Post-campaign coverage survey of vitamin A administration carried out in June 2024 among children aged 6 to 59 months in six health regions supported by Helen Keller in Mali.

FINAL REPORT



OCTOBER 2024

Search sites :	Mali, health regions of Kayes, Ségou and Koulikoro
Type of study :	Mixed qualitative and quantitative study (WHO cluster survey, 2015 version)
Consultant :	Center for the Promotion of Citizenship for Sustainable Grassroots Development (CEPROCIDE) Email : ceprocide@yahoo.fr
Study period :	August-September 2024
Study sponsor :	Helen Keller International
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LIST OF ABBREVIATIONS AND ACRONYMS

ASC	Community Health Agent
CEPROCIDE	Center de Promotion de la Citoyenneté pour le Développement Durable à la Base (Center for the Promotion of Citizenship for Sustainable Grassroots Development)
CSCom	Community Health Center
SURVEYCTO	Chief Technology Officer survey
CVA	Vitamin A deficiency
DGSHP	Directorate General of Health and Public Hygiene
DQQ	Diet Quality Questionnaire
DTC	Technical Director CSCOM
EDSM	Mali Demographic Health Survey
FPPI	Immediate postpartum women
GPS :	Global Position System
KHI	Helen Keller International
IT Manager	Information Technology Manager
INSTAT	National Institute of Statistics
JNV	National Immunization Days
MCD	District Chief Medical Officer
MS Excel	Microsoft Excel
WHO	World Health Organization
PECS	Post Event Coverage Survey
PPT	Probability Proportional to Size
RGPH	General Census of Population and Housing
RND	District Nutrition Manager
RNG	Random Number Generator
SIAN	Nutrition Intensification Week
SPSS	Statistical Package for the Social Sciences
VAS	Vitamin A supplementation
USAID/SSGI	High Impact Health Services
UI	Unit International

UNICEF	United Nations Children's Fund

ACKNOWLEDGEMENTS

The Ministry of Health, through its Nutrition Sub-Directorate of the General Directorate of Health and Public Hygiene of the Ministry of Health and Social Development, all the District Medical Officers and Technical Directors of the Community Health Centers (DTC) involved in the vitamin A supplementation and deworming campaigns for children aged 6 to 59 months, for their support in making this study a success.

The support of the various district medical officers gave us access to the CSCOMs and other health workers (community relays, DTCs and other health workers). They were invaluable in providing practical advice on the accessibility of the various clusters and support at every stage of the study.

Our thanks also go to the officials of the various administrations who contributed at any level to this study, as well as to the collection teams, local guides and members of the households visited and surveyed, in particular the target elderly mothers who made no effort to answer the questions administered within households.

Their sustained efforts and collaboration enabled them to overcome difficulties in the field, obtain quality data and produce the various reports on time.

GLOSSARY

- **Coverage of children supplemented during the campaign**
  This term refers to the proportion of children who received vitamin A supplementation during the campaign period. This includes all children targeted by the campaign, regardless of other supplementation periods.

- **Coverage of children supplemented ONLY during the campaign**
  This term refers to the proportion of children who received vitamin A supplementation only during the campaign, and who were not supplemented at any other time during the six-month period. This measures the exclusive impact of the campaign.

- **Coverage of children supplemented during the campaign AND at another time during the semester**: This item concerns the proportion of children who received supplementation both during the campaign and during another supplementation period during the same semester. It identifies children who had multiple access to supplementation.

- **Coverage of children NOT supplemented during the campaign BUT supplemented at another time during the semester**: This measure indicates the proportion of children who were not supplemented during the campaign but who received supplementation on another occasion during the semester. It assesses access to supplementation outside the campaign.

- **Coverage of children supplemented at another time during the semester**: This term refers to children who received vitamin A supplementation at some point during the semester outside the campaign. It includes all cases of supplementation outside the campaign, whatever the precise time.

- **Coverage of children not supplemented at all during the semester**: This item refers to the proportion of children who received no vitamin A supplementation during the semester, either during the campaign or at any other time. It can be used to identify children potentially at risk of deficiency.

- **Coverage of children supplemented during the semester**: This term covers all children who received vitamin A supplementation at least once during the semester, whether during or outside the campaign. It provides an overall measure of supplementation coverage over the whole six-month period.

SUMMARY

Study title

Evaluation of the quality and coverage of vitamin A supplementation during the Semaine d'Intensification des Activités de Nutrition Communautaire (SIAN) 1st Passage July-August 2024 in children aged 6-59 months, in the health regions of Kayes, Koulikoro and Ségou.

Context

Since 1982, Mali has been combining national polio vaccination days with vitamin A supplementation for children. But the twice-yearly administration of vitamin A was not institutionalized until 2003. The same year saw the organization of the country's first Intensified Nutrition Week (SIAN). In 2005, the SIAN was reintegrated into the JNV-Polio in order to minimize the use of financial resources and maximize supplementation coverage.

With funding from Good Venture, Helen Keller INTL has been supporting the implementation of the campaign to administer vitamin A and deworming to children aged 6-59 months through Vitamin A Supplementation campaigns since 2018. Three regions (Kayes, Ségou and Koulikoro) benefited from Helen Keller's support during the first round of the SIAN July-August 2024 campaign, and will continue to do so for the 1st round.
2024.

Also, every year since 2018, Helen Keller INTL in collaboration with the Nutrition Sub-Directorate of the General Directorate of Health and Public Hygiene of the Ministry of Health and Social Development and Social Affairs has committed to conducting at least one post-campaign coverage survey (PECS) to measure the quality of interventions and assess the coverage rate of VAS activities.

This year, the coverage survey is scheduled after the first round of the VAS and deworming campaign for children aged 6-59 months, to be held in August-September 2024.

Also, as VAS does not address the underlying causes of Vitamin A Deficiency (VAD) and its temporary effect, some countries are intensifying their efforts on dietary intake and other underlying causes of poor vitamin A status, such as repeated infections due to poor hygiene. For the implementation of the next campaign, we will conduct a descriptive cross-sectional WHO-type cluster sample survey (2018) at two stages after the campaign in three regions.

Keywords: supplementation, vitamin A, campaign, coverage, evaluation, deworming, SIAN, Survey CTO

Objectives

The general aim of the PECS survey is to evaluate the coverage of services
provided during the vitamin A supplementation and deworming campaign in 28 health districts in the Kayes, Koulikoro and Ségou regions for children aged 6 to 59 months.

Specifically, during the first round of the campaign to
Vitamin A supplementation in 2024 of :

- Measuring vitamin A supplementation coverage for children aged 6 to 59 months;
- Identify the main reasons for non-administration of vitamin A ;
- Determine the level of knowledge of healthcare providers, distribution agents, mothers and/or childminders about VAS activities;
- Evaluate the campaign implementation process (coordination, training, social mobilization, supervision and specifically the input supply chain);
- Evaluate the satisfaction of beneficiaries of vitamin A supplementation activities;
- Identify strengths, weaknesses, constraints and lessons learned, as well as bottlenecks in the implementation of the vitamin A supplementation campaign in each health region.
  targeted during the campaign;
- Formulate recommendations for improving the VAS strategy for implementation of the next campaign.

Methodology

Type of study

This is a mixed cross-sectional study comprising a quantitative component based on a household survey and a survey of implementation players, and a qualitative component aimed at health agents, distribution agents, and the Father, Mother and Carer focus groups. It will consist of a :

- Household survey by two-stage cluster sampling according to the WHO post-vaccination coverage survey methodology version 2018 ;
- Survey of Community Agents (community distributors or relays) and
- Survey of health workers, focus groups.

Study framework
The study will take place in the 28 health districts from the three regions supported by Helen Keller Int during the first run of the 2024 VAS campaign, grouped into a stratum of 115 clusters.

Study population
The study population consists of households living with at least one child aged 6-59 months at the time of the first round of the July-August 2024 vitamin A supplementation and deworming campaign.

Sample size
The sample size is 1,142 households from 115 clusters divided into 26 urban and 89 rural areas.

Community agent survey
Target population: community agents (community distributors, relays or community health workers (CHWs) attached to the sampled clusters and who actually participated in the July-August 2024 campaign as distributors.

Health worker survey
Target population: health workers from the nearest health centers attached to the sampled clusters who participated in the campaign and/or were involved in vitamin A supplementation activities.

Sample size :
- ✓ 115 Health workers
- ✓ 115 Distributors

Study period: August-September 2024

Collection technique: Direct interview using mobile technology
SurveyCTO will be used for data collection and transmission.

Qualitative survey

- National: 6 semi-structured interviews
- Regional and departmental: 30 semi-structured interviews
- Community level: 12 focus groups

Results

During the coverage survey for the August 2024 vitamin A supplementation campaign, 8,591 households in the 115 planned clusters were surveyed, representing a 92% enumeration rate. This figure is lower than the 93,346 households estimated by the Institut National de la Statistique (INSTAT) for this target population.

A comparison between INSTAT's household forecasts by Enumeration Zone (ZD) and the results of the PECS count reveals significant discrepancies: 37.4% of clusters have more households than forecast, 2.6% match estimates, and 60% have fewer.

It is important to note that this discrepancy can be attributed to population movements due to insecurity and flooding caused by torrential rains in certain areas during the collection period.

Of the households counted, 6,014 were identified as eligible. A total of 1,263 households were interviewed out of the minimum 1,265 expected, i.e. 11 households per cluster, with a very low refusal rate of 0.16% (2 households out of 1,265).

In addition, of the 15,044 children aged between 6 and 59 months in eligible households, data were collected for 3,181 children. In addition, 2,324 mothers were interviewed, testifying to the scope and quality of the information gathered.

Household characteristics and access to healthcare services

- Characteristics of heads of household: Of the 1,263 heads of household, 96.2% were men, 54.6% were aged between 30 and 49, 98.1% were married, and more than half had never attended school, with a predominance of agricultural and commercial activities.

- Average number of children and guardians: The households surveyed had an average of 2.52 ± 2.15 children aged between 6 and 59 months, and 1.84 ± 1.49 mothers or guardians of children.

- Characteristics of mothers or guardians of children : Of the mothers or guardians, 99.4% were women, 60.6% had no schooling, 99% were married, 47% were spouses of the head of household, 89.7% were aged between 18 and 39, and 58.7% were housewives.

- Household wealth quintile: Households were evenly distributed between quintiles, with 19.9% in the lowest quintile, 20.3% in the first upper quintile, and 20.6% in the middle class, based on criteria of non-food goods and living conditions.

Access to health services

- Types of health facilities attended : The majority of respondents (90.5%) consult public health facilities, mainly CSCOMs (72.9%), and 8.8% attend private facilities.

- Distance and means of travel: Approximately 73.6% of households live within 5 km of a healthcare facility, with 49% of mothers/carers travelling on foot and 44.6% using a motorcycle or tricycle.

- Types of services available: The most commonly reported services include consultations for sick children (93.7%), sick mothers (80%), and maternity services (74.6%), with lower mentions for prenatal consultations (53.3%) and vitamin supplementation (40%).

- Visits from community health workers: Over half of households (59.2%) had received between 1 and 3 visits from community health workers in the previous six months, while 26.1% had received none.

- Services received from the community/volunteers: The most frequent services include vitamin A supplementation (85%), malaria prophylaxis (70.8%), and deworming (70%), with awareness-raising activities in 8.6% of households.

- Perception of community visits: The majority of respondents (67.8%) felt that the frequency of visits was "just right", but 23.4% felt that the frequency was "too low" or non-existent, indicating a need for improvement.

Information about the supplementation campaign and *product* knowledge

- Informing households about the campaign: Just over half of households (50.7%) were informed about the campaign before it was launched.

- Main sources of information: Community relays were cited by 80% of households as the main source of information, followed by town criers (57.1%), while radio (15.3%), television (5%) and neighbors (10%) played more limited roles.

- Level of vitamin A knowledge: Although 92.1% of respondents were familiar with vitamin A, more than half were unaware of when to administer the first dose (52.3%) and the recommended frequency (57.9%), highlighting gaps in awareness.

- Vitamin A knowledge index: Only 26.6% of mothers and guardians have a good knowledge of vitamin A, while 17.2% show a low level, and the majority display average knowledge.

Child characteristics and VAS coverage and deworming

- Children's socio-demographic characteristics : The children surveyed were almost evenly divided between boys (50.6%) and girls (49.4%), with 88.6% aged between 12 and 59 months, and biological mothers responding for 81.6% of them.
- Source of birth date information: Less than 49% of children's birth dates could be verified using official documents such as health records or birth certificates.

Coverage of vitamin A supplementation during and outside the campaign period

- Coverage during the campaign: Nearly 82.1% of children aged 6-59 months received vitamin A supplementation, but 95.7% of supplementation information was not verifiable by official document.

- Location and administrators during the campaign: The majority of children were supplemented at home (89.5%) by community agents or relays (66.8%).

- Reasons for non-supplementation: Lack of information was the main reason for non-supplementation (48.4%), while refusals remained marginal (1.9%).

- Coverage outside the campaign: Only 12.3% of children not covered during the campaign received vitamin A at

another time during the half-year.

- Place of supplementation outside the countryside: Most children supplemented outside the countryside were supplemented at home (82.5%) by community or health workers (98.2%).

- Supplementation during and outside the campaign: Only 7.2% of children were covered both during the campaign and at another time, and without the campaign, only 12.4% of children would have been supplemented.

- Frequency of supplementation during the semester: The majority of children (81.2%) were supplemented once during the semester, and 15.8% received no vitamin A.

- Campaign impact: Supplementation campaigns were essential, covering 84% of children in the first half of 2024, compared with just 12.4% without these initiatives.

Factors influencing vitamin A coverage

- Coverage by age group: Vitamin A coverage was slightly higher in children aged 12 to 59 months (82.3%) than in those aged 6 to 11 months (80.7%), but this difference was not statistically significant (p = 0.695).

- Coverage by gender: Vitamin A coverage was similar between boys (80%) and girls (84.3%), and no statistically significant relationship was observed between gender and coverage (p = 0.055).

- Coverage by parental knowledge: Coverage increased with the parents' level of knowledge about vitamin A, rising from 77.2% for a low level of knowledge to 83.4% for a high level, with this relationship being statistically significant (p = 0.000).

- Coverage by wealth quintile: Children from the middle quintile had the best coverage (87.7%), followed by the secondary and lowest quintiles (84.9% and 81.7% respectively), with a significant relationship between wealth quintile and vitamin A coverage (p = 0.001).

Coverage of deworming supplements

- Overall deworming coverage: The July-August 2023 VAS campaign dewormed 73.9% of children aged 12-59 months.

- Location and administrators: The majority of children received the dewormer at home (88.6%), mainly administered by community relays or distributors (64.9%).

- Coverage by age group: Dewormer coverage was higher in children aged 24-59 months (76.5%) than in those aged 12-23 months (66.2%).

- Coverage by gender: A slight difference was observed, with higher coverage among girls (76.2%) compared to boys (71.5%).

- Coverage by wealth quintile: Children from households in the 2nd and 3rd quintiles showed the highest deworming rates, while those in the highest quintile had the lowest (68.6%).

Executive summary of factors influencing vitamin A supplementation and deworming :

Vitamin A: Children whose parents had average or good knowledge of vitamin A were 1.74 to 1.78 times more likely to receive supplementation. Prior information about the campaign increased this probability by more than 7 times, while parents' secondary or higher levels of education significantly reduced the chances of supplementation (OR = 0.47). Children from wealthier households also had a lower probability of supplementation (OR = 0.69).

Dewormer : Better parental knowledge significantly increased the likelihood of taking the dewormer (OR = 1.35 to 1.46), while secondary or higher education reduced it (OR = 0.47). Children informed in advance about the campaign were 3.3 times more likely to receive the dewormer, but consultation with private structures or traditional practitioners reduced this probability (OR = 0.56 and 0.23 respectively).

These results underline the importance of awareness-raising, targeted efforts in less educated households, and improved accessibility via public health channels.

Evaluation of the campaign implementation process

The campaign implementation process was assessed through the coordination of activities, input management, and the satisfaction of health workers and the beneficiary population. Overall, the implementing actors were satisfied with the coordination of the vitamin A supplementation (VAS) campaign activities. However, some raised challenges, particularly with regard to the mobilization of human resources:

- Campaign coordination: 78.3% of regional and health district players gave a positive assessment of campaign coordination, awarding scores of at least 8 out of 10, with 37.2% of respondents giving a score of 8 and 15.5% a perfect score of 10.
- Follow-up mechanisms: 90% of stakeholders stressed the existence of effective follow-up and feedback mechanisms, including regular meetings and dedicated telephone lines to resolve problems encountered during the campaign.
- Social mobilization: 72.1% of stakeholders rated social mobilization positively, giving scores of at least 8 out of 10, but 20.1% considered it insufficient, highlighting sticking points to be improved in future campaigns.
- Mobilization of resources: 66.7% of players felt that the mobilization of resources (financial, human and logistical) was insufficient, mainly due to the insufficient number of distributors and the lack of time allocated to the activity.

Satisfaction of the beneficiary population

- Health worker satisfaction: 95.4% of health workers were satisfied with the training they received during the vitamin A supplementation campaign, of which 41.7% were very satisfied, although a few workers reported shortcomings in terms of training duration and coverage. 97.2% of health workers found the supervision to be adequate, and 91.7% considered the feedback mechanisms to be effective.
- Community health worker satisfaction: 92.7% of community health workers were satisfied with the training they received, and 91.7% felt they received good supervision. Almost all (99.1%) would like to participate in future campaigns, and 76.1% found the feedback mechanisms effective, with a preference for dedicated telephone lines.
- Mothers' satisfaction: Overall, mothers appreciate vitamin A supplementation, recognizing its importance for their children's health, despite logistical challenges such as access to distribution points and stock-outs. They suggest improving communication, in particular through cell phone reminders and increased awareness-raising campaigns.
- Fathers' satisfaction: Fathers shared similar perceptions to mothers, emphasizing the accessibility and planning of supplementation campaigns, while recommending improvements in communication, particularly via local authorities and community channels such as radio and social networks.

Conclusion

The results of the evaluation of vitamin A supplementation and deworming among children aged 6-59 months in the Kayes, Koulikoro and Ségou regions show satisfactory coverage overall, although regional disparities exist, with lower rates in Koulikoro for both interventions. The low level of household information, the challenges of accessing specialized health services and socio-economic disparities, particularly in Ségou, still limit the effectiveness of these campaigns. It is recommended to reinforce accessibility to health services, improve household awareness, balance coverage according to wealth quintiles, and optimize logistics, notably vitamin A stock management. Efforts must also be made to increase the recording of interventions in health booklets, and to support campaigns outside the official period. In addition, it is suggested to review the design of data collection tools, strengthen the separation of quantitative and qualitative studies, and adapt implementation strategies to local realities, while updating maps of selected clusters to ensure more accurate coverage. These actions will improve the coverage and impact of supplementation and deworming campaigns.

1. INTRODUCTION

In Mali, infant and child mortality rates according to the results of EDSM-III 1, EDSM IV 2, EDSM V3 decreased respectively from 229 to 191 and then to 95 per thousand live births. However, EDSM VI 4 shows an increase in infant mortality from 95 to 101 per 1000 live births.

Child undernutrition affects child survival, globally the prevalence of vitamin A deficiency among children under five is 29% worldwide and 48% in Africa (Stevens, et al. 2015). Data on this deficiency are not available in Mali. However, according to a study carried out in 2004 by Nutrition International (NI), UNICEF and WHO, vitamin A deficiency affects 45% of pre-school children and would be responsible for 24,000 deaths each year without any intervention.

In addition, analysis of the 2014 PROFILES advocacy tool showed that vitamin A deficiency would be the cause of 110303 deaths in children under 5 between 2012 and 2017.
To reverse the trend in countries where the under-five mortality rate is above 50 deaths per 1,000 live births, the WHO recommends that all children aged 6 to 59 months receive two doses of Vitamin A every year, spaced six months apart, to ensure a significant impact on child survival. With funding from Give well, since 2018, Helen Keller INTL has been supporting the implementation of vitamin A supplementation in Mali and particularly in the regions of Kayes, Ségou (since 2018), part of the operational costs in Sikasso (2019) and Koulikoro since (2021).

Helen Keller INTL also supports the implementation of post-campaign coverage surveys. Between 2019, 2020, 2021, 2022 and 2023, six surveys were implemented, with vitamin A supplementation coverage of : 73.90%, 72%, 84.4%, 70% and 88.9%[1] .The SMART 2023 result showed that 89.3% of children aged 6 to 59 months in the areas surveyed had received vitamin A according to their mothers, and confirmed on 44.2% of EPI vaccination cards that include vitamin A supplementation and deworming.

This report presents an account of the collection and analysis of data from the survey carried out in September 2024 in the regions of Kayes, Koulikoro and Ségou. The aim of the survey was to assess the quality of the campaign's implementation, and to draw relevant lessons for evidence-based decision-making.

[1] 1 EDSMIII (2001)
2 EDSM IV (2006)
3 EDSM V (2012-2013)
4 EDSM VI (2018)

2. OBJECTIVES OF THE COVERAGE SURVEY

2.1 General objective

The general objective of the PECS survey is to assess the coverage of services provided during the vitamin A supplementation and deworming campaign in 28 health districts of the Kayes, Koulikoro and Ségou regions, among children aged 6 to 59 months.

2.2 Specific objectives

Specifically, this will involve :

- Measuring vitamin A supplementation coverage for children aged 6 to 59 months;
- Identify the main reasons for non-administration of vitamin A
- Determine the level of knowledge of healthcare providers, distribution agents, mothers and/or childminders about VAS activities;
- Evaluate the campaign implementation process (coordination, training, social mobilization, supervision and specifically the input supply chain);
- Evaluate the satisfaction of beneficiaries of vitamin A supplementation activities;
- Identify strengths, weaknesses, constraints and lessons learned, as well as bottlenecks in the implementation of the vitamin A supplementation campaign in each of the health regions targeted during the campaign;
- Formulate recommendations for improving the VAS strategy for implementation of the next campaign.

