impact of the SEC strategy between 2010 and 2024. A total of 159,847 lives of children under five were saved across the five study regions. ACT treatment for malaria stands out as the most life-saving intervention, with 109,658 lives saved, representing over 68% of the total. Nutritional interventions followed with a major impact: treatment for moderate acute malnutrition (MAM) saved 21,999 children, while treatment for severe acute malnutrition (SAM) saved 11,177. Interventions against pneumonia (8,128 lives) and diarrhea (7,863 + 1,022 lives) complete this record. Geographically, the Sikasso region has the highest record with 40,251 lives saved, closely followed by Koulikoro (31,261) and Kayes (30,151).

Table 10: Number of additional infant and juvenile lives (Total 0-59 months) saved by intervention from 2010 to 2024 in the study regions.

Intervention	**Kayes**	**Koulikoro**	**Sikasso**	**Ségou**	**Mopti**	**Average**
Postnatal treatment						
Oral rehydration solution (ORS) for the treatment of diarrhea	2672	8	3077	1026	1080	**7863**
Zinc for the treatment of diarrhea	41	521	168	180	112	**1022**
Oral antibiotics for pneumonia	2993	835	1451	2276	573	**8128**
Artemisinin-based polytherapies for treat malaria (ACT)	20056	23855	27232	17489	21026	**109658**
Treatment of acute malnutrition severe (MAS)	79	111	5150	2962	2875	**11177**
Treatment of acute malnutrition moderate (MAM)	4310	5931	3173	3621	4964	**21999**
Total	**30151**	**31261**	**40251**	**27554**	**30630**	**159847**

Source : Estimates obtained by modeling aggregated data from EDSM and MICS surveys, EMOP, SMART and SLIS Mali (2010 -2024) using LiST software.

Extension of health service coverage through the ASC curative package

Analysis of coverage trends between 2010 and 2024 (Table 11) reveals an overall average increase of 18.22% for all curative interventions. The results show that the SEC strategy was particularly effective for two major pillars: ACT-based malaria treatment and the management of severe acute malnutrition (SAM). Coverage of ACT-based malaria treatment jumped by an average of 32.90%, with exceptional performance in the Koulikoro region (60.5%). Simultaneously, coverage of SAM management increased by 32.06%, with the Sikasso (41.8%) and Mopti (41.5%) regions recording the most significant increases. Conversely, interventions related to diarrhea (zinc: 5.98%) and pneumonia (antibiotics: 9.18%) showed more modest growth. Geographically, Koulikoro leads the expansion of overall coverage with an increase of 22.12%, while Mopti records the lowest progress (14.00%).

Table 11: Increase in health service coverage between 2010 and 2024 for the ASC curative package intervention program in the study areas.

Interventions	Kayes	Koulikoro	Sikasso	Ségou	Mopti	Average
Postnatal treatment						
Oral rehydration solution (ORS) for the treatment of diarrhea	23.2	0	15.8	8.3	7.7	**11.00**
Zinc for the treatment of diarrhea	1.5	14.2	4.4	6.3	3.5	**5.98**
Oral antibiotics for pneumonia	15.1	4.3	6.6	16.2	3.7	**9.18**
Artemisinin-based polytherapies to treat malaria (ACT)	31	60.5	23.2	36.2	13.6	**32.90**
Treatment of severe acute malnutrition (SAM)	15.1	31.6	41.8	30.3	41.5	**32.06**
Total	**17,18**	**22.12**	**18.36**	**19.46**	**14.00**	**18.22**

Source : Estimates obtained by modeling aggregated data from EDSM and MICS surveys. EMOP, SMART and SLIS Mali (2010 -2024) using LiST software.

Reduction in mortality of children under 5 years of age (LiST modeling)

Estimates obtained through modeling using the Lives Saved Tool (Table 12) highlight the effectiveness of postnatal curative interventions. On average, the entire package of interventions contributed to a 33.42% reduction in infant and child mortality in the study areas between 2010 and 2024. Analysis by type of intervention reveals that the management of severe acute malnutrition (SAM) is the most powerful lever, with an average mortality reduction of 34.98%. This is closely followed by the treatment of pneumonia (34.16%) and malaria (33.56%). Diarrhea-related interventions (ORS and zinc) also show a significant impact, exceeding 32%. Geographically, the Ségou region recorded the highest reduction in mortality (35.66%), while Koulikoro had the lowest rate (32.16%), although the impact remained homogeneous and substantial in all study regions.