2.3 Research questions

To thoroughly assess the effectiveness of the vitamin A supplementation (VAS) campaign, the survey incorporated the following research questions:

i. What are the coverage rates of vitamin A supplementation and other related services for children aged 6-59 months during the campaign [in Helen Keller INTL support areas], and how do these rates compare with reported administrative data?

ii. What are the main reasons why children do not receive vitamin A supplementation and other services [in Helen Keller INTL support areas], and to what extent are caregivers aware of the benefits of vitamin A supplementation?

iii. How effectively was the campaign implemented (with a particular focus on the supply chain) according to established protocols, and what strategies can be recommended to improve future campaigns based on the results of this study?

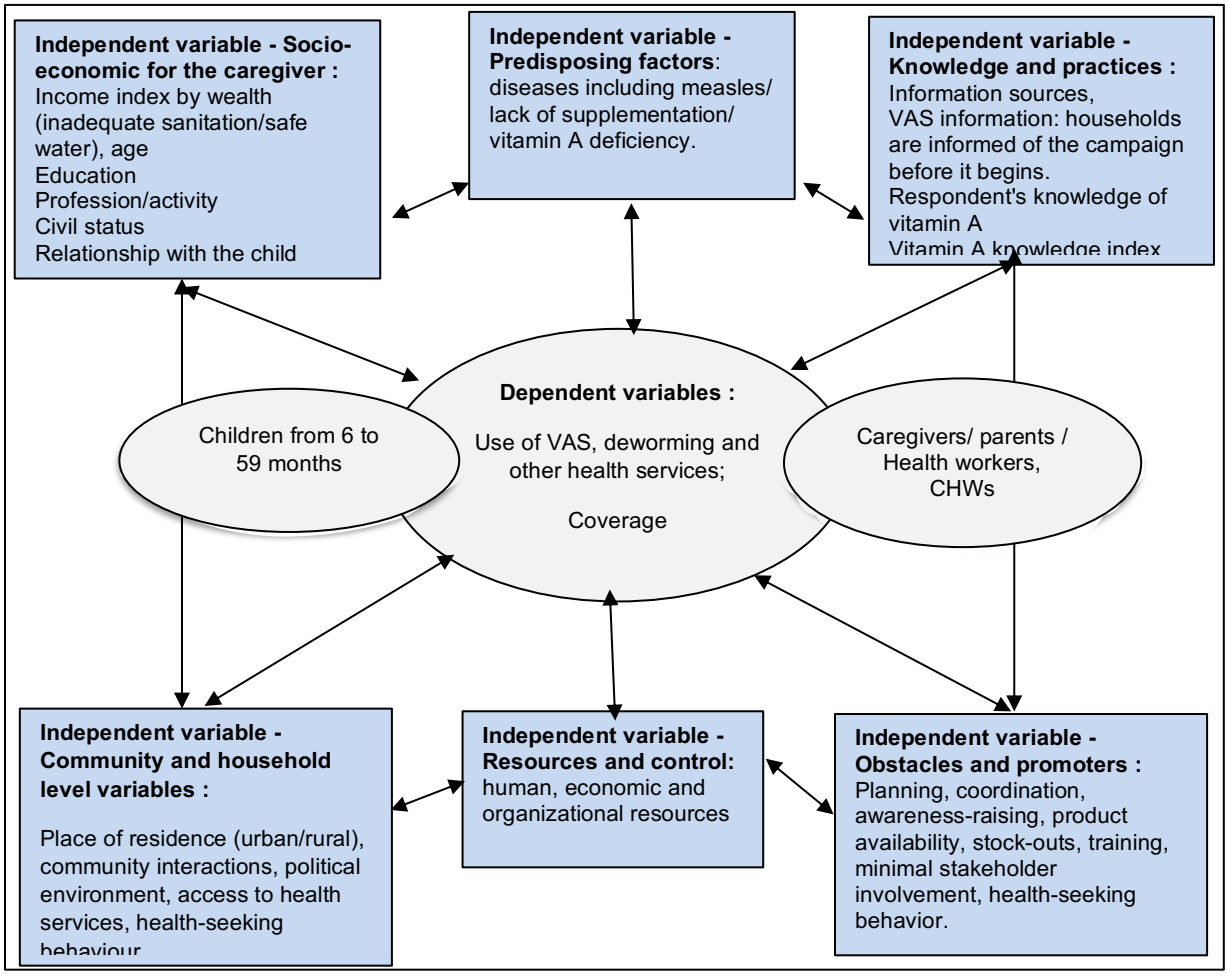
iv. How satisfied are beneficiaries with the VAS campaign and how do they perceive its effectiveness and the quality of service delivery?

These questions aimed to capture both the quantitative results of the campaign and the qualitative factors influencing its success, including the supply chain and beneficiary satisfaction, in order to provide a comprehensive assessment of the program's implementation and impact.

2.4 Assessment conceptual framework

The conceptual framework used identifies several individual, family and community factors that can facilitate or hinder the use of VAS, deworming and other health services by households. These include socio-economic characteristics, predisposing determinants, knowledge and practices of both the community and health workers, as well as resources and their control.

Figure 1Conceptual framework showing the factors that can influence VAS coverage.



3. METHODOLOGY

3.1. General design

This study is part of a participatory approach involving the steering committee made up of members of Helen Keller INTL, UNICEF, World Vision, INSTAT, the General Directorate of Health and Public Hygiene through the Nutrition Sub-Directorate and the CEPROCIDE research firm. This committee will be consulted on the major orientations of the survey, will validate all stages of the process and will regularly monitor the progress of the survey. The mission will be guided by the following key principles:

1. Compliance with validated methodology and timetable;
2. Extensive coordination of all activities and tasks under the direction of the steering committee, which masters teamwork and project management techniques to guarantee efficiency and cost control;
3. The total commitment and dedication of the technical team (staff of Helen Keller Mali and its partners) and field agents to achieving results, thanks to frequent information sharing and close monitoring of the implementation of the activities in the established timetable;
4. Transparent collaboration and anticipatory management;

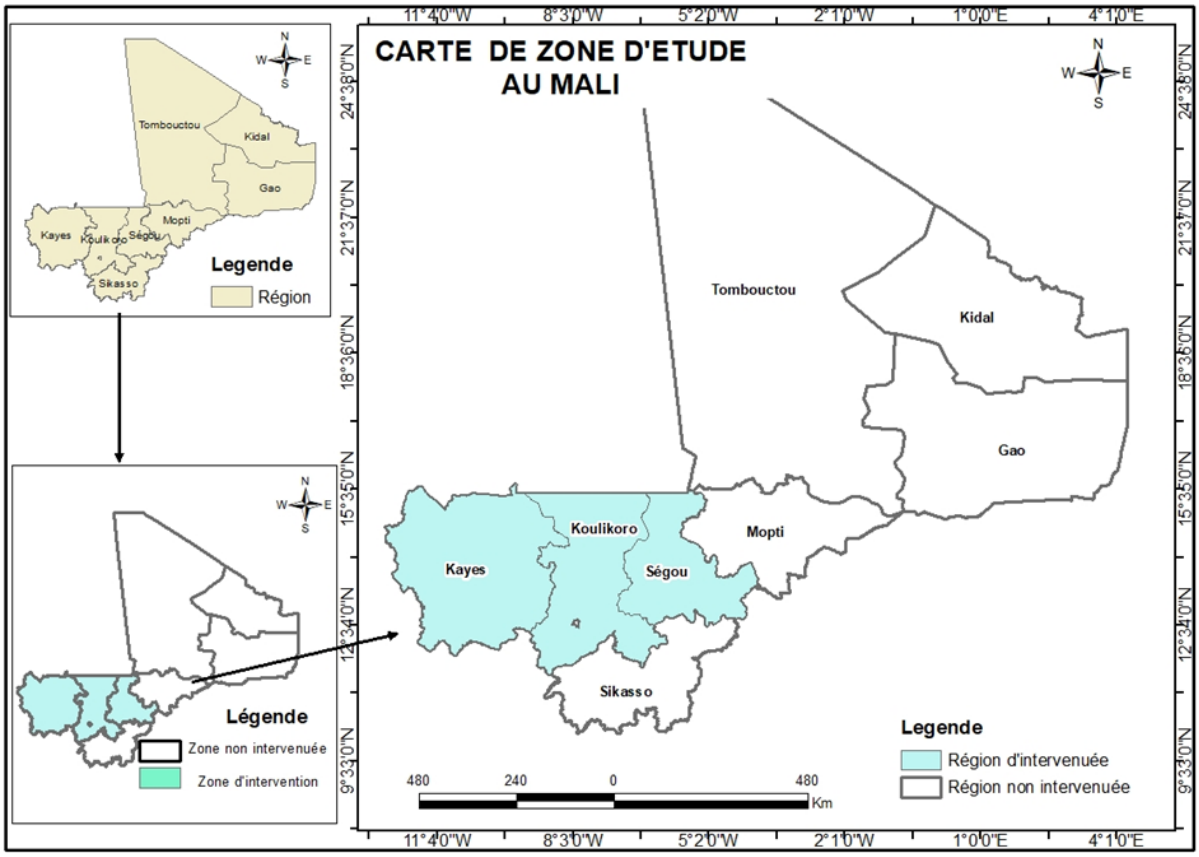
The following activities and missions will be carried out by CEPROCIDE in collaboration with the steering committee and with the support of Helen Keller's regional team:

- Finalization of study methodology, including survey design and collection tools;
- Finalization and submission of the survey protocol for validation by the steering the study.
- Submit the protocol to the ethics committee and obtain its approval for implementation;
- Recruitment and training of collection agents (interviewers and supervisors) ;
- Organization and supervision of data collection ;
- Application and observance of appropriate ethical standards throughout the research process ;
- Processing and analysis of survey data ;
- Drafting of the preliminary survey report ;
- Presentation of survey results during a workshop ;
- Finalization of the evaluation report for the 2024 campaign, incorporating participants' observations from the workshop.

3.2. Study framework

Helen Keller INTL is committed to conducting a seventh survey in August-September 2024 post July-August 2024 campaign in the regions of Kayes, Koulikoro, Ségou, in collaboration with the Direction Générale de la Santé et de l'Hygiène publique through the Sous-Direction Nutrition. The study will take place in 28 health districts in the three regions.

Figure 2 Map of regions covered by the PECS 2024 survey in Mali



3.3. Type of study

This was a mixed cross-sectional study.

The study will be cross-sectional, combining two aspects:

The quantitative component was carried out using the cluster coverage survey methodology (Practical Guide to Implementing WHO Post-Campaign Vaccine Coverage Surveys, 2015), which is a rapid, standardized and simplified survey method. Clusters will be drawn randomly in accordance with the method of probability proportional to the estimated population size. The weight of each area of residence will be based on data from the 2022 General Census of Population and Housing (RGPH5). In summary, the quantitative survey consisted of a :

(i) In summary, the survey will consist of a :
(ii) i. Household survey (parents and target children) ;
(iii) ii. Partner survey ;
(iv) iii) Survey of SDN and Regional Directors and District Medical Officers or Nutrition Officers;
(v) iv. Health worker survey ;
(vi) v. Survey of community players.

The qualitative component consisted of interviews with representatives of the DAN, regional inspectorates, health districts and health areas. In addition, focus group discussions were held with mothers, fathers and health care providers.

3.4. Study period

The survey was carried out over a two (02) month period from August to September 2024, and field data collection took place from September 12 to 27, 2024.

3.5. Target population

a) Household survey

The household survey assessed the quality of the campaign's implementation and the post-campaign VAS coverage rate, as well as the level of knowledge about vitamin A at household level. Data collection also enabled us to assess the coverage of nutrition activities for children aged 6 to 59 months.

The target population for this study was :

- Households with children aged 6 to 59 months living in the DZs drawn from the six target regions;
- All children aged 6 to 59 months living in households at the time of the campaign (June 28 - July 02, 2024);
- Mothers/guardians and fathers of children aged 06 to 59 months in the selected household.

Sample size :

The sample size was calculated from the WHO 2015 reference manual using the following formula:

n = A*B*C*D*E

With

A: the number of strata to be considered for the survey. In our case, this is a stratum made up of all six regions (Kayes, Koulikoro and Ségou);

B: The sample size that would be required if a Systematic Random Survey (SAS) were used. According to WHO 2015 guidelines, we obtain B= 306, corresponding to an expected coverage of 80% , a desired precision (half length of the confidence interval) of 0.05 and an Alpha =5% for a confidence level of 95%, as recommended by WHO-2015 ;

C: Cluster effect (DEFF). We obtained DEFF= 3.72947 by setting m = 10 and ICC=1/6 as recommended for post-campaign surveys by the WHO, with m designating the number of households to be selected per cluster;

D: Average number of households to visit to find 1 eligible respondent: here we retain D= 1 because previous post-campaign surveys give us a minimum average of one (01) child under 5 per household visited;

E: Non-response inflation factor = 1.020; we have assumed a minimum response rate of 95%, taking into account data from the post-campaign surveys we have piloted.

All these parameters (A, B, C, D and E) give us :
n=A*B*C*D*E = 1x306x3.72947x1x1.020 = 1166 households to visit with a minimum of 1142 completed interviews

Table 1Survey sample size

Taille de l'échantillon

A x B x C = N_cs	1 142	**Nombre total d'entretiens terminés nécessaires**
N_cs x D x E	1 166	**Nombre total de ménages à visiter (taille totale de l'échantillon du ménage)**
B x C x D x E	1 165	**Nombre de ménages à visiter dans chaque strate (taille de l'échantillon des ménages par strate)**
B x C / m	115	**Nombre de grappes par strate**
D x E x m	11	**Nombre de ménages par grappe**
Num. clusters per stratum x A	115	**Nombre total de grappes**

The minimum sample size required was **1142 households to be visited in the 115 clusters and one stratum after enumeration.**

The* sampling *plan

A stratified, two-stage cluster survey was carried out. The stratification criteria are the regions accompanied by Helen Keller and those that are not.

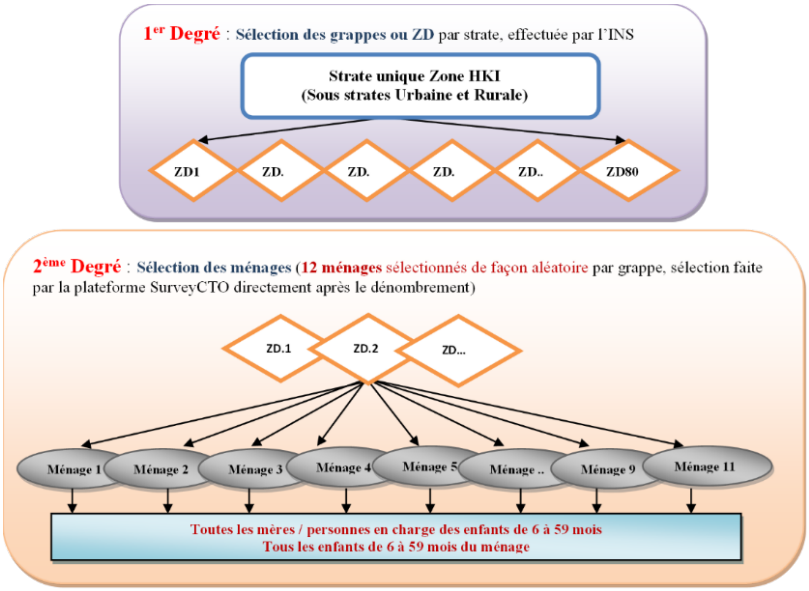
- ***In the first degree: pulling bunches***,

Table 2Distribution of clusters by stratum for the pilot and actual surveys

STRATES	Number of ZDs		
	Survey	Replacements	Pre-test
Kayes	26	3	-
Koulikoro	64	4	5
Ségou	25	3	-
Total	**115**	**10**	**5**

- ***Second degree: Household draw***,

The diagram below summarizes the process of drawing the GRAPPEs and selecting the households to be surveyed.



Sampling plan diagram

3.6. Collection tools

The following collection tools were used:

- Household enumeration form ;
- Household questionnaire ;
- Supervisor form ;
- Health Agent Questionnaire ;
- Community Relay/Community Distributor Questionnaire ;
- Interview guide for mothers
- Fathers' interview guide
- Interview guide for healthcare providers

In addition to these collection tools, the following tools were used for supervision and quality control:

- Monitoring and quality control form for supervisors ;
- Supervision grid

Finally, the free and informed consent form was used to obtain free and informed consent from participants.

b) Community relay survey

Type of study: A cross-sectional survey was carried out.

The target group: community health workers (CHWs) involved in vitamin A distribution (routine or campaign) in the 115 target DZs.

Inclusion criteria: all active ASCs in the enumeration area were considered.

Exclusion criteria: CSAs absent on the day of the survey were excluded.

Sampling: The complete list of DZ CHWs was obtained from the health center manager. The name of each CHW was then written on a piece of paper and placed in a container. A health center staff member drew the names without giving them out. The person whose name was written on the drawn piece of paper was then interviewed. If this person was absent, the same procedure for the draw was repeated.

Collection tools: the "Relais Communautaire/Distributeur Communautaire" questionnaire was used to collect data.

Sample size: 115 ASC.

c) Health Agent (HA) survey

Type of study: A cross-sectional survey was carried out.

Target group: EPI agents or their replacements

Inclusion criteria: all EPI agents or their deputies or replacements involved in campaign activities in one of the 115 target DZs were considered.

Exclusion criteria: agents absent on the day of the survey were excluded.

Sampling: The choice of health agent in each cluster was systematic. This was the EPI agent or his/her deputy if the latter had been involved in campaign activities. In the absence of the health agent or his/her deputy, the person to be surveyed was the one who had been most involved in campaign activities. If the cluster included two or more health centers, a draw was made between the health centers.

Collection tools: The "Health Agent" questionnaire was used to collect data.

Sample size: 115 health workers.

3.7. Protocol development and ethics committee approval

The research protocol, as well as the data collection tools, were adjusted to comply with the standard protocol provided by Helen Keller International to the firm in charge of the PECS survey. Subsequently, the ethical submission file was prepared and submitted for approval to the Comité d'Éthique de l'Institut National de la Santé Publique (CE-INSP) on August 26, 2024. The INSP then requested a letter of introduction from the Cabinet on the same day.
The letter of introduction was drafted and submitted by the Director of Helen Keller, at the request of INSP, as of August 28, 2024.
The INSP Ethics Committee suggested amendments to the protocol, which were taken into account by Helen Keller and the Cabinet. The revised version of the protocol was returned to the CE-INSP on September 6, 2024 and received final approval under decision N°04/2024 dated September 10, 2024.
It should be noted that the survey was conducted in strict compliance with national policies on the ethics of public health surveys.

3.8. Recruitment and training of collection agents

45 data collectors, including 30 interviewers and 15 supervisors, were recruited following a call for applications and on the basis of criteria including experience with previous surveys, knowledge of the field, language skills and immediate availability for the field. Gender was taken into account as a cross-cutting criterion to ensure good female representation.

The training session took place in two phases: from August 26 to 30, 2024 for the session dedicated to quantitative survey, and from September 2 to 3, 2024 for the one dealing with qualitative survey. Both sessions took place in the conference room of the Agence de Technologie, d'Informatique et de Communication (AGETIC), located in Hamdallaye ACI 2000, in the district of Bamako. This choice of venue was motivated by the availability of several rooms of varying sizes, but also by logistical criteria, such as the presence of a giant screen for PowerPoint projections, sound equipment, as well as Internet access for downloading and sending data via SurveyCTO.

The training was designed to prepare participants rigorously for data collection in order to guarantee quality and methodological rigor. Participants were trained in the use of electronic data collection tools, becoming familiar with their handling and the resolution of technical problems. The training covered various topics, such as map reading and delimitation of enumeration zones (ZD), enumeration, drawing households, conducting the household survey, conducting interviews and group discussions.

Figure 3:An overview of the training room with the interviewers selected for the PECS 09.2024 data collection.

3.9. Pilot survey

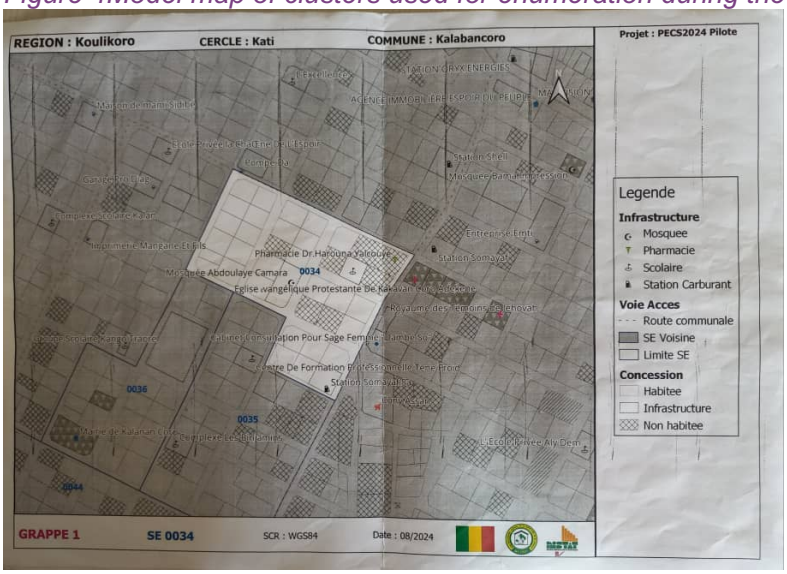
The pilot survey was organized on September 4, 2024 after five days of intensive training for all agents. It took place over one day in the Kalabancoro health district in five (5) clusters outside the sample for the study proper. These were the following clusters: Cluster 1 SE 0034; Cluster 2 SE 0036; Cluster 3 SE 0045; Cluster 4 SE 0044 and Cluster 5 SE 0035. This pilot survey was crucial for testing the various components of the data collection process, involving 15 teams set up for the purpose.

The main objective of this phase was to put into practice all aspects of the survey, from interactions with health facility managers, village/quartier chiefs and guides, to cluster delimitation, as well as the use of SurveyCTO data collection software.
The pilot survey focused on several key aspects: testing the questionnaires to ensure they met the survey objectives, assessing the average time taken to administer the questionnaires, and verifying the interviewers' skills in using SurveyCTO on cell phones for data collection. The efficiency of the SurveyCTO application, in particular its ability to transmit data, was also tested. Difficulties encountered were identified, enabling appropriate solutions to be developed and data collection tools to be finalized on the basis of the results obtained.

Following completion of the pilot survey, a debriefing session was held on the evening of September 04, 2024 to discuss the results of the pilot survey and determine whether any changes to questionnaires or procedures were required. This meeting served to consolidate the achievements of the pilot survey and effectively prepare the teams for the forthcoming data collection, ensuring that all members were aligned with the methodological and ethical objectives of the study.

Interviewers were selected on the basis of their understanding of the subjects covered, their motivation and their general demeanor. Teams were formed under the guidance of a team leader/supervisor, without gender discrimination.

Figure 4Model map of clusters used for enumeration during the pilot survey



3.10. Data collection quantitative and qualitative

The survey took place from September 12 to 30, 2024 with 15 teams spread across the regions of Kayes, Koulikoro and Ségou supported by Helen Keller Intl in Mali by fifteen teams each consisting of a supervisor and two interviewers, making a total of 45 agents (15 supervisors and 30 interviewers). Each team member was equipped with a tablet for data collection and transmission. Team leaders, who also acted as supervisors, were responsible for distributing the workload, checking the completeness of the data collected and conducting interviews with health and community workers. They were also responsible for ensuring compliance with ethical standards and the professional conduct of their team, while coordinating with local authorities.

- **Phase 1: Reconnaissance / delimitation and enumeration of the enumeration area / cluster**

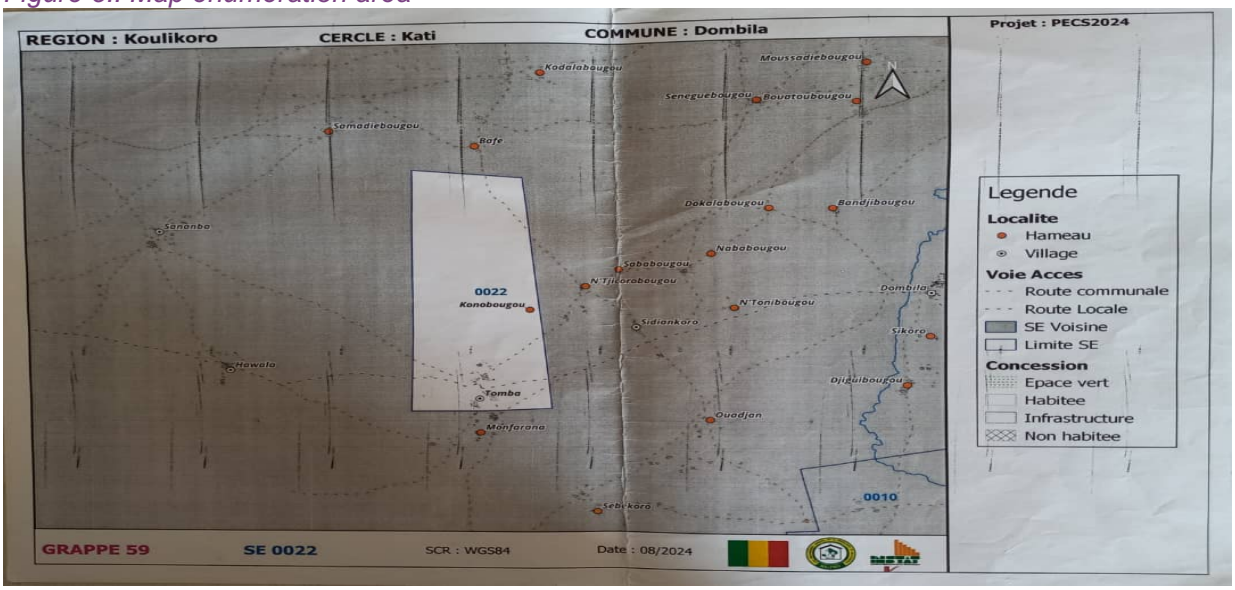
The following approach was used to recognize, delimit and count each DZ:

- Once in the target locality, the team made contact with local authorities and identified a local guide to assist with the count.
- The process began with the identification of the cluster, using the ZD (cluster) maps designed by INSTAT and made available to the teams during training. Using the landmarks on the map, the team identified and delimited the cluster.
- Then, before starting the household enumeration, a starting point was designated, from which the team moved from household to household, covering the entire cluster.
- In cases where a large part of the cluster was uninhabited (e.g. occupied by farmland) and all the inhabitants lived along a road or waterway, the team would go round the whole cluster to count all the households in the cluster. If, unfortunately, the cluster was uninhabited due to displacement or exodus, a replacement cluster was requested from the coordination team.

- Each team had the task of finding out from anyone with sufficient information about the household (household members, neighbors, visitors, etc.) whether there were any children aged between 6 and 59 months living in the household, and whether any relatives were present during the campaign.

All households in the cluster were visited and marked. It should be noted that the team had to use a single device (tablet or phone) to carry out the entire enumeration.

Figure 5:: Map enumeration area



❖ **Phase 2: Household selection and survey**

At the end of the enumeration, the interviewers used the same application to fill in the household draw field on the enumeration form (by entering the number of households to be drawn, eg. 11). The application automatically generated random numbers for the 11 households selected.

Household collection :
Once the 11 households had been selected, the teams visited only those households to explain the survey objectives once again, obtain the respondent's consent and conduct the interview using the appropriate "Household" form.
At the end of the interview, the team took the time to thank the household and moved on to the next household on the list.

Data collection at health facilities and community relays:
In health facilities, the "Health Agent" questionnaire was used to collect data from EPI agents or their replacements. For community health workers (CHWs), the "Community Relay/Community Distributor" questionnaire was used to collect data from those involved in vitamin A distribution (routine or campaign) in the 115 target DZs.

Qualitative data collection

- National: 3 semi-structured interviews
- Regional and departmental: 28 semi-structured interviews
- Community level: 58 focus groups.

3.11. Monitoring and supervision during collection

Throughout the data collection process, a rigorous monitoring system was put in place, based on daily meetings to ensure the smooth running of both quantitative and qualitative data collection operations. These meetings, attended by the team of consultants, Helen Keller Intl staff in Bamako and regional office staff, were designed to review the progress of data collection, resolve any problems encountered and adapt procedures as required.
Before each meeting, a report detailing ongoing activities was sent to the steering committee, facilitating discussions and informed decision-making. These meetings played an essential role in guaranteeing the quality of the data collected, enabling a rapid response to difficulties in the field, and ensuring compliance with methodological objectives and defined standards. They were also a key moment for sharing progress, exchanging experiences and coordinating actions between the different teams involved.
Concerning the clusters studied, out of a total of 115 clusters, 43 showed a higher count than INSTAT's estimates, i.e. around 37% of the total. Of these, around 9% of clusters showed a significant overestimate, with counts exceeding the predicted estimates by more than 40%. On the other hand, almost 12% of clusters were significantly underestimated, with numbers counted at less than 60% of the expected size according to the sampling frame.

The average time taken to administer household forms varied significantly between interviewers. On average, it took 41.68 minutes to complete a form, but some interviewers recorded much longer times, at 63.86 and 66.61 minutes. Conversely, some recorded times close to or slightly above the minimum threshold of 30 minutes, with respective averages of 29.73 and 30.38 minutes, and an average number of children per household fluctuating between 1.62 and 2.59. These cases were carefully monitored by supervisors to check data integrity and ensure compliance with the technical team's guidelines, which aim to prevent any under- or over-estimation of the target populations, essential factors in maintaining the quality and reliability of the data collected.

3.12. Comparison of PECS data and auditory data

To ensure data quality, some specific questions in the vitamin A section were randomly selected to assess the consistency and accuracy of the answers provided by the interviewers. These questions address various aspects, such as the child's receipt of supplementation, its registration, where and by whom it is administered, and any obstacles to supplementation. They also provide information on the frequency of visits to the health center and associated services, giving an overview of access to and use of vitamin A in our survey.

Analysis of the discrepancies between the audio recordings and the database shows very positive results overall, with low discrepancies in most cases. Of the 12 questions examined, the majority had a discrepancy rate of 0.00% or very close to zero, indicating strong agreement between the values collected orally and those recorded in the database. However, some questions such as Q81 (1.98%) and Q84 (0.99%) show larger discrepancies, although these remain relatively small overall. These slight discrepancies do not appear to have a significant impact on data integrity. In summary, the data are reliable overall, with rare exceptions that do not compromise the accuracy of the results.

Table 3Comparison of PECS and auditory data

Questions	Matching values between audio and database	Discordant values between audio and database	Percentage of discordance	Total Audio listened to
Q81	99	2	1,98%	101
Q82	100	1	0,99%	101
Q83	101	0	0,00%	101
Q84	101	1	0,99%	101
Q85	98	0	0,00%	98
Q86	50	0	0,00%	50
Q812	60	0	0,00%	60

Q813	89	0	0,00%	80
Q814	80	1	1,11%	90
Q815	90	0	0,00%	90
Q819	80	0	0,00%	80
Q816	80	0	0,00%	80

3.13. Independent PECS monitoring

3.13.1. Independent PECS monitoring: Counting results

As part of the coverage survey, a team of independent monitors from another consultant different from the one conducting the coverage survey was carefully trained and deployed to carry out rigorous data quality control. This team carried out independent enumeration of 10% of the clusters (i.e. 12 clusters) and conducted household surveys, checking the consistency of the audio recordings with the data entered to ensure the accuracy of the information. Daily analyses and reports were produced, enabling real-time monitoring via a dashboard of key indicators.

The results presented in the table reveal disparities between expected households, those counted by PECS and those counted by independent monitoring (IM). In fact, the total number of households counted by IM (1,165) exceeds those counted by PECS (1,048), well above the expected number of 1,018, particularly in clusters 52, 53 and 97, where the number of households counted far exceeds forecasts.

In contrast, several clusters, such as Cluster 44, show an underestimate in MI enumeration compared to PECS, suggesting inconsistencies in data collection or household identification across the two methodologies. These results underline the importance of cross-validating data to identify potential sources of enumeration error and improve the accuracy of estimates. Analysis of these discrepancies is crucial for refining data collection protocols, optimizing the methods used and guaranteeing the reliability of the information gathered for future analyses.

Table 4 Summary of independent monitoring results

Clusters	Expected number of households	No. of households counted (PECS)	No. of households counted (IM)
3	125	74	95
6	51	41	52
10	54	44	51
44	57	27	30
52	120	116	136
53	71	99	147
66	98	89	74
72	77	100	115
85	73	62	65
92	167	200	197
97	69	142	144
108	56	54	59
Total	1018	1048	1165

3.13.2. Independent PECS monitoring: Results of household survey

Table 5 presents a comparative analysis of the results between the coverage survey (PECS) and the counter-survey (Monitorage), carried out to assess the quality of data concerning vitamin A supplementation. In this counter-survey, independent monitors visited households already surveyed by the PEC team and interviewed a randomly selected mother or guardian to confirm the information collected. The variables analyzed fell into two categories: those considered stable (age,

gender, relationship) and those specifically linked to vitamin A supplementation (such as where and by whom the supplement was administered, registration in the health record, and knowledge of the date of the next campaign).

The results show that for stable variables, such as the child's sex and relationship to the respondent, the means are virtually identical between the two surveys, and no statistically significant differences are observed ($p > 0.05$). On the other hand, for variables specific to vitamin A supplementation, notable differences appear. For example, with regard to the recording of supplementation in the health record (Q8.2), the question on the identity of the person who administered the vitamin A (Q8.3), and the place of supplementation (Q8.4), significant discrepancies are observed, with respective deviations of 1.91, -1.16 and -4.18 and p-values below 0.05. These discrepancies suggest that the IM method provided more complete and reliable information on these specific aspects, probably due to the more accurate verification of the data by independent monitors. These results underline the importance of strengthening the quality of supplement-specific information collection, while highlighting the reliability of data for general information.

The results obtained do not call into question the quality of the data collected, as the variables considered stable (such as the child's gender and relationship to the respondent) show no significant difference between the two surveys. This suggests that this general information was correctly recorded, irrespective of the respondent. It is important to note that in the counter-survey, only one mother or guardian was selected from each household to answer the questions, focusing only on the section relating to vitamin A supplementation for her dependent children. This limited framework may explain some of the discrepancies observed in the responses concerning supplementation, particularly for specific questions such as the recording of data in the health record or the place of vitamin A administration.

Table 5:: Summary of independent monitoring results

Variables	PECS		Monitoring		Difference	p-val
	Average	n	Average	n		
What is the child's gender?	1,47	242	1,51	357	-0,04	0,389
During the recent vitamin A supplementation campaign completed in July	3,22	242	1,84	357	1,38	0,157
Is this information recorded on the health record or another document?	0,11	163	2,02	304	-1,91	0,000
Who gave the vitamin A capsule to?	2,98	163	4,13	304	-1,16	0,004
Where did the child receive the vitamin A capsule?	1,83	163	6,01	304	-4,18	0,000
Are you satisfied with the place where your child received vitamin A?	0,99	163	1,28	304	-0,28	0,471
Was not informed about the campaign	0,01	72	0,53	49	-0,52	0,000
The child was ill during the campaign	0,03	72	0,00	49	0,03	0,243
Do you know the next date for vitamin A supplementation for	0,03	242	0,01	357	0,02	0,113
Apart from the last vitamin A supplementation campaign, July 24, 2024	2,75	242	1,82	357	0,93	0,400
Relationship of respondent to child	3,07	242	2,65	357	0,42	0,469

3.1. Data processing and analysis, report writing

3.1.1. Data processing and statistical analysis

For this study, a platform was used to manage and collect data electronically from tablets and Android cell phones (Smartphones), in order to generate results more quickly. All data collected was transferred to Helen Keller's SurveyCTO database, with strictly limited access to ensure

confidentiality. The raw data was exported from SurveyCTO in Excel format by the consultant, then processed and analyzed with STATA and Excel software to ensure accuracy and completeness.
The treatment consisted of the following steps:

❖ **Clearance**

A quality control program was set up to process the data on a daily basis, enabling errors to be corrected while the teams were still in the field. A quality control report was drawn up by the Consultants and presented at the Supervisory Committee meetings for validation. Recommendations made to improve the quality of the data collected were systematically implemented with the participation of the field teams. After the data collection phase, five (05) separate files were obtained, processed and analyzed:

- The file for counting eligible and non-eligible households.
- The household data file from the VAS coverage survey.
- Quality control and supervision files.
- Survey data file of CSAs involved in VAS.

The survey data file of health workers in the health centers closest to the 115 sampled clusters. The data was processed in five stages, with full traceability:

- **Import and preparation**: Data forms were extracted from SurveyCTO and imported into Stata, preparing the groundwork for subsequent analyses.
- **Database merging**: All collected databases have been merged for integrated analysis.
- **Thorough cleaning**: Elaborate syntaxes were used to detect missing, inconsistent, outlier and atypical values. Errors detected were corrected by carefully documented STATA codes.
- **Calculation of weights** : Weights were calculated to accurately reflect the representativeness of each health district in the total sample.
- **Indicator calculation**: The main indicators, including the VAS coverage rate, were calculated with their 95% confidence intervals. A comparison was made with the administrative coverage rate.

All analyses were documented in STATA Dofile (.do) files, containing detailed comments on each adjustment to ensure transparency, reproducibility and reversibility of modifications. Finally, the GPS coordinates collected in the household forms were projected onto an administrative map of Mali to verify that the data corresponded to the targeted geographical areas, reinforcing the consistency and rigor of the study.

❖ **Merge databases and calculate derived variables**

After importing, cleaning and checking, data from various forms was merged into a single comprehensive database for analysis. This included steps such as data mapping, cleaning, integration, entity resolution, photo linking, quality assurance and documentation. Data on households, mothers/caregivers and children, for example, were merged and consolidated to form the final household survey base.

3.1.2. Calculation of weights for data weighting

The sampling weight represents the probability that the respondent will be selected to take part in the survey: it is the inverse of the selection probability.
In our survey with a two-stage sample, the sampling weight took into account the probability of the cluster being selected and the probability of the household being selected, knowing that the cluster had been selected. Thus, the original enumeration area (cluster) selection probabilities from the HIPC sample or any other method employed, and the household selection probability will be used to calculate the cluster weighting coefficient.

In this study, the sampling weight took into account the probability of the cluster being selected and the probability of the household being selected, given that the cluster had been selected. Thus, the original probabilities of selection of the enumeration area (cluster) from the HIPC sample or any other method employed, and the probability of household selection were used to calculate the weighting coefficient per cluster. The weighting coefficient was calculated as follows:

Sampling weight for respondent i= 1/ (Probability that cluster was selected) x (Probability that household was selected)

- **Probability of cluster selection** = number of selected clusters in stratum **/** total number of clusters in stratum.

- **Probability of household being selected** = number of eligible households selected in the cluster **/** total number of eligible households in the cluster.

The various tables and graphs in the analysis report were generated from the audited databases, containing the weighting coefficients.

3.1.3. Data analysis quantitative

Analysis was carried out using STATA 17 software for quantitative data, and Word and Excel for qualitative data. Quantitative data downloaded from the SurveyCTO platform in CSV format were imported into STATA for processing. The analysis consisted of four main types according to the adopted analysis plan:

- The **univariate analysis** covered all variables, including the number of households, population measures and socio-demographic characteristics of households and participants. Depending on the distribution of the data and the nature of the variables, the mean with its standard deviation or the median with its interquartile range were used to summarize the quantitative variables. Absolute frequency (number) and proportion were used for categorical variables. The proportion and its 95% confidence interval were used for the VAS coverage rate.

- A **bivariate analysis** was also performed. Certain characteristics of children, mothers and households were cross-tabulated with Vitamin A supplementation to look for static differences that might explain non-supplementation. A Pearson chi-square test was used for this purpose, respecting all conditions of application.

- A **Principal Component Factor Analysis** (PCA) was carried out to construct a composite wealth index by combining variables relating to household amenities;

- An **econometric model** was constructed to identify the factors likely to explain vitamin A supplementation in children aged 6-59 months. The dependent variable was a dichotomous variable taking the value 1 if the child received vitamin A and 0 if not. Sociodemographic factors were used as explanatory variables. Odds ratios were calculated at the statistical threshold of 5% and reported with a 95% confidence interval.
- In addition, knowledge indices were constructed on the basis of a set of questions on the knowledge of households, health workers and CHWs about vitamin A and deworming. These indices were cross-referenced with certain socio-demographic characteristics to highlight any links between knowledge levels and socio-demographic factors. Weighting coefficients were calculated to extrapolate the indicators.

3.1.4. Quality control of the qualitative survey

To guarantee the quality of semi-structured interviews, several essential measures are put in place. Firstly, interviewers receive in-depth training in active listening and reformulation techniques. A standardized interview guide is used to ensure uniform coverage of the main themes. In addition, regular quality control of the audio recordings was carried out to check the clarity of the exchanges and the relevance of the questions asked. Supervisors provide constructive feedback after listening to certain interviews, and verbatim transcripts are carefully checked for omissions. Finally, a collaborative analysis of the transcripts, carried out by members of Helen Keller's team, helped to

reduce bias and ensure rigorous interpretation of the data. Interviews are recorded on tablets using the 'voice recorder' application and transcribed using Microsoft Stream. Analysis is then carried out using Word, combined with Excel and Microsoft Copilot AI for additional support.

3.1.5. Strong points in the organization of the survey

The organization of this survey benefited from a number of positive factors that facilitated its implementation:

- Good collaboration between stakeholders in preparing and carrying out the survey. To this end, the Ministry of Health, through the SDN Nutrition Sub-Directorate, mobilized its staff to participate in the training of interviewers and supervisors during the pilot survey. The SDN sent a letter to the health authorities from the central to the peripheral level on the conduct of the study. Helen Keller INTL staff (national and regional teams as well as regional supervisors) provided technical assistance to the consultant at all stages of the process. Helen Keller Intl's regional supervisors relayed information on the arrival of the teams in their areas to the regional inspectorates, prefectoral directorates and health centers.
- The quality of the supervisors and interviewers, many of whom had previous experience of this type of survey, with levels of study ranging from bachelor's to master's degrees. It should also be noted that the majority came from the medical professions and that the qualitative interviews were conducted by sociologists.
- Daily follow-up meetings between Helen Keller Intl and the firm's teams to discuss collection progress, challenges and corrective measures to be undertaken to ensure data quality and compliance with the study protocol.
- Obtaining ethics approval on time, which enabled the teams to be deployed within the time window set for the study.
- The fruitful collaboration and availability of political, administrative and traditional authorities, including village chiefs.
- The duration of the training, 5 days in the classroom and one pilot day, enabled the interviewers and supervisors to appropriate the survey tools.
- The good material and logistical organization that enabled the collection work to be completed;
- The addition of a qualitative component to the survey, albeit modest, made it possible to obtain information relating to the perceptions and expectations of certain key players in vitamin A supplementation, in order to improve the implementation of future campaigns.