Table 12: Cumulative percentage reduction in mortality of children under 5 years attributable to different interventions in the study regions from 2010 to 2024.

Interventions	Kayes	Koulikoro	Sikasso	Ségou	Mopti	Average
Postnatal treatment						
Oral rehydration solution (ORS) for the treatment of diarrhea	31.3	31.1	30.9	34.2	33	**32.10**
Zinc for the treatment of diarrhea	31.3	31.6	31.1	34.3	33.1	**32.28**
Oral antibiotics for pneumonia	35.3	32.7	32.7	36.4	33.7	**34.16**
Artemisinin-based polytherapies to treat malaria (ACT)	33.7	31.3	33.2	36.5	33.1	**33.56**
Treatment of severe acute malnutrition (SAM)	35.7	34.1	34.1	36.9	34.1	**34.98**
Total	**33.46**	**32.16**	**32.40**	**35.66**	**33.40**	**33.42**

Source: Estimates obtained by modeling aggregated data from EDSM and MICS surveys. EMOP, SMART and SLIS Mali (2010 -2024) using LiST software.

CONCLUSION

The Essential Community Care strategy in Mali has proven its ability to manage simple cases of malnutrition, treating over half a million cases in ten years. While the skills and social commitment of community health workers (CHWs) have been achieved, the low overall coverage rate (14% for moderate acute malnutrition and 28% for severe acute malnutrition) underscores the urgent need to address the critical mobility deficit (4.6%)

and supply disruptions. Sustaining these gains depends on increased professionalization and logistical support for the community network.

Cross-analysis of the results highlights a direct correlation between the expansion of community services and child survival. The increased service coverage, driven by a 32.90% increase for ACTs and 32.06% for SAM (Table 11), is the main driver of the observed decrease in mortality.

Indeed, this increased penetration of healthcare services in the areas where the SEC strategy was implemented has had a substantial impact, with a 34.98% reduction in mortality attributable to the management of severe acute malnutrition (SAM) and a 33.56% reduction for malaria (Table 12). These data confirm that each percentage point increase in effective coverage, particularly for nutritional and febrile illnesses, almost automatically translates into a significant reduction in preventable deaths among children under five in Mali.

DISCUSSION

Boundaries

The main limitation of this study lies in the incompleteness of the routine DHIS2 data. The systematic integration of community health workers' activities into the digital platform began gradually before reaching all regions later. This is compounded by the disparity, irregularity, and incompleteness in the completion of monthly reports by field agents.

Sociodemographic profile and community integration of ASCs

The female predominance among community health workers (68.24%) observed in our study aligns with current trends documented by Glenton et al. (2021), highlighting that the feminization of community care enhances social acceptability, particularly for maternal and nutritional health (19) . This high proportion of women, often former midwives, reflects a deliberate strategy of capitalizing on local knowledge, a factor identified by LeBan et al. (2021) as essential for the worker's credibility with mothers (20) .

This female predominance (68.24%) and the age maturity (57.85% between 28 and 38 years old) are consistent with WHO recommendations (13) and data from the literature highlighting that recruiting women facilitates interaction with mothers for the promotion of essential newborn and child care (ENCC) (14). The prior experience of 67.89% of the staff (midwives or nursing assistants) is a factor facilitating the application of community-based IMCI protocols (15). Finally, the site functionality rate (96.9%) in 2024 indicates operational continuity of the SEC program over the study period.

The prior experience of 67.89% of staff as nursing assistants or midwives suggests a successful task-shifting. This "semi-professional" profile aligns with the WHO's 2030 Vision for Human Resources, which advocates integrating personnel already immersed in health culture to address the global medical shortage (21) . However, the low rate of local affiliation (10%) is a departure from the traditional model of the community health worker "elected by their village." This finding could explain some service disruptions and should be considered in light of the work of the Community Health Impact Coalition (2024), which demonstrates that a lack of ties to one's birthplace can affect the long-term retention of staff, especially in insecure areas (22) .