3.1.6. Difficulties encountered and corrective actions

The main difficulties encountered during collection were as follows:

- The difficulty of sending data to the server during the first three days of collection;
- The inaccessibility of some clusters due to poor road conditions, heavy rains leading to flooding, and displacement in some areas ;
- Migratory movements in localities close to gold-mining areas ;
- The use of a single tablet for household enumeration, which made the task particularly arduous;
- The coincidence of the start of collection with the CPS vaccination campaign, which disrupted the organization of activities, particularly with health workers;
- The absence of certain mothers and babysitters from households, often due to work in the fields;
- The considerable distance between clusters ;
- The time available was insufficient to cover the composite clusters, which were often far apart;
- River crossings, river branches, marigots and rivers;
- The unavailability of certain relays to accompany the enumerators during the enumeration, which is a real problem in households where the population does not know you;
- Insufficient time for collection and for travel between two clusters.

Although almost all these difficulties were resolved, two cases of refusal to participate persisted, where heads of households simply refused to cooperate by not answering the questionnaire. The solutions proposed included the replacement of inaccessible clusters, whether due to the presence of armed men or the very poor state of the tracks. Problems with sending data to the server were quickly dealt with by Helen Keller International.

3.1.7. Study limits

This study has several limitations inherent in its cross-sectional methodology.

Firstly, the sample was calculated on the basis of a single stratum covering the three regions supported by Helen Keller Intl in Mali, which limits the statistical power for inter-regional comparisons. This lack of comparative data between regions limits the capacity for analysis, particularly for micro-planning. In addition, no data were collected in areas not supported by Helen Keller Intl, making it impossible to make comparisons between covered and uncovered areas.

Causal relationships for factors identified as related to vitamin A coverage cannot be established with certainty. There are also risks of information bias, notably linked to participants' memory and social desirability, which could affect the accuracy of responses.

Profound cross-sectional collection of qualitative data does not allow in-depth exploration of the socio-cultural determinants influencing vitamin A supplementation, thus limiting understanding of motivations and barriers within communities.

Caregivers may give socially desirable answers rather than truthful ones, especially if they feel there are advantages or disadvantages to admitting that their child has, or has not, received supplementation.

4. RESULTS OF THE HOUSEHOLD SURVEY

The cluster survey identified 8,591 households in the 115 planned clusters, representing a 92% enumeration rate. This figure is lower than the 93,346 households estimated by the Institut National de la Statistique (INSTAT) for this target population. It is important to note that this discrepancy can be attributed to population movements due to insecurity and flooding generated by torrential rains in certain areas during the collection period.

Of the households counted, 6,014 were identified as eligible. A total of 1,263 households were interviewed out of the minimum 1,265 expected, i.e. 11 households per cluster, with a very low refusal rate of 0.16% (2 households out of 1,265). In addition, of the 15,044 children aged between 6 and 59 months in eligible households, data were collected for 3,181 children. In addition, 2,324 mothers were interviewed, testifying to the scope and quality of the information gathered.

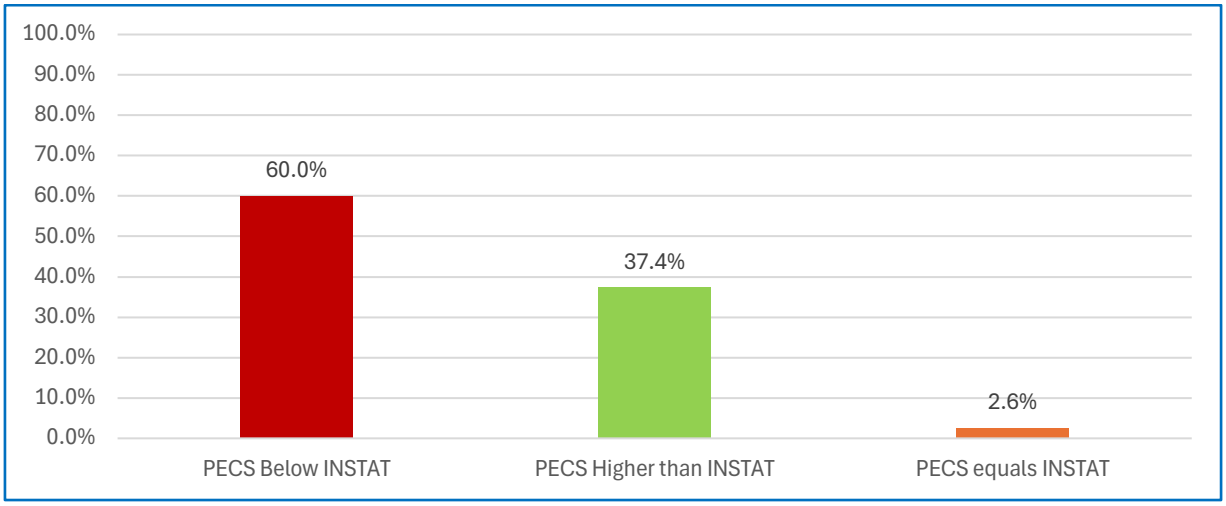
Table 6Survey coverage indicators based on sample data

Results		n
Counting phase	Number of clusters (EA) planned	115
	Number of households surveyed	8591
	Number of eligible households	6014
	Total number of children aged 6-59 months in eligible households	15044
Household interviews	Number of households surveyed	1263
	No. of REFUSALS from eligible households	2 (0,16%)
	No. of eligible children surveyed	3187
Estimated Population & Children aged 6 to 59 months	No. of eligible children Supplemented with Vitamin A only	257
Women's interviews	Number of mothers surveyed	2324

4.1. Comparison of PECS enumeration data and data from the Institut National de la Statistique (INSTAT)

Figure 6 illustrates the comparison between the number of households expected according to the forecasts of the Institut National de la Statistique (INSTAT) and the results observed during the enumeration carried out during the PECS survey. This analysis reveals significant discrepancies between INSTAT's estimates and the data actually collected in the various zones studied.
In 37.4% of clusters, the number of households enumerated in the PECS survey exceeded INSTAT forecasts. In 2.6% of enumeration zones (ZD), the observed figures correspond precisely to estimates, while in 60% of clusters, the number of households enumerated is lower than forecast. These results suggest significant variations in household distribution from initial estimates.

Figure 6Comparison of the number of households counted in PECS DZs and the number of households expected, according to INSTAT



4.2. Socio-demographic characteristics of households surveyed

4.2.1. Socio-demographic characteristics of household heads

Of the 1,263 heads of household surveyed, nine out of ten (96.2%) were men. 54.6% of heads of household were aged between 30 and 49, and the majority were married (98.1%). Over half the heads of household had never attended school, and a significant proportion were engaged in agricultural or commercial activities (see Table 7).

Table 7Distribution of heads of households by sex

	n	%
Gender of head of household		
Male	1204	96,2
Female	59	3,8
Marital status of head of household		
Married or living as a couple	1236	98,1
Widow	24	1,8
Divorced	1	0
Single	2	0,1
Age of head of household (age range)		
18 to 29 years old	51	5,2
30 to 39 years old	284	24,3
40 to 49 years old	397	31,3
50 and over	531	39,3
Education level of head of household		
Out of school	669	56,1
Primary	326	26
Secondary	152	11,1
Superior	84	5,3
Professional	32	1,6
Main activity of head of household		
Public-sector employee	80	4,7
Private-sector agent	138	9,9
Retailer	149	9,7
Farmer/Fisherman	592	52,6
Housewife (homemaker)	33	2,2
Craftsman/self-employed	157	12,6
Unemployed	20	1,3
Retired	29	2,2

Pupil/Student	1	0,1
Other	64	4,8

4.2.2. Average number of children and mothers/caregivers per household

On average, the households surveyed had 2.52 ± 2.15 children aged between 6 and 59 months. The average number of mothers or guardians in these households was 1.84± 1.49 (Table 8).

Table 8 Average number of children and custodial mothers in households

Results	Average	Standard deviation
Average number of children aged 6-59 months in households	2,52	2,15
Average number of mothers/caretakers of children aged 6 59 months in households	1,84	1,49

4.2.3. Socio-demographic characteristics of mothers or babysitters in surveyed households

Table 9 shows the socio-demographic characteristics of the mothers and guardians who took part in the survey. Of the respondents, 99.4% were women responsible for the children. Over 60.6% of mothers and guardians surveyed had not attended school. The majority of participants were married (99%), and 47% were the wife or husband of the head of household. Moreover, 89.7% of mothers and guardians were in the 18-39 age bracket.

In terms of professional activity, housewives (homemakers) were the most represented group at 58.7%, followed by farmers, who accounted for 21.8% of respondents.

Table 9 Socio-demographic characteristics of the mother/caregiver or representative of the child aged 6-59 months

	n	%
Gender		
Male	16	0,6
Female	2308	99,4
Relationship of mother/caregiver to head of household		
Head of household	92	4
Head of household's spouse	972	47
Daughter/son of head of household	103	4,8
Relative of the head of household or his/her spouse	424	15,6
Other parents	259	8,3
Person not related to the head of household	87	5,2
Domestic	5	0,1
Other	382	15
Age of mother's/children's guardian		
14 to 17 years	35	1,5
18 to 29 years old	1320	60
30 to 39 years old	746	29,7
40 to 49 years old	145	6,4
50 years plus	30	1,4
Don't know	48	0,9
Marital status of mother/guardian of children		
Married or living as a couple	2282	98
Widow	10	0,4
Divorced	8	0,5

	n	%
Single	24	1,1
Mother's/children's guardian's level of school education		
Out of school	1350	60,6
Primary	667	28,1
Secondary	216	7,5
Superior	68	2,9
Professional	23	0,9
Main activity of mother/childminder		
Public-sector employee	40	1,6
Private-sector agent	39	1,8
Retailer	274	12,1
Farmer/Fisherman	491	21,8
Housewife (homemaker)	1372	58,7
Craftsman/self-employed	51	2,1
Unemployed	10	0,4
Pupil/Student	34	1,2
Other	13	0,4

4.3. Household wealth quintile survey

❖ Wealth quintile calculation method

A synthetic indicator of economic well-being known as the household wealth quintile is designed on the basis of non-food consumer goods to characterize a household's level of affluence. This indicator is constructed using a factorial method, namely principal component analysis. Information on household goods included information from the household questionnaire on household ownership of certain consumer goods such as television, radio or car. This information also covered certain housing characteristics such as the availability of electricity, the type of water supply, the type of toilet, the flooring material and the fuel used for cooking. Households were then divided into population quintiles, with each quintile corresponding to a level, ranging from 1 (lowest) to 5 (highest).

❖ Survey household wealth quintile

Table 10 shows the household wealth quintile. Overall The wealth quintile was estimated on the basis of 10 questions (in accordance with the equity tool: https://www.equitytool.org/) covering non-food consumer goods, such as the type of fuel used by household members, the water supply, or the type of toilet used. The results are presented in Table10. They show that around 19.9% of households are in the lowest quintile (the first quintile represents 20.3% and the second quintile 19.7%) and 20.6% belong to the middle class.

Table 10 Wealth quintile

Wealth quintile	n	%	CI(95%)
1st quintile	235	20,3	[16,8-24,3]
2nd quintile	187	19,7	[15,8-24,3]
3rd quintile	250	20,6	[17,0-24,7]
4th quintile	285	19,5	[16,5-23,0]
5th quintile	306	19,9	[17,2-22,9]

4.4. Access to healthcare services

4.4.1. Types of healthcare facilities visited

To access medical care, the vast majority of respondents (90.5%) say they regularly use public health facilities. In addition, 8.8% of respondents also mentioned turning to private health facilities for their care needs. Among the most frequented facilities, the Centre de Santé Communautaire (CSCOM) stands out, with a frequentation rate of 72.9% (Table 11).

Table 11 Types of healthcare facilities visited

		n	%	CI (95%)
Where do you most often go for medical care?	Formation (Centre) de santé publique	2076	90,5	[88,7-92,0]
	Private health center	223	8,8	[7,3-10,5]
	Pharmacy	1	0	[0,0-0,2]
	Traditional practitioner	15	0,4	[0,2-0,7]
	Other	9	0,3	[0,2-0,6]
What type of public healthcare facility is closest to you?	District Hospital (CSREF)	144	5	[4,0-6,2]
	Health center (CSCOM)	1814	72,9	[69,3-76,1]
	Health post (ASC site)	241	14,4	[11,6-17,7]
	Regional hospital	4	0,3	[0,1-1,1]
	Other	121	7,4	[5,6-9,8]

4.4.2. Distance and means of transport to the nearest health center

Table 12 shows the distances between households and the nearest healthcare facilities, as well as the means of transport used to get there. Some 73.6% of the households where the mothers/guardians surveyed reside are less than 5 km from a health facility. In terms of means of transport, almost half of mothers/guardians (49%) walk to the health center, while 44.6% prefer motorcycles or tricycles. Only 3.4% travel by car.

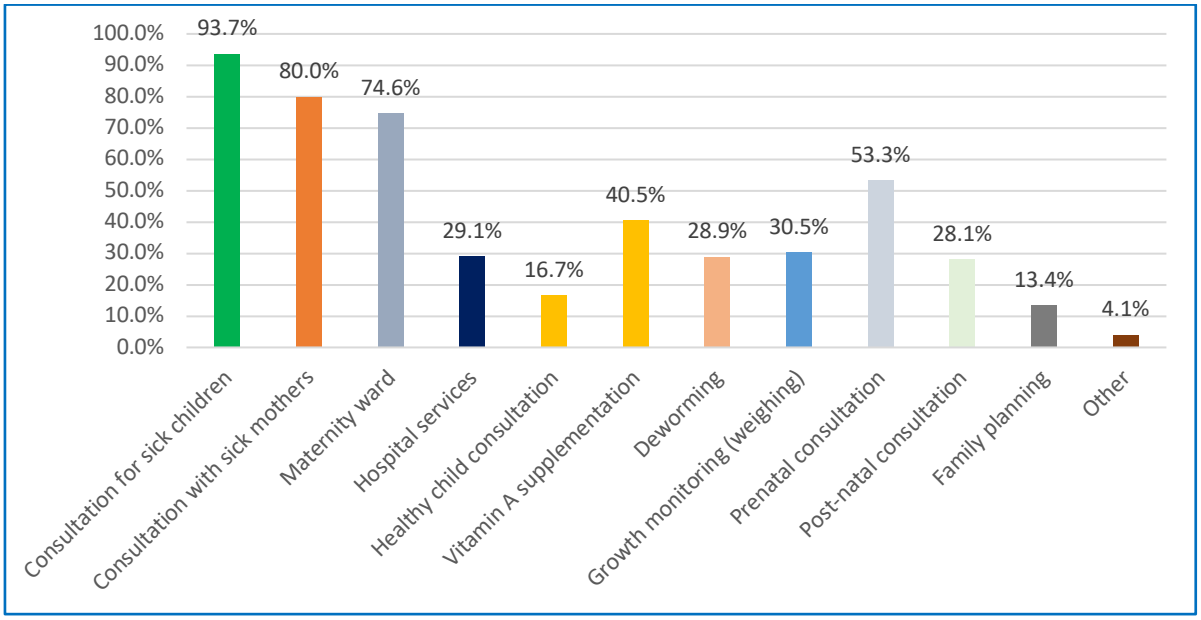
Table 12 Distance and means of travel to the nearest health center

		n	%	95%CI
What is the distance in kilometers between your household and the nearest facility?	Less than 5 KM	1748	73,6	[70,3-76,6]
	Between 5-9 KM	468	21,7	[18,9-24,8]
	Between 10-14 KM	66	3,3	[2,2-4,9]
	Between 15-19 KM	17	0,8	[0,4-1,6]
	More than 20 KM	25	0,7	[0,4-1,0]
How do you usually get to this healthcare facility?	On foot	1082	49	[45,6-52,4]
	By car	84	3,4	[2,7-4,3]
	By bike	24	0,9	[0,6-1,4]
	By motorcycle/tricycle	1095	44,6	[41,3-48,0]
	Cart	22	0,7	[0,4-1,1]
	Other	17	1,4	[0,8-2,5]

4.4.3. Types of services available at health centers

Figure 7 shows the results for services available at health centers, as reported by surveyed households. The most frequently mentioned service was consultation for sick children, cited by 93.7% of respondents. Around 80% of households also indicated the availability of consultations for sick mothers, while 74.6% said that maternity services were accessible in the health facilities they frequented. Prenatal consultations were available in more than half of health centers (53.3%), and 40% of households reported that vitamin A supplementation services were available. In contrast, services for healthy children and other types of consultation were much less frequently mentioned, with only 16.7% and 4.1% of households respectively.

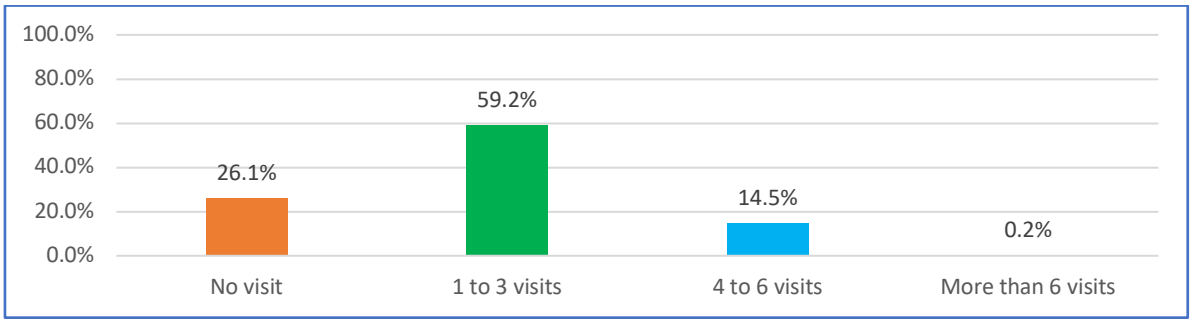
Figure 7Type of services available at health centers



4.4.4. Number of times the household was visited by community health workers or volunteers

Figure 8 illustrates the frequency of visits received by households from community health workers or volunteers. The results show that more than half of households (26.1%) received no visits at all in the six months prior to the survey. On the other hand, a significant 59.2% of households indicated that they had received between 1 and 3 visits during this period, suggesting partial coverage of community health interventions.

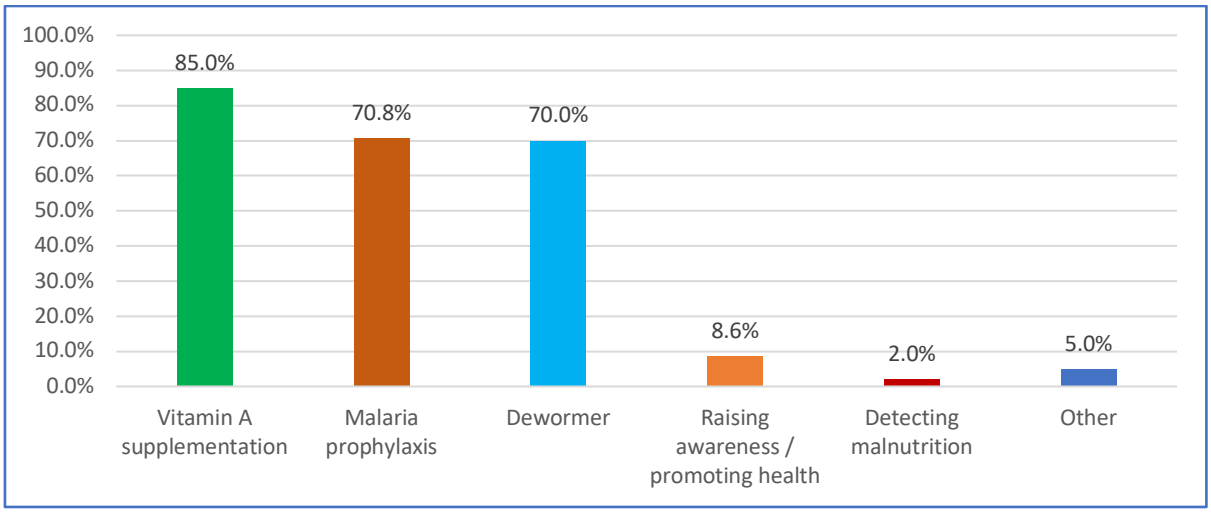
Figure 8Number of times the household was visited by community health workers or volunteers



4.4.5. Type of services received from the community/volunteers

Figure 9 shows the services provided to household members by community agents. The results show that the majority of households (85%) benefited from vitamin A supplementation provided by these agents, underlining the importance of this intervention in community health. Next come malaria prophylaxis (70.8%) and deworming (70%), two essential services for the prevention of common diseases. Less frequently, health awareness and promotion were reported in 8.6% of cases. Finally, other miscellaneous services were offered in 5% of households during visits by community agents, demonstrating the diversity of actions taken in the field to improve people's health.