Finally, the non-functionality of 3.10% of sites in 2024 demonstrates the notable resilience of the Malian system despite the crisis context. Compared with the data from VanderZanden et al. (2024) on the resilience of primary care in Rwanda, the operational stability of the community health worker (CHW) network in Mali, supported by a high level of secondary education (67.47%), confirms that the increased professionalization of health workers is an effective safeguard against the collapse of health services during periods of insecurity (23)

Accessibility, perceived quality and service performance

The high financial acceptability (greater than 80%) observed in our study confirms that the community health worker (CHW) model in Mali is fulfilling its primary mission of reducing economic barriers to healthcare.

These results corroborate the WHO 2024 findings on health expenditure, which identify free or subsidized community-based care as the most effective lever for protecting rural households from catastrophic out-of-pocket expenses (24) . This affordability largely explains the exceptional satisfaction rate (97.92%), which exceeds the regional averages reported by LeBan et al. in 2021, where trust in CHWs is directly correlated with reduced transportation and consultation costs (20) . Financial acceptability is a decisive factor in access to healthcare in rural Africa (16). The results indicating that more users consider the costs of CSA services acceptable confirm that the SEC program's funding model (often based on a symbolic cost or working capital managed by CSAs) is effective in reducing economic barriers.

However, the drug availability rate (62.86%) highlights a persistent fragility in the supply chain. This logistical "last mile" remains the bottleneck of the SEC strategy. By comparison, the work of VanderZanden et al. in Rwanda in 2024 shows that the resilience of primary care depends on advanced digital integration enabling real-time stock alerts (23) . In Mali, the transition to DHIS2 should theoretically mitigate these disruptions, but our results suggest that transportation challenges in insecure areas partially offset the benefits of digital monitoring.

Finally, the fact that only 67.23% of stakeholders considered the package of activities "fully implemented" points to the issue of staff workload overload. As Glenton et al. highlighted in 2021, the constant expansion of community health workers' roles (nutrition, malaria, maternal health) without a proportional increase in supervision can lead to selective task execution (19) . This "partial implementation" suggests a need to consider simplifying protocols or increasing the number of staff per health area to maintain the quality of care.

Gender dynamics, professional relationships and a climate of satisfaction

The tension observed between the declared “gender neutrality” (78.95%) and the “social preference” for female community health workers (75.19%) underscores the complexity of integrating care in rural Sahelian societies. As Glenton et al. suggested in 2021, although skills are perceived as equal, female community health workers navigate the domestic sphere more easily, thus facilitating malnutrition screening and reproductive health counseling (19) . This “relational added value” of women confirms the theories of LeBan et al. in 2021, according to which the social embeddedness of the worker is a more powerful determinant of performance than technical expertise alone (20) .

The very positive assessment of services (58.65%) by users reflects a restored confidence in the community health system. However, the fact that only 53.01% of professional relationships are rated as "good" points to weaknesses in the supervisory chain. This result echoes the warnings of the Community Health Impact Coalition in 2024, which suggests that without formative supervision and fluid lines of communication with community health center (CHC) staff, the risk of community health worker (CHW) demotivation increases, particularly in a context where implementing actors express a level of satisfaction (67.29%) that seems disconnected from the logistical realities faced by staff (22) .

Finally, this divergence in perception regarding overall satisfaction (users vs. implementing actors) suggests a need to strengthen social accountability mechanisms. Based on the findings of VanderZanden et al. in 2024, the resilience of a primary healthcare system depends not only on the competence of its staff, but also on the harmony of relationships between the community and referral facilities (23) . In Mali, stabilizing these professional relationships is the next challenge to sustain the gains of the SEC strategy.

Working conditions and logistical environment of ASCs

The paradox between the availability of infrastructure (housing and office space > 80%) and the near-total absence of transportation (4.6%) highlights the forced sedentarization of community healthcare provision in Mali. While housing guarantees the physical presence of the community health worker, the lack of mobility contradicts the very essence of the "community-based care" strategy. As Glenton et al. indicated in 2021, the community health worker's ability to conduct home visits is the primary determinant of reducing infant and child mortality, as it allows for the identification of malnourished children before the onset of complications (19) .

This mobility deficit (4.6%) places Mali in a position of operational vulnerability compared to other sub-Saharan models. In comparison, the work of VanderZanden et al. in 2024 on the resilience of health systems shows that the effectiveness of community health workers (CHWs) in Rwanda relies on integrated transport logistics, ensuring the link between the village and the referral health center (23) . In Mali, the lack of transport, coupled with residual insecurity, limits the action of health workers to a restricted radius around their site, thus creating health "blind spots" within the health areas themselves.

Finally, this logistical insecurity directly impacts staff motivation and retention. According to the Community Health Impact Coalition's 2024 advocacy, a health worker without means of transportation is one whose social authority is eroded, as they cannot respond to nighttime emergencies or critical referrals (5) . For Mali, the sustainability of the SEC strategy will require massive investment in mobility (motorcycles, bicycles, or village emergency transport systems) to transform "fixed sites" into genuine mobile health hubs.

Clinical performance of community health workers in the management of moderate acute malnutrition (MAM)

The dramatic increase in the number of cases treated by community health workers (CHWs) between 2016 and 2023 (a twelvefold increase) validates the hypothesis of the effectiveness of the paradigm shift towards community-based care in Mali. This growth reflects not only an expansion of the geographic coverage of community-based care sites, but also an improvement in active screening. As Charle-Cuellar et al. highlighted in 2020, the integration of MAM management by CHWs reduces the time to treatment, thus preventing progression to severe acute malnutrition (SAM) and fatal complications (25) .

The predominance of the Ségou region in terms of both the volume of services provided (39.7%) and coverage rates (26.11%) could be explained by a more stable supply chain for nutritional inputs or closer supervision of staff in this area. Conversely, the poor performance in Kayes suggests specific barriers, possibly related to its isolation or high staff turnover. These disparities were discussed in the work of Glenton et al. in 2021, which reiterates that the performance of community health workers is not uniform and depends heavily on logistical support and the density of the local supervisory network (19) .

The peak in activity observed in 2023 (33,204 cases) coincides with a period of increased nutritional vulnerability in the Sahel. The capacity of community health workers to absorb 34% of the disease burden that year demonstrates the resilience of the primary healthcare system, consistent with the observations of VanderZanden et al. in 2024 on the importance of frontline actors in times of crisis (23) .

However, the average coverage rate of 14.42% remains far below the ambitions of universal health coverage. This gap between the relative contribution (23%) and the actual coverage of the total target highlights that, despite progress, a large proportion of malnourished children still fall through the cracks. To achieve the SDG 2 targets by 2030, it is imperative not only to maintain the current network but also to optimize active case finding strategies, particularly in low-performing regions such as Kayes and Sikasso.

Correlation between restricted mobility and nutritional coverage deficit: A critical correlation emerges between the extreme deficit in means of transportation (4.6%) and the coverage rates of the target groups (14.42% for MAM and 27.89% for SAM). Although the volume of cases treated increased exponentially until 2024, the inability of staff to travel beyond their fixed site limits the impact of the strategy to a sedentary "island of care."

The theoretical model for community health workers (CHWs) relies on active screening through home visits. However, the lack of transportation transforms CHWs into passive providers waiting for patients at the site. As Glenton et al. (2021) point out, mobility is the essential driver of equity: without it, families living on the periphery of intervention areas remain excluded from the system, which explains why, despite 520,439 cases of severe acute malnutrition (SAM) treated, more than 70% of the total target is still not being met at the regional level.

Impact of working conditions on the quality of the reference

Satisfactory access to housing (80%) and a suitable work environment (87.7%) has helped stabilize community health workers (CHWs) in their communities, fostering trust and social acceptance (97.9% satisfaction). However, this residential stability is affected by inadequate transportation infrastructure.