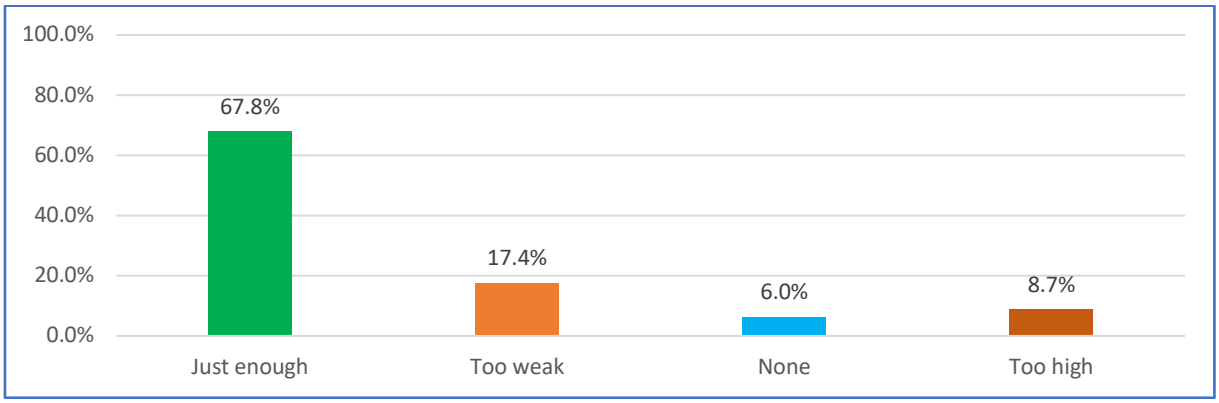
Figure 9 Type of services received by the community from community health workers



4.4.6. Household perceptions of the number of visits made by community health workers.

Figure 10 shows respondents' perceptions of the frequency of household visits by community health workers. The results indicate that the majority of respondents (67.8%) felt that the frequency of visits was "just sufficient", suggesting general satisfaction with the accessibility and regularity of these interventions. However, 23.4% of respondents felt that this frequency was "too low" or "non-existent", highlighting a potential need for improvement in visit coverage, and underscoring a gap between supply and demand. Finally, a minority of respondents (8.7%) considered the number of visits to be "too high", which may reflect a perception of overload or a lack of adaptation to specific household needs.

Figure 10 Household perceptions of the number of visits made by community health workers



4.5. Vitamin A Supplementation Coverage

4.5.1. Socio-demographic characteristics of children

The table below shows the socio-demographic profile of eligible children aged between 6 and 59 months. In terms of gender distribution, boys made up slightly more than half the sample (50.6%), while girls accounted for 49.4%. In terms of age distribution, around 88.6% of children were aged between 12 and 59 months, highlighting a majority of older children in the sample. In addition, 81.6% of the children's biological mothers took part in the survey, answering the sections relating specifically to children aged between 6 and 59 months.

Table 13 Socio-demographic profile of children

	n	%
Child's gender		
Male	1575	49,4
Female	1612	50,6
Child's age in completed months		
[6-11 months]	362	11,4
[12-59 months]	2825	88,6
Respondent's relationship with child		
Father	105	3,3
Mother	2608	81,8
Uncle	38	1,2
Aunt	222	7
Tutor	6	0,2
Tutor	27	0,8
Grandfather	26	0,8
Grandmother	129	4
Servant/Domestic	1	0
Other, please specify	25	0,8

4.5.2. Source of information on children's date of birth

Table 14 shows the sources of information used to verify the birth dates of the children surveyed. Overall, less than 49% of children's dates of birth could be reliably verified, using either a health record or a birth certificate. This suggests that, in a significant proportion of cases, date-of-birth information is not available or cannot be formally validated.

Table 14 Sources of information on children's date of birth

	n	%
Source of this information on the child's age		
Health booklet/Supplementation booklet	1078	33,8
Birth certificate	483	15,2
Parent's allegation (assertion) without source of verification	1523	47,8
Events calendar	99	3,1
Other	4	0,1

4.5.3. Coverage of vitamin A supplementation during the campaign

Tables 15 illustrate the coverage of vitamin A supplementation among children aged 6 to 59 months during the June 2024 campaign. Around 82.1% of children benefited from this supplementation, with a confidence interval ranging from 79.9% to 84.1%, indicating relatively high coverage. However, it is important to note that in more than nine out of ten cases (95.7%), information

concerning supplementation could not be verified using a health record or other follow-up document. This lack of formal documentation suggests a weakness in the monitoring and data verification system.

Table 15 Coverage of children supplemented with vitamin A

	n	%	CI (95%)
The child received vitamin A during the vitamin A supplementation campaign in June 2024.			
Yes	2650	82,1	[79,9-84,1]
No	503	17,2	[15,3-19,4]
Don't know	34	0,6	[0,4-0,9]
Information on vitamin A is recorded in the child's health record			
Yes	109	4,3	[3,2-5,8]
No	2541	95,7	[93,2-98,3]

4.5.4. Where vitamin A is received during the campaign

With regard to where and by whom vitamin A was administered, the results in Table 16 show that the majority of children received their supplements at home (89.5%). A smaller proportion of children were supplemented at the health center (2.5%), by a community health worker (0.5%) or in the village (65%). With regard to vitamin A administrators, mothers and guardians reported that community health workers and community relays/distributors were the main people responsible for administering the product, accounting for 66.8% of cases, followed by health workers (18.6%). These results suggest a strong involvement of community actors in vitamin A distribution, which may be perceived as a factor facilitating access to supplementation, particularly in remote areas.

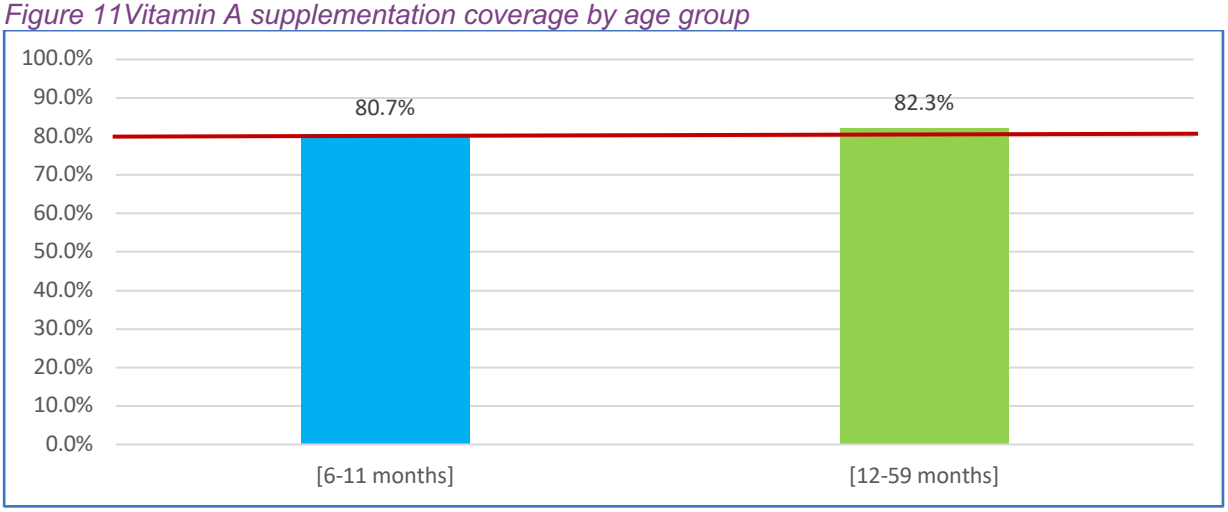
Table 16 Location and personnel administering vitamin A

	n	%
Where did the child receive the vitamin A capsule?		
At the health center	67	2,5
Community health workers (CHWs)	13	0,5
In the village	171	6,5
At home	2372	89,5
Other location outside the village/neighborhood	10	0,4
Don't know	1	0
Other	16	0,6
Who gave the child the vitamin A capsule?		
Health agent	493	18,6
Community health agent	338	12,8
Parent/guardian	41	1,5
The child himself	4	0,2
Relay/Agent Distributor	1769	66,8
Don't know	4	0,2

4.5.5. Vitamin A intake by age group during the campaign

Figure 11 illustrates vitamin A supplementation (VAS) coverage according to children's age group. It shows that children aged 12-59 months benefit from higher coverage (82.3%) than those aged 6-11 months (80.7%). The coverage rate for children aged 12 to 59 months thus exceeds the recommended threshold of 80%, while that for children aged 6 to 11 months remains below it. However, statistical analysis using the chi-squared test (P = 0.695) shows that there is no significant difference between vitamin A coverage rates according to gender, suggesting that vitamin A supplementation coverage is not influenced by this variable. These results underline the importance of strengthening supplementation in infants aged 6 to 11 months to ensure universal and effective coverage for all age groups.

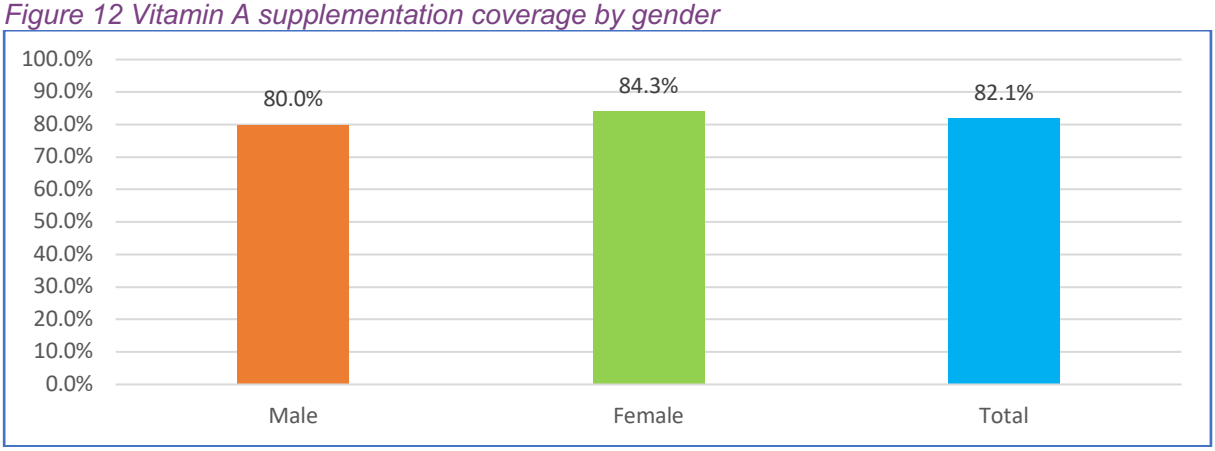
Figure 11Vitamin A supplementation coverage by age group



4.5.6. Receipt of vitamin A by sex and stratum during the campaign

Figure 12 shows vitamin A coverage by gender. The results show that coverage was relatively similar between boys (80%) and girls (84.3%), with a difference of 4.3 percentage points. However, statistical analysis, using the chi-squared test (P = 0.055), indicates a trend towards a possible association between child gender and vitamin A coverage, although this difference was not statistically significant at the 0.05 threshold. Furthermore, this analysis suggests that there may be other factors, such as the child's age group or socio-economic factors, influencing supplementation coverage, thus requiring further investigation to better understand these disparities.

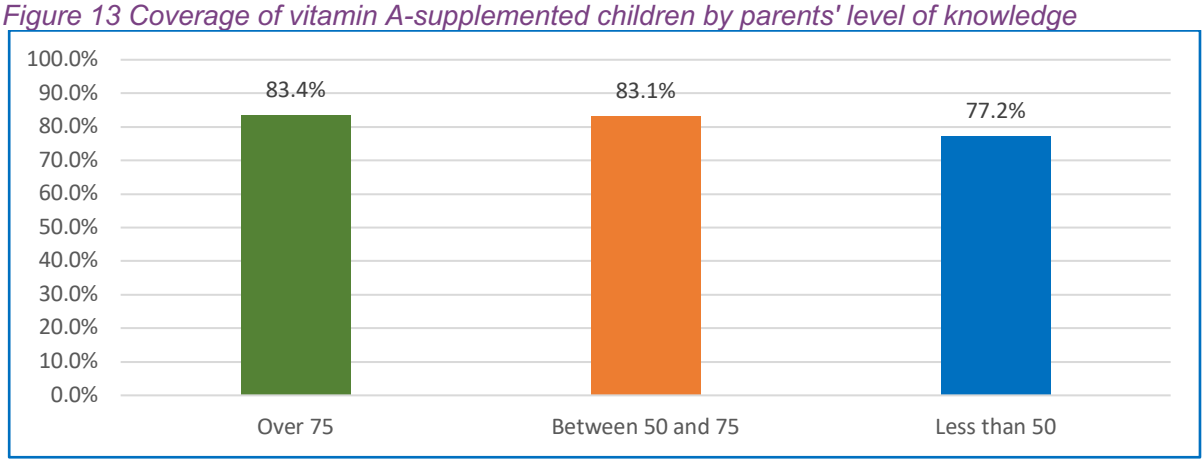
Figure 12 Vitamin A supplementation coverage by gender



4.5.7. Receipt of vitamin A during the campaign according to household VAS knowledge index

Figure 13 shows a positive correlation between parents' level of knowledge about vitamin A and children's coverage of vitamin A supplementation. Indeed, coverage was 77.2% for children whose parents had a low level of knowledge, while it reached 83.1% for those whose parents had an average level of knowledge, and 83.4% for those with a high level of knowledge. This trend indicates that the more knowledgeable parents are about vitamin A, the greater the likelihood that their children will benefit from supplementation. Statistical analysis, using the chi-squared test (P = 0.000), confirms the existence of a significant association between parents' level of knowledge and vitamin A coverage, suggesting that further efforts to improve parental awareness and education could help increase coverage of this vital supplement.

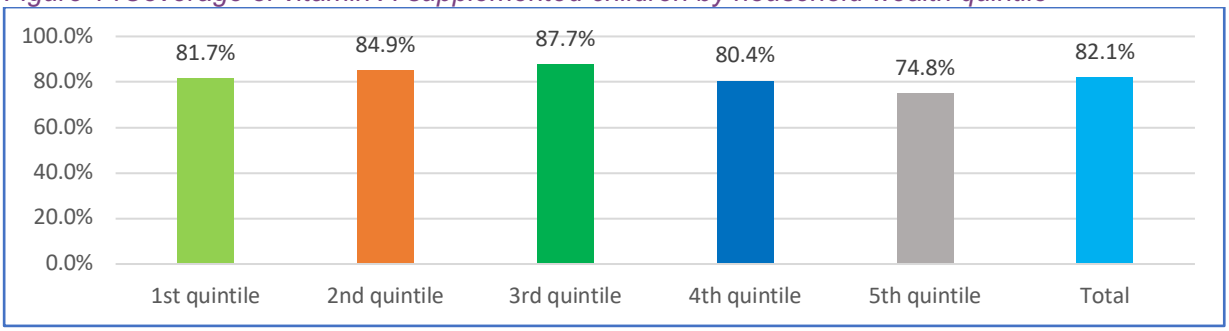
Figure 13 Coverage of vitamin A-supplemented children by parents' level of knowledge



4.5.8. Receipt of vitamin A during the season, by household wealth quintile

Figure 14 shows children's vitamin A coverage according to household wealth quintile. The results show that children from households in the middle quintile enjoy higher vitamin A coverage (87.7%), followed by those in the lowest and highest quintiles (84.9% and 81.7% respectively). Children in quintile 3 (87.7%) had higher coverage than those in quintiles 4 (80.4%) and 5 (74.8%). This suggests that factors other than wealth may influence vitamin A coverage. Statistical analysis using the chi-squared test (P = 0.001) indicates a significant relationship between household wealth quintile and vitamin A coverage, but the results also highlight the need to take into account other contextual variables that could affect access to supplementation, beyond household wealth alone.

Figure 14Coverage of vitamin A-supplemented children by household wealth quintile

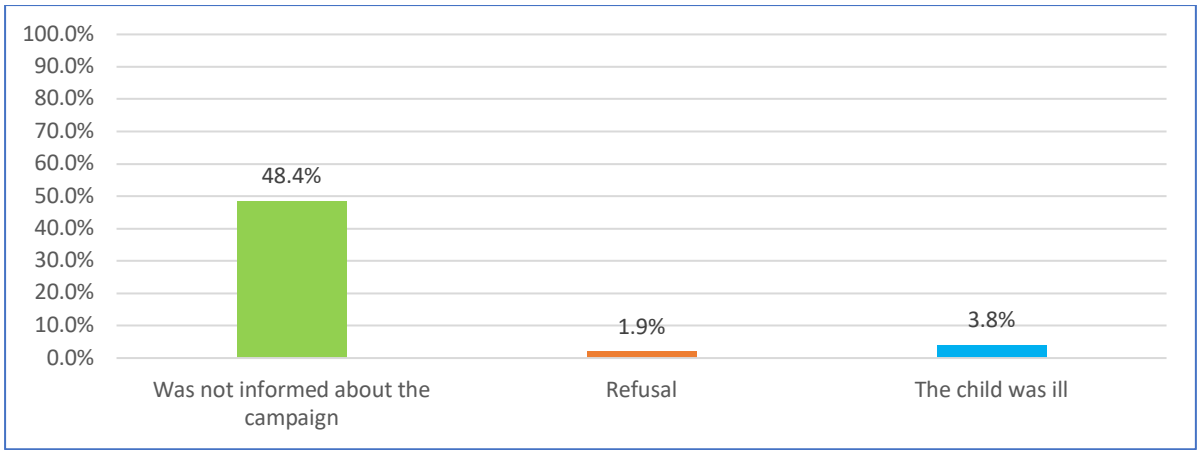


4.5.9. Reasons for not taking vitamin A during the campaign

Figure 15 highlights the main reasons given by respondents for non-supplementation of vitamin A in the children surveyed. The majority of non-supplementation cases (48.4%) are attributed to a

lack of information, suggesting that awareness of the importance of vitamin A is not sufficiently effective. In contrast, a very low percentage (1.9%) of refusals to supplement were reported, indicating that, overall, there is no significant resistance to supplementation on the part of parents or guardians. These results underline the importance of strengthening information and awareness-raising efforts to ensure that all children benefit from vitamin A supplementation.

Figure 15 Reasons for not supplementing with vitamin A



4.5.10. Coverage of vitamin A supplementation in the last six months outside the campaign period

Table 17 shows data for children who did not receive vitamin A supplementation during the campaign, but were covered on another occasion during the half-year. According to the results, a relatively small proportion of children (12.3%) who missed the supplementation campaign were able to be covered at another time during the semester. In contrast, the vast majority of children (85.1%) did not benefit from supplementation outside the campaign period. A small proportion of respondents (2.6%) were unable to provide precise information on their child's supplementation status. These results suggest that continuous vitamin A coverage outside specific campaigns remains limited, highlighting a potential need to strengthen year-round supplementation mechanisms to reach all eligible children.

Table 17:: Children not covered during the campaign but covered at another time during the semester

	n	%	CI (95%)
Children not covered during the campaign but covered at another time during the semester			
No	2681	85,1	[83,1-86,8]
Yes	403	12,3	[10,7-14,1]
Don't know	103	2,6	[1,9-3,5]

4.5.11. Months when vitamin A is received outside campaigns

As shown in Table 18, 12.3% of children received vitamin A supplementation outside the July 2024 campaign. Of these children, 19.1% were supplemented before the official launch of the campaign in July, while around 12.9% received vitamin A in June. It should be noted that in 29% of cases, mothers could not specify the exact month of supplementation outside the campaign.

Table 18Months in which children who were not covered during the campaign were covered at another time during the semester

	n	%	CI(95%)

Months when children who were not covered during the campaign were covered at another point in the semester			
July	113	19,1	[15,4-23,4]
June	58	12,9	[9,2-17,9]
May	28	7	[3,7-12,7]
April	27	7,1	[4,3-11,4]
March	25	5,6	[3,1-9,7]
February	51	10,1	[6,4-15,7]
January	44	9,3	[6,6-12,9]
Don't know	160	29	[24,0-34,5]

4.5.12. Location of vitamin A reception outside the campanes

The table below provides information on where and by whom vitamin A was administered to children who were not covered during the main campaign, but who received supplementation at another time during the six-month period. It appears that the majority of these children (82.5%) received supplementation at home. Moreover, in 98.2% of cases, vitamin A was administered by community health workers or health agents. These results highlight the important role of community agents in the dissemination of vitamin A supplementation outside official campaigns, and suggest that home health services play a crucial role in supplementation coverage, particularly for children not reached during the main campaign.

Table 19 Location and staff who administered vitamin A to children not covered by the campaign and who received VAS at another time during the semester

	n	%
Where did the child receive vitamin A?		
At home	137	82,5
At the health center	20	12
In the village	6	3,6
Community health workers (CHWs)	1	0,6
Other	2	1,2
Who gave the child the vitamin A capsule?		
Community health agent	84	50,6
Health agent	79	47,6
Don't know	3	1,8

4.5.13. Children supplemented with vitamin A during and outside the campaign

Table 20 shows that only 10.4% of children received vitamin A supplementation both during the July 2024 campaign and at another time during the six-month period. In contrast, only 2% of children who were not covered during the campaign received supplementation at another time during the same period. These results underline that the July 2024 vitamin A supplementation campaign played a decisive role in supplementation coverage. Indeed, without this campaign, only 12.4% of target children would have been covered by community health workers or health agents, highlighting the high dependence of vitamin A coverage on national campaigns and the commitment of community health workers.