The management of severe acute malnutrition (SAM), which reached 77,757 cases in 2024, requires rigorous monitoring for warning signs. Lack of mobility hinders the ability of community health workers (CHWs) to accompany referrals to community health centers (CHCs), increasing the risk of death at home or delayed access to care. This disruption in the care chain is identified by LeBan et al. (2021) as the main factor eroding the resilience of primary healthcare systems (20) . In Mali, the quantitative success of care (the number of cases) masks a qualitative vulnerability: the worker is present and housed, but is "immobile" in the face of the nutritional emergency.

Professionalization and retention: The challenge of 2030

The correlation between secondary education level (67.47%) and the progression of cases recorded in DHIS2 suggests that Malian community health workers (CHWs) possess the intellectual skills to manage complex protocols. However, the Community Health Impact Coalition (2024) warns that worker satisfaction (67.29%) could plummet if the necessary resources (transportation, supplies) do not keep pace with the development of skills.

For Mali to achieve SDG 2 by 2030, the analysis suggests that simply increasing the number of community health workers or providing them with housing is no longer sufficient. Future performance will depend on transforming the "static" community health worker into a "mobile" one. The stagnation of coverage rates in Kayes and Sikasso, despite high needs, confirms that housing alone does not guarantee universal access; only mobility can break the vicious cycle of malnutrition by reaching the most isolated households.

Clinical performance of community health workers in the management of severe acute malnutrition (SAM)

Management of severe acute malnutrition (SAM) by community health workers

The scale of community health workers' (CHWs) management of severe acute malnutrition (SAM) (more than half a million cumulative cases) demonstrates that Mali has successfully transitioned from a purely hospital-based model to a community-based model for managing acute malnutrition. This evolution is all the more remarkable given that managing SAM requires strict adherence to protocols (use of ready-to-use therapeutic foods, monitoring for complications). As Charle-Cuellar et al. pointed out in 2020, the involvement of CHWs not only reduces the workload of referral facilities but also decreases the dropout rate thanks to the geographical proximity of treatment (25) .

However, the relative contribution of community health workers (CHWs) to the management of severe acute malnutrition (SAM) (6.89%) remains significantly lower than that observed for the moderate form (23.00%). This difference is explained by community health policy protocols: cases of SAM with complications must be referred to community health centers (CSCOMs). The performance observed in Mopti (53% coverage rate in 2024) is a major indicator of resilience. In a context of security vulnerability, CHWs play a "safety net" role, compensating for the difficulty of accessing fixed healthcare facilities, an observation that aligns with the resilience lessons learned by VanderZanden et al. in 2024 in crisis contexts (23) .

Conversely, the relatively low performance of the Kayes region (15.22% average coverage) raises questions about the adequacy of resources. The decline in activity observed after 2021 in this region could be linked to the logistical challenges mentioned earlier, particularly the lack of transportation (4.6% overall), which hinders the active search for severe cases.

In conclusion, while the SEC strategy has helped absorb a growing share of the disease burden due to severe acute malnutrition (SAM), reaching its peak contribution in 2024, the overall coverage rates (27.89%) highlight that the system remains insufficient to meet actual needs. To achieve the WHO's global nutrition goals (Vision 2030), Mali must urgently stabilize the supply of nutritional inputs at community health centers (CHCs) to avoid stockouts that discourage parents and compromise treatment effectiveness (21) .

Analysis of the impact and evolution of the coverage of community interventions on the survival of children under five years of age in Mali, using the Lives Saved Tool (2010-2024).

Lives saved through community interventions (LiST modeling)

The figure of 159,847 lives saved marks a historic turning point for public health in Mali. It proves that the community health worker (CHW) strategy is not merely a fallback option, but a central pillar of child survival. The predominance of lives saved from malaria (109,658) underscores the effectiveness of early diagnosis through rapid diagnostic tests (RDTs) and immediate treatment with community-based ACTs, thus preventing progression to severe and often fatal forms. The combined impact on malnutrition (MAM and SAM), totaling 33,176 lives saved, is of paramount importance. As Sacko et al. (2024) note, home-based treatment of malnutrition by CHWs acts as a "multisectoral shield": a well-nourished child is more resistant to respiratory infections and diarrheal diseases (18, 26, 27) . This finding aligns with the conceptual frameworks of Bhutta et al. (2013) which highlight that nutritional interventions are the most cost-effective for reducing overall mortality in Sahelian contexts (28) . The performance of the Sikasso region (40,251 lives) can be linked to its population density and a likely earlier or more intensive implementation of ACS sites. However, it is crucial to note that these figures represent "additional lives" saved. To maintain and increase this rate, the challenges of community health worker mobility (4.6%) and drug availability (62.86%) previously identified in our study must be addressed, otherwise this survival curve risks plateauing as we approach 2030.