Table 20 Children supplemented with vitamin A during and outside the campaign period

	n	%	CI (95%)

Children covered during the campaign and at other times during the semester			
No	2845	89,6	[88,0-91,1]
Yes	342	10,4	[8,9-12,0]
Children not covered during the campaign but covered at another time			
No	3126	98	[97,2-98,6]
Yes	61	2	[1,4-2,8]

4.5.14. Frequency of vitamin A supplementation for children during the six-month period

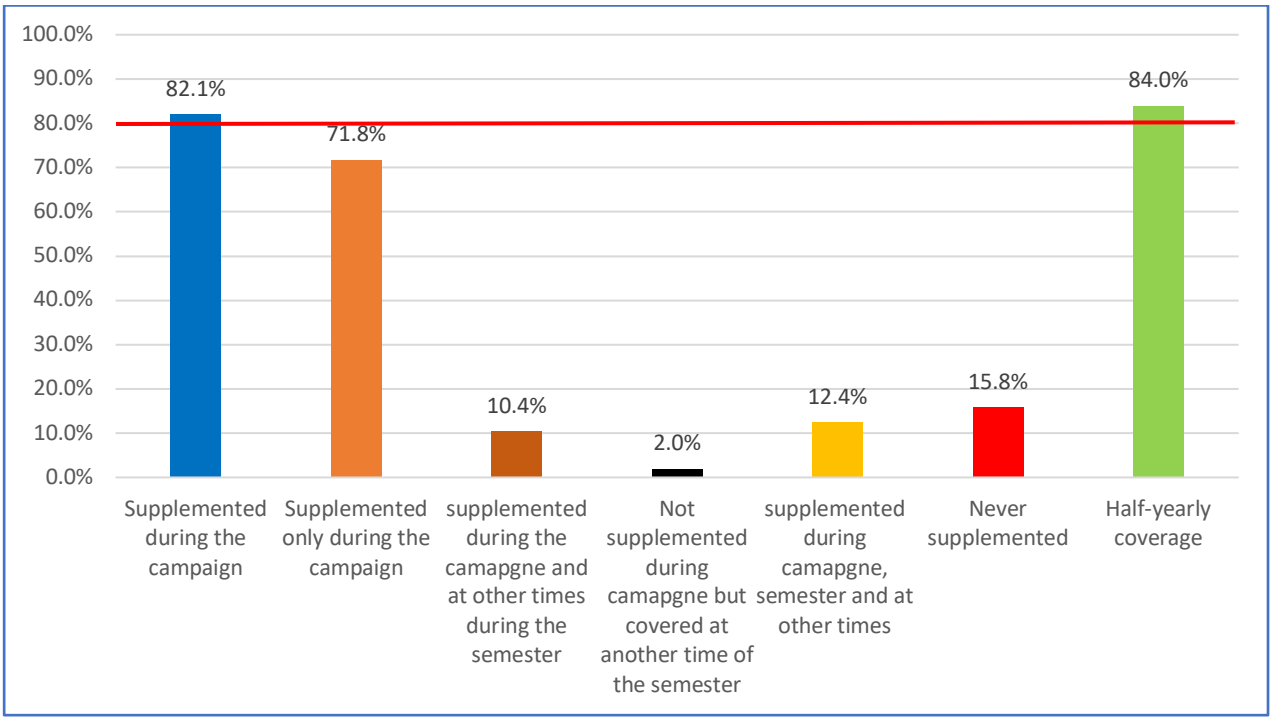
Table 21 shows that the majority of children (81.2%) received vitamin A supplements only once during the six-month period. Far fewer children received supplements more than twice, indicating that repeated supplementation remains relatively rare. In addition, a small proportion of children (0.3%) were uncertain about their supplementation status, suggesting that there is a small degree of lack of follow-up for a tiny proportion of children during the period studied. These results underline the effectiveness of the main campaign, but also the need to reinforce follow-up to ensure that every child receives the recommended supplementation within the appropriate timeframe.

Table 21:: Number of times children received a supplement during the semester

	n	%	CI (95%)
Number of times children received a supplement during the semester			
0	456	15,6	[13,7-17,7]
1	2617	81,2	[79,0-83,2]
2	88	2,7	[2,1-3,6]
3	6	0,2	[0,1-0,4]
Don't know	20	0,3	[0,2-0,5]

Analysis of the results presented in Figure 16 shows that the majority of children (71.8%) received vitamin A supplements only during the August 2024 vitamin A supplementation campaign (VAS). In addition, 10.4% of children received not only this campaign, but also additional supplementation in the following six months, indicating prolonged follow-up. Furthermore, 2% of children who had not been supplemented during the campaign in the first half of 2024 still received vitamin A in the preceding six months, indicating access to supplementation outside the campaign periods.
However, 15.8% of children did not receive vitamin A supplementation during the first half of 2024, highlighting a significant gap in coverage. In summary, 84% of children received at least one dose of vitamin A during this six-month period, reflecting a relatively high coverage rate. It is important to note, however, that in the absence of the supplementation campaign, only 12.4% of children would have received vitamin A, highlighting the significant impact of supplementation campaigns in reaching target populations.

Figure 16Vitamin A supplementation coverage in S1 2024

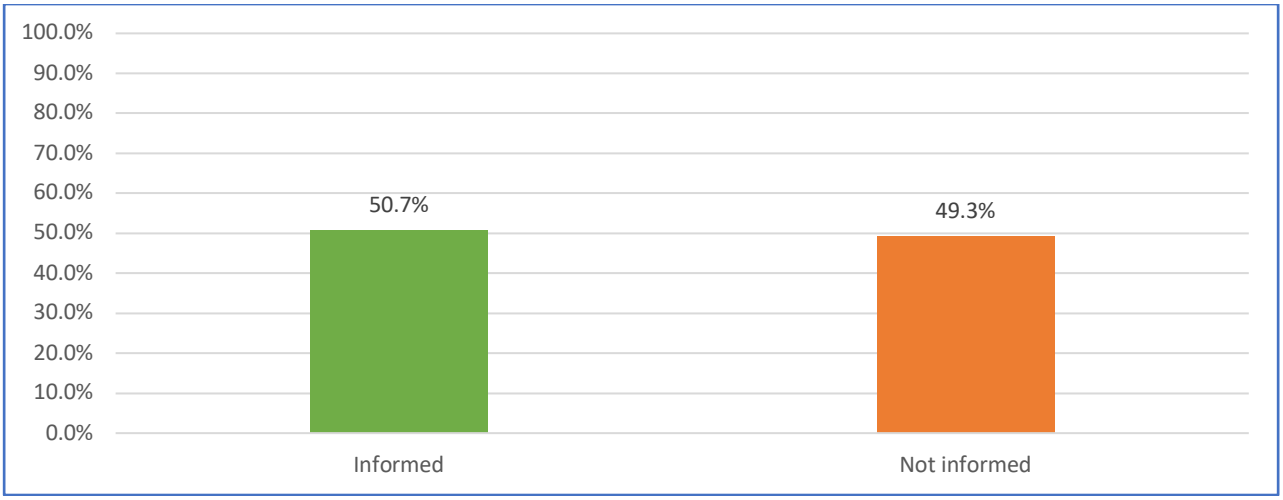

100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
82.1%
71.8%
10.4%
2.0%
12.4%
15.8%
84.0%
Supplemented during the campaign
Supplemented only during the campaign
supplemented during the camapgne and at other times during the semester
Not supplemented during camapgne but covered at another time of the semester
supplemented during camapgne, semester and at other times
Never supplemented
Half-yearly coverage

4.6. Campaign communication strategies

4.6.1. Household information by stratum

Figure 17 shows the results for household awareness of the vitamin A supplementation campaign prior to its launch. It shows that over half of households (50.7%) were informed about the campaign before it began, suggesting relatively good coverage of pre-campaign communication efforts. This indicates that a significant proportion of the target population was made aware of the importance of vitamin A supplementation before the initiative began, which is crucial for maximizing participation and campaign effectiveness. However, a significant proportion of households were not informed in advance, which could limit the campaign's impact on certain vulnerable populations.

Figure 17Households informed about the campaign before it begins

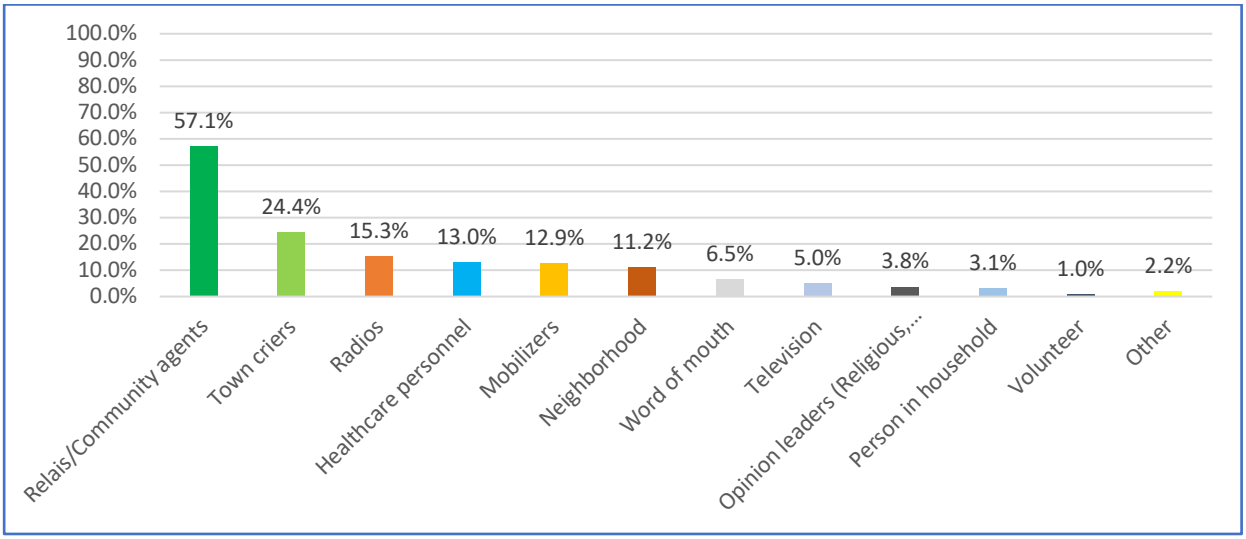


4.6.2. Households' main sources of information about the campaign

Figure 18 shows the main sources of information used to inform households about the vitamin A supplementation campaign. It shows that the majority of households (80%) were informed through community relays, underlining the importance of these local actors in disseminating information within communities. Town criers also played a key role, with 57.1% of households reporting having obtained information through this channel. Radio was a source of information for 15.3% of households, while television had a more limited impact, with only 5% of households reporting having used it as a source of information.

In addition, 10% of households said they had received information from their neighbors, and 13% from health workers. Finally, a significant proportion (6.5%) of households learned about the campaign by word-of-mouth. These results underline the diversity of information channels used, and show that traditional means of communication, such as community relays and town criers, play a predominant role in disseminating health messages.

Figure 18:Households' main sources of information about the campaign



4.6.3. Knowledge of vitamin A

The results of the survey show that a large majority of respondents (92.1%) are aware of the product of vitamin A supplementation, but a significant proportion remain ill-informed about the recommendations for its administration. In fact, 52.3% of respondents did not know when to administer the first dose, and 57.9% were unaware of the frequency of doses to be administered. These shortcomings underline the urgent need to improve awareness and education on good practices related to vitamin A supplementation.

The main sources of information on vitamin A are health personnel (76.1%) and community relays (24.4%). This highlights the central role of health personnel in disseminating this information, but also the importance of strengthening communication through other community channels. These results suggest that it is essential to fill existing gaps in the transmission of good practices relating to vitamin A supplementation, in particular by improving training and awareness-raising among the population, especially parents and guardians of children.

Table 22 Knowledge of vitamin A

		Set n	%	IC(95%)
Do you know this product?	No	207	7,9	[6,4-9,8]
	Yes	2.117	92,1	[90,2-93,6]
At what age should children receive their first dose?	Less than 6 months	585	24,9	[22,2-27,8]
	At 6 months	1025	47,7	[44,3-51,2]
	Over 6 months	249	11,2	[9,2-13,6]
	Don't know	451	15,8	[13,8-18,1]
	Other	14	0,4	[0,2-0,7]
Number of times this product is received A per year	1 time	249	10,1	[8,2-12,4]
	2 times	862	42,1	[38,6-45,6]
	3 times	485	20	[17,5-22,8]
	Don't know	614	23,1	[20,6-25,9]
	Other	114	4,7	[3,5-6,3]
Who / where did you learn about vitamin A?	Health agents	1778	76,1	[72,9-79,0]
	AC	432	23,4	[20,1-27,1]
	Radio/TV	146	5,4	[4,1-7,0]
	Other	313	12,7	[10,8-14,9]

4.6.4. Vitamin A knowledge index

❖ **Methodology for constructing the vitamin A knowledge index**

This index is based on three (3) questions:

- Do you know the benefits of vitamin A? (Helps eyesight, promotes growth, protects against disease/anemia, increases appetite). A score of 20 points is awarded to a respondent who cites one of the benefits of vitamin A, and 0 when no benefit of vitamin A is given by the respondent;
- At what age should children receive their first dose of vitamin A? (At 6 months corresponds to a correct answer and other represents the wrong answer). A score of 15 points is awarded for each correct answer and 0 for each incorrect answer;
- How many times a year should a child receive vitamin A? (2 times corresponds to the right answer and another to the wrong answer). A score of 15 points is awarded for each correct answer and 0 for each incorrect answer.

After calculation, the scores obtained are categorized into three (3) levels as follows:

- **Less than or equal to 50%:** Poor knowledge
- **Between 50 and 75%**: Average knowledge
- **Over 75%**: Good knowledge

❖ **Household vitamin A knowledge index**

Table 23 highlights the levels of knowledge of vitamin A among the children's mothers and guardians. Only 26.6% of respondents demonstrated a good knowledge of vitamin A, while 17.2% showed a low level of knowledge. More than half the mothers surveyed (56.2%) fell into the average knowledge category, suggesting a partial understanding of the product and its benefits.
These results underline the existence of a significant knowledge gap, indicating that there is an urgent need to step up awareness-raising and training efforts, particularly among mothers and guardians, to improve their understanding of vitamin A supplementation recommendations. Strengthening health education, for example through targeted awareness campaigns or additional training for health staff and community relays, could help reduce these gaps and thus improve the effectiveness of supplementation programs.
.

Table 23 Vitamin A awareness index (households)

		n	%	IC(95%)
Knowledge index	Less than 50% of sales	520	17,2	[15,2-19,4]
	Between 50% and 75%	1.287	56,2	[52,8-59,6]
	Over 75% of the total	517	26,6	[23,4-30,1]

4.7. Deworming coverage for children aged 12 to 59 months

4.7.1. Deworming coverage for children during the campaign

The July-August 2023 vitamin A supplementation (VAS) campaign dewormed 73.9% of children aged 12-59 months, with a confidence interval of [22.0-27.0]. This deworming coverage indicates strong participation in the campaign, although it is important to note the wide variation represented by the confidence interval, suggesting some heterogeneity in coverage according to regions or campaign implementation modalities. These results underline the importance of improving access and logistics for public health campaigns to ensure uniform coverage and reach all children eligible for these crucial interventions.

Table 24Coverage of dewormed children, December 2023

	n	%	95% CI
During the recent July-August 2024 campaign, did the child receive the dewormer			
No	648	24,4	[22,0-27,0]
Yes	2136	73,9	[71,2-76,3]
Don't know	70	1,7	[1,3-2,3]

4.7.2. Place where children received the dewormer during the campaign

In terms of where and by whom vitamin A was administered, the majority of children received supplementation at home (88.6%) (see Table 25). A much smaller proportion received supplementation at the health center (0.5%) or by a health worker (18.3%). As regards the administration of the dewormer, community relays or distributors played a predominant role, being responsible for administering the treatment in 64.9% of cases, according to information provided by mothers and guardians. These results show the strong involvement of community relays in the management of supplementation campaigns, highlighting their key role in reaching target populations, particularly in rural areas or those far from health centers.

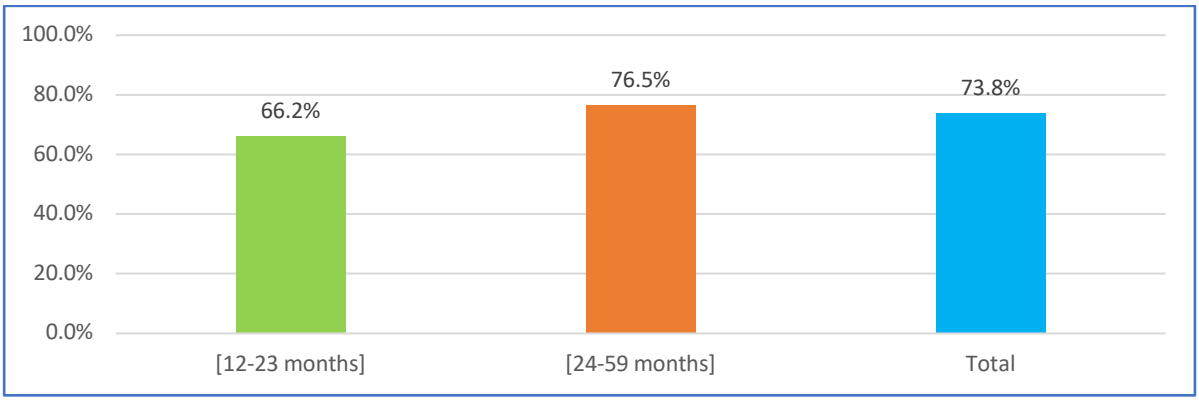
Table 25Place of receipt of dewormer

	n	%	95% CI
Where did the child receive the dewormer?			
At the health center	64	3,5	[2,6-4,7]
Community health workers (CHWs)	24	1	[0,6-1,8]
In the village	153	6,8	[5,3-8,6]
At home	1889	88,6	[86,4-90,4]
Other location outside the village/neighborhood	3	0,1	[0,0-0,2]
Don't know	1	0	[0,0-0,1]
Other	2	0,1	[0,0-0,2]
Who administered the dewormer to the child?			
Health agent	382	18,3	[16,0-20,8]
Community health agent	257	12,3	[9,9-15,3]
Parent/guardian	93	4,4	[3,3-5,7]
The child himself	2	0,1	[0,0-0,2]
Relay/Agent Distributor	1397	64,9	[61,5-68,2]
Don't know	3	0,1	[0,0-0,2]
Other	2	0	[0,0-0,2]

4.7.3. Dewormer uptake by age group during the campaign

Overall, deworming coverage is higher in children aged 24-59 months (76.5%) than in those aged 12-23 months (66.2%). This difference could be linked to factors such as accessibility to health services for older children, as well as greater awareness or particular priorities for older age groups during deworming campaigns.

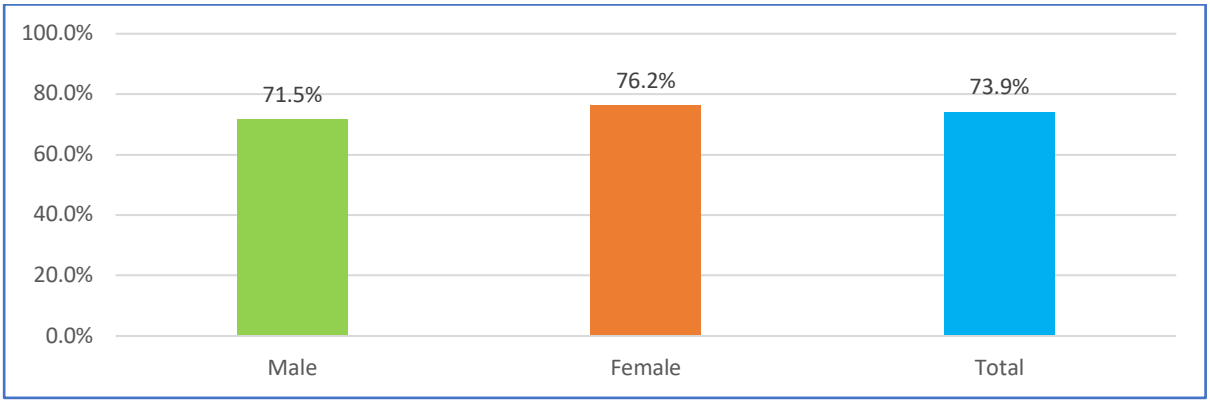
Figure 19 Coverage of dewormed children by age group



4.7.4. Receipt of dewormer by gender during the campaign

Deworming coverage by gender reveals a slight difference, with slightly higher coverage among girls (76.2%) than boys (71.5%). This variation could be linked to contextual or social factors influencing access to care, or to specific priorities for girls during health campaigns. However, this difference remains relatively small and needs to be confirmed by further analysis to identify the underlying causes.

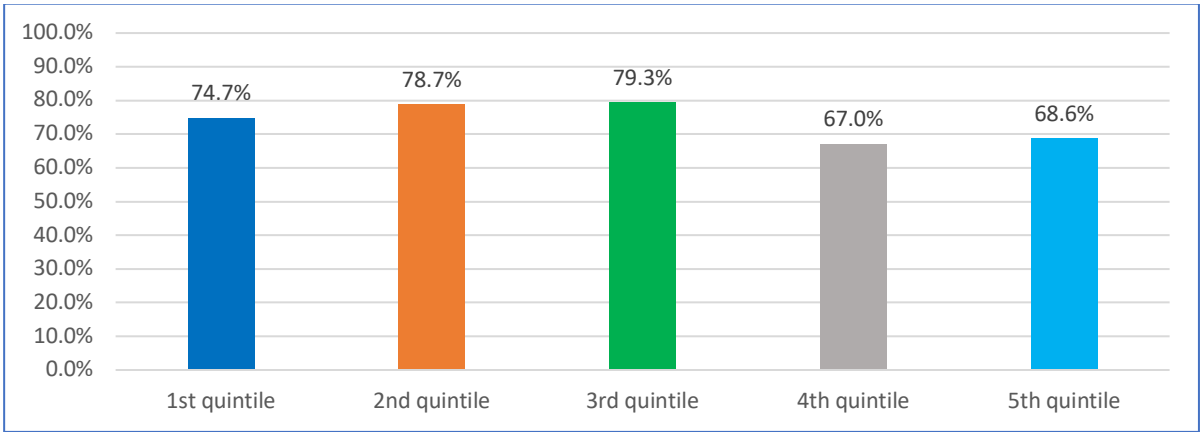
Figure 20Coverage of dewormed children by gender



4.7.5. Receipt of dewormer during the campaign by household wealth quintile

Analysis of deworming coverage data by household wealth quintile reveals an interesting trend. Children from households in the middle quintiles (2nd and 3rd quantiles) have higher rates of deworming. For example, in the 2nd quintile, the rate of deworming is notably higher than in the lowest quintile, where 74.7% of children benefited from deworming, compared with 68.6% in the highest quintile. This difference suggests that middle-class households may have better access to health services or benefit from more targeted awareness campaigns. However, the inverse trend between the lowest and highest wealth quintiles merits further exploration to better understand the factors influencing these results.

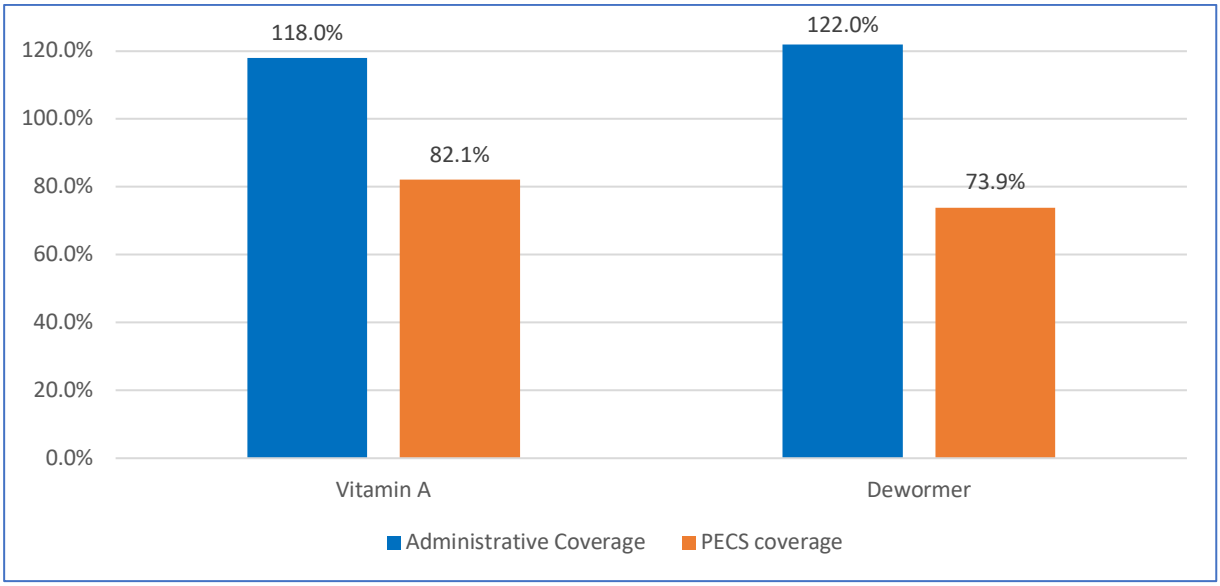
Figure 21Coverage of dewormed children by household wealth quintile



4.8. Comparison of administrative data with study data

The results reveal significant differences between administrative coverage and that observed in the PECS survey. Indeed, administrative coverage of vitamin A supplementation is higher than that obtained by the PECS survey, reaching a rate of 118% versus 82.1% for the PECS. Similarly, for deworming, administrative coverage is 122%, while coverage measured by PECS is around 74%. These discrepancies suggest that administrative data may include cases of supplementation or deworming not covered or reported with some excess, which could indicate an overestimation of administrative results. These differences underline the need to critically compare administrative data with those obtained in the field, in order to better assess the actual coverage of public health interventions.

Figure 22Comparison of PECS survey and administrative coverage levels



4.9. Factors influencing vitamin A supplementation in children

SIDEBAR: LOGISTIC MODEL, CALCULATION AND INTERPRETATION OF ODDS RATIOS (OR)

We want to explain the variable Y representing nutritional status. It is defined as follows:

$$Y_i = \begin{cases} 1 : si\ l'enfant\ a\ bénéficié\ de\ la\ SVA\ (ou\ du\ déparasitage) \\ 0 : si\ l'enfant\ n'a\ pas\ bénéficié\ de\ la\ SVA\ (ou\ du\ déparasitage) \end{cases}$$

The profile of children supplemented with vitamin A and deworming was analyzed using a logistic econometric model (Logit). The probability associated with the Chi-square statistic at a 5% risk was used to assess the overall significance of the model, and the probabilities associated with the Wald statistic at the 5% threshold for the individual significance of the explanatory variables.
The exogenous variables selected for the implementation of the logistic regression to detect the influential factors of vitamin A supplementation are the following:
Strata; Consultation location; Mother/guardian/guardian marital status; Mother/guardian/guardian school education level; Informed household; Vitamin A knowledge index; Wealth quintile; The main factors influencing children's supplementation are presented below.

Factors influencing vitamin A supplementation
Odds ratio analysis for vitamin A supplementation shows that higher knowledge is a key factor in access to the vitamin. People with average or good knowledge of vitamin A are significantly more likely to receive this supplementation. However, higher levels of education appear to have the opposite effect, as those with secondary or higher levels of education are less likely to receive

vitamin A, which could suggest that barriers to access or a lower priority given to this intervention exist among better-educated populations. In addition, prior information about the campaign plays a crucial role, with those who have been informed more than seven times more likely to participate in supplementation. Finally, the Ségou region stands out for a higher probability of receiving vitamin A, perhaps underlining regional efforts or better access to the campaign in this area.

Factors influencing dewormer supplementation

With regard to deworming, the results also show that greater knowledge is strongly associated with a greater likelihood of intake. However, unlike vitamin A, the effect of education seems more marked, with those with higher levels of education less likely to receive a dewormer, which could indicate differences in health behaviors or access to this treatment. Private health facilities and traditional practitioners are important negative factors: those who consult these alternatives have a much lower probability of taking a dewormer, which could reflect less access to treatments recommended by health authorities. Finally, as with vitamin A, prior information about the campaign greatly increases the probability of taking the dewormer, reinforcing the importance of communication in the success of these interventions.

Table 26 Odds ratios for variables in the econometric model

Variables	Vitamin A		Dewormer	
	ORaj	Pvalue	ORaj	Pvalue
Wealth quintile				
The lowest	1		1	
Second	1,408411	0,094	1,157313	0,309
Medium	1,110786	0,569	1,22768	0,138
Fourth	0,823125	0,274	0,798652	0,098
The highest	0,694545	0,043	1,013727	0,924
Knowledge index				
Little knowledge	1		1	
Average knowledge	1,781357	0	1,349741	0,003
Good knowledge	1,740038	0	1,463765	0,003
Marital status				
Married	1		1	
Widow	1,901133	0,441	1,323651	0,662
Divorced	0,947694	0,951	0,466563	0,287
Single	1,559666	0,432	1,387291	0,458
Education level				
Out of school	1		1	
Primary	0,783353	0,041	0,786481	0,01
Secondary	0,911658	0,63	0,715434	0,025
Superior	0,47407	0,006	0,468766	0,002
Professional	2,228945	0,141	0,561252	0,148
Place of medical care				
Public health training	1		1	
Private health training	0,357464	0	0,557285	0
Other	1,145729	0,815	1,885022	0,2
Traditional practitioner	0,312076	0,123	0,230006	0,01
Number of eligible children	0,832352	0,835535	0,003	0,832352
Region				
Kayes	1		1	
Koulikoro	0,853364	0,239	0,87917	0,216
Ségou	1,019309	0,908	1,695321	0
Informed of the campaign				
No	1		1	
Yes	7,612083	0	3,318541	0

5. RESULTS OF THE EVALUATION OF THE CAMPAIGN IMPLEMENTATION PROCESS

Tables 27 to 29 present the perceptions of regional players and health districts regarding the process of implementing the vitamin A supplementation campaign.

According to the survey results, the stakeholders involved generally expressed a positive assessment of coordination and collaboration throughout the campaign. Indeed, 78.3% of respondents gave coordination a score of at least 8 out of 10, indicating satisfactory management and good collaboration between stakeholders. Of these respondents, 37.2% gave a score of 8, 25.6% gave a score of 9, and 15.5% judged collaboration to be optimal, awarding the maximum score of 10 out of 10. These results suggest that, overall, regional and health district stakeholders perceive the campaign as having been well coordinated.

In addition, the majority of players (90%) emphasized the existence of effective mechanisms for monitoring and feedback throughout and after the campaign. Among these mechanisms, regular meetings and dedicated telephone lines were cited as key tools for monitoring the campaign, synthesizing data and resolving problems encountered in the field. Some 52.1% of respondents mentioned difficulties encountered, reflecting an active and responsive management process. This indicates a well-managed campaign, with fluid communication and tools adapted to meet the logistical and operational challenges encountered.

Table 27 Evaluation of the implementation process of the vitamin A supplementation campaign

		n	%
How would you rate the coordination and collaboration between the various players involved in the vitamin A supplementation campaign?	5	9	7
	6	1	0,8
	7	18	14
	8	48	37,2
	9	33	25,6
	10	20	15,5
Have effective mechanisms been put in place to enable you to provide feedback during and after the campaign?	Yes	117	90,7
	No	11	8,5
	Don't know	1	0,8
What is the planned feedback mechanism?	WhatsApp group	17	14,5
	Dedicated telephone line	31	26,5
	Dedicated e-mail addresses	1	0,9
	Regular meetings	30	25,6
	Suggestion box	1	0,9
	Facebook Group/Page	1	0,9
	Dedicated people at the health centers to collect observations.	23	19,7
	Form/questionnaire to be completed by health centers	4	3,4
	Other	9	7,7

Table 28 shows the perceptions of regional and health district players regarding social mobilization during the vitamin A supplementation campaign. On a scale of 0 to 10, where 10 represents optimal mobilization and 0 minimal mobilization, some 72.1% of respondents evaluated this mobilization positively, giving a score of at least 8 out of 10. More specifically, 36.6% of stakeholders gave a score of 8, 17.8% gave a score of 9, and 21.7% judged social mobilization to be optimal, giving the maximum score of 10 out of 10. These results suggest that the majority of stakeholders perceived social mobilization as effective and well executed.

However, 20.1% of respondents felt that social mobilization was insufficient, giving scores of 5 or 6 out of 10. This group of respondents highlights certain sticking points in the mobilization process, suggesting that improvements are needed to strengthen participation and community involvement. These results indicate that there are still aspects to be improved to optimize the effectiveness of social mobilization in future campaigns, particularly in terms of coverage, communication and mobilization of local players.

Table 28 Assessment of social mobilization during the vitamin A supplementation campaign

	n	%
How would you assess social mobilization during the last campaign?		
4	2	1,6
5	8	6,2
6	7	5,4
7	19	14,7
8	42	32,6
9	23	17,8
10	28	21,7

Table 29 presents the results relating to the mobilization of financial, human and logistical resources during the vitamin A supplementation campaign, according to the perceptions of regional and health district players. On a scale of 0 to 10, where 10 represents optimum mobilization of resources and 0 insufficient mobilization, some 66.7% of players felt that the resources mobilized were insufficient. More specifically, almost 64.3% of respondents gave relatively low scores (5, 6 or 7 out of 10), indicating a general perception of sub-optimal resource mobilization.
The main shortcomings identified by the players mainly concerned the number of distributors available, reported by 44.2% of respondents, and the lack of time allocated to the activity (19.8%). In addition, around 12.8% of players mentioned a shortage of vitamin A capsules, a factor which contributed to limiting the campaign's effectiveness. These results underline the need to strengthen resource planning and management in future campaigns, particularly in terms of personnel, time and supplies, in order to improve the impact and coverage of supplementation.

Table 29 Assessment of resources mobilized for the vitamin A supplementation campaign

	n	%
Were the resources provided (financial, human, logistical) satisfactory?		
Yes	42	32,6
No	86	66,7
Don't know	1	0,8
How would you evaluate the resources of the last campaign?		
0,5	1	1,2
2	1	1,2
3	2	2,3
4	13	15,1
5	22	25,7
6	18	21
7	16	18,6
8	7	8,1
9	2	2,3
10	2	2,3
Insufficient	1	1,2
Insufficient human resources	1	1,2
What resources do you feel have been insufficient?		
Not enough paid time to do the job	17	19,8
Not enough distributors	38	44,2
Not enough mobilizers	4	4,7
Not enough supervisors	1	1,2
Not enough vitamin A capsules	11	12,8

Not enough equipment	8	9,3
Other	7	8,1

6. RESULTS OF SURVEY OF HEALTHCARE PROFESSIONALS

This section presents the overall results of the survey of health workers, aimed at assessing their role, perceptions and involvement in the vitamin A supplementation campaign and community health activities. The survey targeted different types of agents, mainly community health workers, nurses, midwives and doctors.

6.1. Respondent's socio-demographic profile

Table 30 presents a detailed analysis of the socio-demographic profile of healthcare workers, with a focus on gender and professional experience. Among the healthcare workers surveyed, a large majority were men, representing 88% of the sample, while women made up 12%. In terms of specialization, the majority were nursing assistants (32.4%) and senior health technicians (30.7%). In terms of professional experience, more than half the agents (52.8%) had over ten years' experience, indicating a high degree of stability and expertise in the field. Agents with between 6 and 10 years' experience represented 27.8% of the sample, while those with less than 6 years' experience made up a smaller proportion. This distribution shows a preponderance of experienced agents, but also a significant presence of young professionals or those at the start of their careers in the healthcare teams.

Table 30 Socio-demographic profile of health agents

	n	%
Gender		
Male	95	88
Female	13	12
What is your role in health training?		
Nurse	10	9,3
Orderly	4	3,7
Doctor	35	32,4
EPI agent	2	1,9
Midwife	4	3,7
Senior health technician	27	25
Health technician	14	13
Obstetric Nurse	2	1,9
Medical Assistant	4	3,7
Other	6	5,6
How long have you been a health agent?		
1 to 5 years	21	19,4
6 to 10 years	30	27,8
Over 10 years	57	52,8

6.2. Supply chain

Table 31 shows the results of the survey on the availability of delivery notes for inputs during the vitamin A supplementation campaign in health facilities. The results show that around 84.2% of health center managers did not receive any delivery slips during the campaign. On the other hand, these slips were mainly kept at the level of the prefectural health directorates or health districts. This situation suggests a disconnect between the different levels of management, which could have implications for the transparency, monitoring and management of input stocks during the campaign.

Table 31 Existence of delivery notes during the VAS campaign

	n	%
Do you have the delivery note?		
No	40	37
Yes, given	17	15,7
Yes, not seen	51	47,2

Table 32 presents the results of the survey on the frequency of receipt of vitamin A stocks, as reported by health workers. According to the results, more than six out of ten health workers (62%) reported receiving vitamin A stocks twice a year, while around 15% of workers reported receiving these stocks only once a year. These data underline a certain regularity in the distribution of stocks, although the frequency of deliveries seems insufficient to guarantee continuous and optimal coverage, which could pose challenges in terms of the constant availability of inputs in health facilities.

Table 32Frequency of receipt of vitamin A stocks

How often do you receive your vitamin A supply?	n	%
How often do you receive your vitamin A supply?		
Once a year	16	14,8
Twice a year	67	62
More than 3 times a year	14	13
Other	11	10,2

Table 33 shows the frequency with which vitamin A stocks were received, and the supply problems encountered during the supplementation campaign. According to the results, 23.1% of health workers reported supply problems during the campaign. These difficulties may have hampered the effective implementation of the campaign, potentially affecting coverage and access to supplementation for some children. These supply problems underline the need to improve logistics management and the regularity of deliveries to ensure the continued availability of essential inputs in future campaigns.

Table 33Supply problems during the VAS campaign

		n	%
Were there any vitamin A supply problems during the event?	No	83	76,9
	Yes	25	23,1

Table 34 shows the main challenges associated with input supply during the vitamin A supplementation campaign. According to the results, the major difficulties mainly concerned input transport problems (96%) and delays in supply (96%). Despite these logistical obstacles, health workers reported that these problems had been fully or partially resolved in all cases, suggesting a degree of flexibility and responsiveness in the management of the campaign. However, these challenges underline the importance of improving transport and planning processes to avoid future delays and ensure smoother distribution of inputs, particularly in areas that are more difficult to access.

Table 34Main supply-related challenges during the VAS campaign

	n	%
If so, what were the challenges?		
Out of stock		
Yes	1	4
No	24	96
Easier transportation		
Yes	24	96
No	1	4
Supply delays		
Yes	24	96
No	1	4
Facilitating supervision		
No	25	100

6.3. Health worker satisfaction

Table 35 shows beneficiaries' satisfaction with the training they received during the vitamin A supplementation campaign. Overall, 95.4% of health workers were satisfied with the training. Of these, 41.7% were very satisfied, while 55.3% were satisfied. However, a minority of 2.9% expressed dissatisfaction. The main reasons cited for this dissatisfaction included the insufficient duration of the training, cited by 20% of agents, and the perception that the training was too short (20%). In addition, more than half of the dissatisfied agents (57.1%) indicated that they had not benefited from the training, which could partly explain their dissatisfaction. These results suggest that, although the majority of health agents were satisfied with the training they received, there is still room for improvement, particularly in terms of duration and access to training for all agents involved.

Table 35 Health workers' satisfaction with VAS training

	n	%
Were you satisfied with the training you received?		
No	5	4,6
Yes	103	95,4
If so, how satisfied were you with the training?		
Very satisfied	43	41,7
Satisfied	57	55,3
Not very satisfied	3	2,9
If not, what went wrong with the training?		
Training too short	1	20
Insufficient number of training days	1	20
Other	3	60

Table 36 presents the results of the survey on health workers' satisfaction with their supervision during the vitamin A supplementation campaign. It shows that the vast majority of health workers (97.2%) felt they had received adequate supervision and support during the campaign. What's more, 98.1% of agents said they felt recognized and appreciated for their role. These results indicate a high level of satisfaction with the support received throughout the campaign.
In terms of their commitment to future campaigns, all health workers (100%) expressed their

willingness to participate in new vitamin A supplementation initiatives. This underlines their continuing motivation and interest in these activities.
Feedback mechanisms were also deemed effective by the majority of agents, with 91.7% confirming that devices had been put in place to enable smooth communication during the campaign. The most frequently used feedback channels included dedicated phone lines (30.3%), regular meetings (26.3%) and WhatsApp groups (18.2%). These tools facilitated the exchange of information and the rapid resolution of problems, thus contributing to the efficient management of the campaign.
All in all, these results testify to a high level of overall satisfaction among healthcare workers, although a minority suggested that there might still be room for improvement in support and communication mechanisms.

Table 36Health workers' satisfaction with their supervision during the VAS campaign

	n	%
Did you feel sufficiently guided and supported during the campaign?		
No	3	2,8
Yes	105	97,2
Do you feel recognized and appreciated for your supervisory role?		
No	2	1,9
Yes	106	98,1
Would you like to participate in future vitamin A supplementation campaigns?		
Yes	108	100
Have effective mechanisms been put in place to provide you with the information you need?		
No	9	8,3
Yes	99	91,7
If so, what feedback mechanism has been put in place?		
WhatsApp group	18	18,2
Dedicated telephone line	30	30,3
Dedicated e-mail address	1	1
Regular meetings	26	26,3
Suggestion box	1	1
Dedicated people at the health centers to collect observations/results.	14	14,1
Form/questionnaire to be completed by health centers	2	2
Other	7	7,1

7. RESULTS OF THE COMMUNITY RELAY SURVEY (RECO)

This section presents the results of a survey of community relays (RECOs) involved in the vitamin A supplementation campaign. Community relays play a key role in raising awareness and distributing supplements, as well as in monitoring target children. The following results illustrate their profiles, tasks and evaluation of the campaign.

7.1. Respondent's socio-demographic profile

Table 37 shows the breakdown of community relays (RECOs) surveyed by gender, level of education and professional experience. In terms of gender, the majority of community relays were men (67%), while 33% were women.

In terms of level of education, a significant proportion of community relays have completed primary school (33.9%), followed by those who have completed secondary school (22%) and secondary 1 (17.4%). This shows that, although RECOs' level of education is relatively modest, a significant proportion of them have sufficient knowledge to carry out their missions effectively.

In terms of professional experience, more than half the community relays (54.2%) indicated that they had between 6 and 20 years' experience in the community field. This substantial experience suggests a good command of awareness-raising, mobilization and distribution practices, reinforcing their ability to carry out their tasks within the vitamin A supplementation campaign.

Table 37 Socio-demographic characteristics of the Community Relays surveyed

	n	%
Gender		
Male	73	67
Female	36	33
What is your level of education		
Out of school	20	18,3
Primary	37	33,9
Secondary 1st cycle	19	17,4
Secondary Cycle 2	24	22
Superior	6	5,5
Professional	3	2,8
How long have you been a relay/distributor?		
1 to 5 years	35	32,1
6 to 10 years	26	23,9
11 to 20 years	33	30,3
Over 20 years	15	13,8

Table 38 presents the results concerning the length of time community relays (RECOs) participated in the vitamin A supplementation campaign in their village. The results show that almost 35% of community relays reported participating in the campaign for 4 days. This represents the majority of participants who contributed significantly to the activity, although a slightly lower proportion, 32.1%, reported participating for 5 days.

This suggests that most community relays were involved in the campaign for a relatively short period, but sufficient to ensure adequate coverage and effective distribution of vitamin A supplements. These results could reflect deployment strategies adapted to local constraints, allowing flexible management of human resources while maintaining the campaign's effectiveness.

Table 38 Number of days CHWs participated in the vitamin A supplementation campaign

	n	%
For how many days did you take part in the campaign in your village?		
0	1	0,9
1	8	7,3
2	15	13,8
3	10	9,2
4	38	34,9
5	35	32,1
6	2	1,8

7.2. Provider satisfaction Community health workers

Table 39 presents the results of the survey on community health workers' (CHWs) satisfaction with the training they received as part of the vitamin A supplementation campaign. The results show that 92.7% of CHWs were satisfied with the training provided. Of these satisfied agents, 57.4% expressed a high level of satisfaction, while 40.6% were simply satisfied.

These results show an overall positive assessment of the training received by CHWs, which may indicate adequate preparation and a favorable perception of the campaign by community health workers. However, a minority (around 7.3%) of CHWs expressed no satisfaction, which could suggest areas for improvement for future training courses, such as duration, content or teaching methodology.