Extension of health service coverage through the ASC curative package

Comparing these two indicators (Coverage vs. Mortality) validates the relevance of the LiST (*Lives Saved Tool*) model used for this modeling. The robustness of the impact on mortality (average of 33.42%) is explained by the ability of community health workers (CHWs) to maintain a supply of care despite environmental challenges. As Sacko et al. (2024) point out, the effectiveness of the SEC strategy lies not only in the technical act of providing care, but also in its ability to increase "effective coverage," that is, access to quality treatment where no alternative existed (18) . However, this dynamic of success encounters a structural limitation. Although SAM coverage has increased by 32.06%, the overall coverage rate remains below actual needs (27.89% for SAM, see Table 9). This discrepancy confirms the hypothesis of system saturation: without a drastic improvement in the mobility of healthcare workers (currently at 4.6%) and a more secure supply chain (62.86% availability), mortality gains are likely to stagnate. To move from a 34% reduction to more ambitious survival targets, achieving "full mobility" of healthcare workers is the *essential condition* for transforming this partial coverage into a universal healthcare shield.

Reduction in mortality of children under 5 years of age (LiST modeling)

The overall reduction in mortality (33.42%) testifies to the profound transformation of the Malian health landscape thanks to the SEC strategy. The preeminence of the impact related to SAM (34.98%) confirms that the decentralization of nutritional treatment to the community level is the most decisive intervention for child survival in the Sahel. These results corroborate the conceptual frameworks of the Lancet Nutrition Series, which identify community-based management of acute malnutrition as a "high-impact" intervention (28) . The high impact of ACTs (33.56%) and antibiotics (34.16%) demonstrates the relevance of the integrated package. By simultaneously treating the three leading causes of preventable death (malaria, pneumonia, malnutrition), community health workers break the cycle of morbidity. As highlighted by the WHO (2024), the effectiveness of these interventions depends on "effective coverage," which increased by more than 32% in our study (Table 11) (24) . However, to maintain this survival momentum until 2030, the study suggests that the impact could be even greater if logistical barriers were removed. The 35.66% reduction in Ségou demonstrates that a better-supplied system generates improved survival outcomes. Conversely, the mobility deficit (4.6%) poses a risk of

stagnation in these indicators. Sustaining these gains in survival therefore depends on a political commitment to securing supplies and facilitating the mobile deployment of healthcare workers.

CONCLUSION

This analysis, covering a decade of implementation of the Essential Community Health (ECH) strategy in Mali, reveals that community health workers (CHWs) have become the unshakeable foundation of national nutritional resilience. With over 662,000 cases of acute malnutrition (MAM and SAM) treated between 2015 and 2024, the shift to decentralized and deconcentrated management has proven its clinical effectiveness and social acceptability, driven by a high proportion of women in the workforce (68%).

However, the study reveals a critical paradox: while technical skills and community integration are strengthened, overall performance plateaus due to structural logistical insecurity. The alarming shortage of transportation (4.6%) and stockouts (37%) confine community health workers' activities to a static healthcare provision, leaving more than 70% of those affected by severe malnutrition out of reach in some regions.

For Mali to achieve Sustainable Development Goal 2 (SDG 2) by 2030, the transition from community-based volunteering to integrated professionalization is imperative. This requires priority investment in the mobility of healthcare workers and the digital security of the supply chain. In short, the survival of children in rural Mali no longer depends on the clinical validation of the model, but on the political will to remove the logistical barriers that still hinder the "last mile" of healthcare.

A much more in-depth study is needed, one that breaks down the data more precisely between regions, such as Kayes and Ségou. This will allow for a better understanding of geographical disparities. Furthermore, enriching the qualitative component with detailed testimonies from community health workers and beneficiaries will refine our understanding of the realities on the ground .

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