Table 39Satisfaction of CHWs with training on vitamin A supplementation

	n	%
Were you satisfied with the training you received?		
No	8	7,3
Yes	101	92,7
If so, how satisfied were you with the training?		
Very satisfied	41	40,6
Satisfied	58	57,4
Not very satisfied	2	2
If not, what went wrong with the training?		
Training not reenumerated	2	25
Other	6	75

Table 40 presents the results of the survey on the satisfaction of community relays (Reco) with their supervision during the vitamin A supplementation campaign. The results show that 91.7% of community relays felt sufficiently supervised and supported during the campaign. What's more, a large majority (96.3%) of relays said they felt recognized and appreciated for their role in the campaign, reflecting a positive valuation of their work.
Almost all community relays (99.1%) expressed a desire to participate in future vitamin A supplementation campaigns, indicating a strong commitment to public health initiatives.
With regard to feedback mechanisms, 76.1% of relays indicated that effective mechanisms had been put in place to ensure communication and follow-up during the campaign. Dedicated telephone lines were identified as the most frequently used feedback mechanisms, with 37.3% of community relays having used them to exchange information and resolve any problems during the campaign.

Table 40 Satisfaction of CHWs with their supervision during the vitamin A supplementation campaign

	n	%
Did you feel sufficiently guided and supported during the campaign?		
No	9	8,3

Yes	100	91,7
Do you feel recognized and appreciated for your role as a health agent?		
No	4	3,7
Yes	105	96,3
Would you like to participate in future vitamin A supplementation campaigns?		
No	1	0,9
Yes	108	99,1
Have effective mechanisms been put in place to enable you to provide feedback during and after the campaign?		
No	25	22,9
Yes	83	76,1
Don't know	1	0,9
If so, what feedback mechanism has been put in place?		
WhatsApp group	4	4,8
Dedicated telephone line	31	37,3
Dedicated e-mail address	1	1,2
Regular meetings	11	13,3
Dedicated people at the health centers to collect observations/results.	16	19,3
Form/questionnaire to be completed by health centers	4	4,8
Other	16	19,3

8. DISCUSSION OF QUALITATIVE SURVEY RESULTS

This part of the report presents an analysis of the results of focus groups carried out to assess perceptions, knowledge and challenges related to vitamin A supplementation. Participants were divided into four categories: mothers aged 15 to 35, mothers over 35, caregivers and fathers, with a total of 58 focus groups spread over 28 focus group districts 19 for caregivers 17 for fathers, 10 for younger mothers and 12 for older mothers.

Discussions were conducted around several key questions: knowledge of the benefits of vitamin A, available means of administration, communication channels used to raise awareness, barriers encountered in accessing supplementation, and recommendations for improving its effectiveness. The questions also sought to explore the impact of these factors on the implementation of vitamin A supplementation programs, by examining participants' perceptions of how supplementation could be improved in their communities.

8.1. Discussion with stakeholders and health workers on VAS activities

Analysis of discussions with stakeholders and health workers on vitamin A supplementation (VAS) activities revealed generally positive perceptions of the impact of supplementation on children's health, but also highlighted several challenges to be overcome to improve access and effectiveness of these programs.

Knowledge and perception of vitamin A: health workers, whether caregivers or community relays, all stressed the crucial importance of vitamin A for children's health. It is seen as an essential means of preventing twilight blindness, strengthening the immune system, promoting growth and combating malnutrition. Health workers, in particular, mentioned that vitamin A is administered as early as 6 months and needs to be renewed every 6 months up to 5 years of age. This perception is widely shared by health workers, who consider vitamin A to be an effective remedy against various childhood illnesses.

Communication and awareness channels: the preferred communication channels for vitamin A awareness vary slightly between groups, but overall, health workers and community relays play a fundamental role in transmitting information. Mothers, in particular, appreciate messages broadcast on the radio and direct interaction with health workers during supplementation campaigns. Discussions also showed that information is often shared during educational talks.

Challenges faced by health workers: one of the major problems identified by health workers and caregivers is the lack of personnel and logistical difficulties associated with vitamin A distribution, notably the distance between villages and health centers, as well as the frequent stock-outs of inputs. Health workers also pointed out that the limited number of distribution teams and the distance to villages make it difficult to cover the entire target population, especially in remote areas. Health workers also stressed the importance of having more and better-trained teams to cope with demand.

Access Issues and Recommendations: Some caregivers suggested reinforcing vitamin A stocks, raising awareness via radio and increasing the duration of campaigns to enable wider coverage. In addition, the idea of routinizing supplementation, i.e. making vitamin A available on a permanent basis, was widely supported by health workers and community relays, who felt that this approach would reduce the difficulties associated with organizing one-off campaigns.

Collaboration between health agents and community relays: Overall, collaboration between health agents and community relays was judged to be very positive. Community relays, in particular, are seen as key players in raising awareness and distributing vitamin A at home. However, some caregivers pointed out that the lack of motivation among distributors and the small number of field teams can sometimes hamper the smooth running of campaigns.

Conclusion: Analysis of discussions with health workers and stakeholders on vitamin A supplementation (VAS) activities reveals generally positive perceptions of the impact of supplementation on children's health. However, a number of challenges need to be overcome to improve access and effectiveness.

Health actors and agents unanimously recognize the crucial importance of vitamin A in preventing twilight blindness, strengthening the immune system, promoting growth and combating malnutrition. Vitamin A is seen as an effective remedy for a range of childhood illnesses, administered from the age of 6 months and repeated every 6 months for up to 5 years.

Preferred communication channels for vitamin A awareness vary, but health workers and community relays play a fundamental role. Mothers particularly appreciate radio messages and direct interaction during supplementation campaigns.

The main challenges identified include insufficient distribution staff to cover all villages, logistical difficulties, the distance between villages and health centers, and frequent stock-outs. The limited number of distribution teams and the distances involved make it difficult to cover the entire target population, especially in remote areas.

To improve access, it is recommended to reinforce vitamin A stocks, intensify awareness-raising via radio, and extend the duration of campaigns. Routinization of supplementation, making vitamin A permanently available, is widely supported to reduce organizational difficulties.

Finally, collaboration between health workers and community relays is considered to be very positive, although the lack of motivation among distributors and the small number of field teams can sometimes hamper campaigns.

8.2. Focus groups with mothers

Analysis of focus group discussions with mothers on vitamin A supplementation (VAS) highlights generally positive perceptions of this practice, although several challenges and needs for improvement were identified.

Knowledge and perception of vitamin A: the majority of mothers, particularly those aged between 15 and 35 and those over 35, recognize the importance of vitamin A for their children's health. They know that it helps prevent twilight blindness, combats malnutrition and improves growth. Discussions reveal that vitamin A is perceived as beneficial not only for children, but also for mothers, who emphasize its positive effects on overall health. The majority of mothers say that health workers, community relays and the media (radio and television) are their main sources of information. However, some mothers mentioned misconceptions, such as the erroneous association of vitamin A with family planning practices, suggesting a confusion to be sorted out at community communication level.

Administration practices and frequency of supplementation: mothers report that they administer vitamin A to their children from 6 months, as recommended, and continue supplementation every 6 months, in line with public health guidelines. Many particularly appreciate the fact that health workers come to their homes to provide vitamin A during supplementation campaigns. This improves accessibility and coverage in remote areas. Nevertheless, some mothers have reported difficulties with the organization of campaigns, such as stock-outs after campaigns and waiting times at health centers, which hamper the effectiveness of the program.

Communication and awareness channels: the preferred communication channels for mothers are direct interaction with health workers and community relays, followed by radio and television. Most mothers particularly appreciate direct communication with health workers, whom they consider accessible and informed. However, there was a strong need to strengthen communication, especially with regard to reminders for supplementation. Some mothers suggested using cell phones to send reminders (via SMS or calls) to improve participation in campaigns, particularly in areas where access to information is limited. It was also suggested to use town criers or to

communicate via community groups (such as WhatsApp groups) to enhance local information dissemination.

Challenges and obstacles encountered: among the challenges mentioned by mothers, one of the main ones remains access to distribution points. In some villages, the distance between mothers' homes and the health center is a major obstacle. Some mothers have expressed frustration at the long distances they have to travel to receive vitamin A, especially when stock-outs occur. This prompts calls for alternative solutions, such as continuous availability of vitamin A via community relays, or more frequent door-to-door distribution.
Another reported obstacle concerns the lack of vitamin A stocks after the campaigns. Mothers report that stocks are often insufficient to meet demand, leading to frustration and reduced confidence in the program. In addition, some mothers pointed out that information on the start dates of supplementation campaigns is sometimes poorly communicated, leading to a lack of preparedness among families. This suggests that better planning and more precise communication of campaign dates would be beneficial.
.
Mothers' recommendations: to improve the effectiveness of vitamin A supplementation programs, mothers made a number of recommendations. One of the key proposals was to strengthen the presence of health workers and community relays in villages, particularly for door-to-door distribution. They also stressed the need to ensure the continuous availability of vitamin A in communities, and not just during one-off campaigns. Many mothers suggested making the supplementation program more "routinized" and accessible on a regular basis to ensure constant access to vitamin A. Finally, several mothers expressed a greater need for community awareness-raising, particularly through radio and outreach campaigns, to better prepare and inform families about the importance and frequency of vitamin A supplementation.

Conclusion: Analysis of focus group discussions with mothers on vitamin A supplementation (VAS) reveals generally positive perceptions, despite certain challenges and needs for improvement. Mothers, particularly those aged between 15 and 35 and those over 35, recognize the importance of vitamin A for child and maternal health, although there are challenges to be overcome. They generally administer vitamin A in line with recommendations, but encounter difficulties in organizing campaigns, such as stock-outs and waiting times.

Preferred communication channels include direct interaction with health workers and community relays, as well as the media. However, there is a need to strengthen communication, notably through reminders via cell phones and community groups. The main challenges identified are access to distribution points and the lack of stock after campaigns, which reduces confidence in the program.

To improve the effectiveness of VAS programs, the mothers recommend strengthening the presence of health workers and community relays, ensuring the continuous availability of vitamin A, and increasing community awareness through various means of communication.

8.3. Focus groups with fathers

Analysis of focus group discussions with fathers on vitamin A supplementation (VAS) highlights perceptions similar to those of mothers, but also notable differences in fathers' priorities and expectations regarding communication and accessibility of services.

Knowledge and Perception of Vitamin A: fathers, like mothers, widely recognize the importance of vitamin A for children's health, particularly in preventing twilight blindness and supporting children's overall growth and development. They also emphasize its role in strengthening the immune system and preventing disease. However, it appears that fathers' knowledge is slightly less detailed in terms of potential side effects or sources of vitamin A, compared to mothers. Fathers mainly associate supplementation with combating malnutrition and preventing vision disorders such as twilight blindness. This knowledge, while correct, is sometimes more limited to the immediate

and visible consequences (such as eyesight), without understanding in depth all the benefits of vitamin A on child health.

Administration practices and frequency of supplementation: fathers understand that vitamin A should be administered as early as 6 months and at 6-monthly intervals thereafter, in line with health authority recommendations. However, some fathers mention confusion over the exact age of the first dose, with some feeling that it could start later (18 months or 2 years), suggesting a lack of clarity over recommendations for the optimal age for supplementation. In terms of administrative practices, there were no major discrepancies with mothers: the majority of fathers maintained that children receive vitamin A during supplementation campaigns or in health facilities, often as part of other interventions such as vaccination.

Communication and awareness channels: fathers express a marked preference for information disseminated by health workers and community relays, as they consider these sources to be reliable and direct. Fathers are also open to the use of radio as a communication channel, especially in areas where other means of communication are less accessible. However, a notable point is the suggestion by some fathers that village chiefs or local authorities should be more involved in disseminating information, via town criers or awareness-raising meetings. This reflects a need to anchor health messages in a more formal and structured framework, where fathers, often perceived as heads of household, can play an active role in community mobilization and education.

Challenges and obstacles encountered: the main obstacles encountered by fathers concern the logistics and organization of supplementation campaigns. Among the difficulties reported, the distance between homes and health centers is a recurring problem. Many fathers expressed the wish that vitamin A supplementation be made more accessible at community level, particularly in rural and remote areas. Difficult access to distribution points, often due to remoteness, is seen as a major obstacle to effective supplementation coverage.

Fathers also point to shortcomings in the planning of supplementation campaigns, notably the lack of prior information on the dates of vitamin A distribution. This leads to confusion and, in some cases, low family participation. Finally, the recurrent problem of vitamin A stock-outs after campaigns is also mentioned, undermining the continuity of the program and the confidence of communities in its implementation.

Fathers' recommendations: the fathers make a number of recommendations designed to improve the effectiveness of the supplementation program. Firstly, they call for better organization of campaigns, in particular by making vitamin A distribution more regular and accessible. This could include door-to-door distribution initiatives or more frequent localized campaigns to get around the problem of long distances. In addition, some fathers suggest that information on campaigns should be communicated earlier and more clearly, notably through village chiefs or community channels such as local radio.

Some fathers also suggested that social networks, such as WhatsApp groups within communities, could be used to improve information dissemination and campaign coordination. This idea reflects a willingness to exploit modern technologies to fill gaps in communication and supplementation management.

Conclusion: Analysis of focus group discussions with fathers on vitamin A supplementation reveals perceptions similar to those of mothers, but also notable differences in priorities and expectations. Fathers recognize the importance of vitamin A for children's health, particularly in preventing twilight blindness and supporting overall development. However, their knowledge of potential side effects and sources of vitamin A is less detailed than that of mothers.

In terms of administration practices, fathers generally understand the recommendations, although some are confused about the age of the first dose. They prefer to receive information

via health workers and community relays, and suggest that village chiefs should be more involved in disseminating information.

The main challenges encountered by fathers include distance from health centers and lack of prior information on supplementation campaigns. They recommend better organization of campaigns, clearer communication and the use of social networks to improve information dissemination.

8.4. Synthesis of focus group results among the various players

A synthetic comparative analysis of the results of focus groups with **mothers**, **fathers** and **health workers** on vitamin A supplementation (VAS) reveals several common points, but also notable differences in perceptions, practices and challenges related to this public health program.

- **Knowledge and perceptions of vitamin A:** All stakeholders, whether mothers, fathers or health workers, recognize the importance of vitamin A for children's health, particularly in preventing twilight blindness, strengthening the immune system and combating malnutrition. However, mothers seem to have a more detailed knowledge of the multiple benefits of vitamin A, particularly on child growth and nutrition. They are also better informed about communication channels and the right times to administer vitamin A. Fathers, while sharing similar perceptions on the prevention of blindness and childhood diseases, remain less informed on other benefits such as improved growth or reduced infant mortality. Health workers, for their part, have a more precise and detailed technical knowledge, but their role is mainly focused on administration and awareness-raising within communities.

- **Communication and awareness channels:** All groups emphasize the importance of **health workers** as the main sources of information on vitamin A supplementation, particularly for mothers and fathers. However, **mothers** also favor **radio** and **community relays** as communication channels, as these media enable information to be disseminated more widely and repeatedly. **Fathers** also make extensive use of radio, but also propose more community-based solutions, such as involving **village chiefs** or using **WhatsApp groups** to strengthen communication. **Health workers**, for their part, mainly consider **community meetings**, **talks** and **community relays** as means of disseminating information. They also stress the importance of awareness campaigns during vaccination sessions.

- **Administration practices and frequency:** In terms of **administration practices**, all three groups agreed that the first dose of vitamin A should be given as early as 6 months, with booster doses every 6 months. However, there are discrepancies in the application of these recommendations: **fathers** are more confused about the age of administration, with some suggesting that vitamin A could be started later (18 months or 2 years). **Mothers**, on the other hand, are more informed and aligned with the recommended schedule for supplementation. **Health workers** rigorously follow this schedule and ensure distribution during campaigns or vaccination sessions. However, a common challenge for all players remains the management of **logistics**, notably the accessibility of health centers, vitamin A **stock-outs** and the **distance** that families have to travel, particularly **fathers** and **mothers** in rural areas.

- **Challenges and obstacles encountered :** All three groups identify **logistical obstacles** as the main challenges. **Mothers** report a lack of vitamin A availability in some health centers, as well as frequent **stock-outs** after campaigns. They also expressed difficulties linked to the remoteness of **community health centers**. **Fathers**, for their part, point out that long distances are an obstacle to accessing services, and also mention a **lack of** clear

communication on campaign start dates. **Health workers**, while recognizing the importance of awareness-raising, point to **staff shortages** and vitamin A **supply problems**, exacerbated by a lack of preparedness to cope with demand, especially during mass campaigns.

- **Recommendations for improving VAS**: **Mothers** and **fathers** share recommendations for improving the accessibility and regularity of supplementation campaigns, with a frequent request for **door-to-door distribution** and **an increase in the number of distribution points** in rural communities. They also suggest **better communication**, notably by telephone or via community relays, to better inform families of the dates and importance of supplementation. **Health workers**, for their part, recommend **increasing vitamin A stocks** and **strengthening distribution teams**. They also stress the importance of **training community relays** and **multiplying awareness-raising channels**, notably through television and radio.

- **Conclusion**: Comparative analysis of the discussions shows that, although all players are broadly aligned on the importance of vitamin A, **mothers** and **fathers** express specific needs in terms of **communication** and **logistics**, while **health workers** focus mainly on the operational aspect and distribution management. Mothers and fathers, involved in daily care, seem to have a better knowledge of the benefits of supplementation and its practices, but encounter obstacles linked to accessibility. Fathers, often less involved in the details of supplementation, prefer practical solutions to improve access to services. All groups agree on the need to improve the organization of campaigns and intensify **community awareness** to make vitamin A supplementation more effective and accessible.

9. DISCUSSION OF SURVEY RESULTS

The aim of the study was to assess post-campaign coverage of vitamin A supplementation coupled with deworming and health and nutrition interventions for children aged 6 to 59 months and women of childbearing age in the Kayes, Koulikoro and Ségou regions,

9.1. Administration of campaign coverage and non-administration of VAS

The results of the survey indicate that vitamin A supplementation and deworming were received by 82.13% and 73.86% of children aged 6 to 59 months respectively. These figures are lower than those found in the December 2023-January 2024 PECS survey, which can be explained by several factors, notably a lower level of information about the campaign, and very little communication about the campaign on the part of health workers,

A small percentage of children were not supplemented, with proportions ranging from 13.28% in Kayes to 19.95% in Koulikoro. The reasons given for these cases included: lack of information, absence of the child when the distributors passed by, failure to pass by the distributors, shortages of inputs, etc. These results underline the need to reinforce strategies in order to achieve more complete coverage,

9.2. Discussion of the communication strategy used during the VAS campaign and households' level of awareness of VAS

The communication strategy for the vitamin A supplementation and deworming campaign shows a variable level of information among households,

In all, 48% of households claim to have received information from the campaign,

Radio remains the main channel of information, particularly in Kayes (25%) and Ségou (24%), while in Koulikoro its impact is less (9%). This shows that greater emphasis needs to be placed on the media as an awareness-raising channel in order to improve supplementation results,

Health workers play a limited role in communication, cited by only 10% of households in total, which could mean a communication gap between health workers and communities. It is therefore crucial to build the capacity of health workers in communication strategy to improve coverage of supplementation and deworming,

With regard to the level of knowledge about vitamin A in the Kayes and Ségou regions, around 60% of households have little knowledge of these products. In contrast, Koulikoro stands out with a percentage of 38% of households with **good knowledge**, in view of these results, it is relevant and necessary to reinforce awareness of the benefits of vitamin A in the Kayes and Ségou regions,

9.3. The main reasons why vitamin A and deworming are not administered

The main reasons given by respondents for not taking vitamin A include :

- Lack of information: A significant proportion of respondents, notably 42% in Kayes, 50% in Koulikoro and 48% in Ségou, said they had not been informed about the campaign, which means that information is of paramount importance for greater supplementation coverage,

- Refusal: Cases of refusal of supplementation remain very low, with 1% in Kayes and 3% in Koulikoro, indicating that most families are open to supplementation if they have the opportunity,

- Other reasons : Responses under the "other" category, representing 62% in Kayes, 60% in Koulikoro, and 60% in Ségou, These responses vary considerably, highlighting recurring problems such as the absence of children on the day of the campaign, the mother's travels with the child, and the non-passage of health workers or distributors,

- Absence of the child: mentioned by 9.25% of respondents in Kayes, (8.23%) in Koulikoro and 8.10% in Ségou, the main reason being a trip for personal or travel reasons,
- Non-passage of health agents: Parents of children have expressed their frustration at the fact that health agents have not passed by, indicating a shortcoming in the execution of the distribution campaign,

- Insufficient resources: this highlights logistical problems during the campaign,

9.4. Evaluate the communication strategy used and identify strengths and areas for improvement

Communication is the key to the success of the vitamin A supplementation and deworming campaign, helping to raise household awareness and improve supplementation coverage. It is therefore crucial to evaluate the communication strategy used to identify strengths and weaknesses,

The media, specifically radio, is an important channel of information, particularly in Kayes (25%) and Ségou (24%), while in Koulikoro its impact is lower (9%). This shows that households still need to turn to the media for crucial information,

Health personnel play a limited role in providing information, being cited by only 10% of households in total, reflecting a communication crisis between health workers and communities,

Other sources, such as word-of-mouth, neighbors and posters, were not significant channels, with the majority of households claiming not to have been informed by these means,

To improve the effectiveness of vitamin A supplementation, it is necessary to :

- Increase parents' awareness of the benefits of vitamin A,
- Increase the level of communication around campaigns,
- Adopt multiple communication channels,
- Emphasize communication between health workers and the community,
- Organize radio messages broadcast on local radio stations,

10. CONCLUSION AND RECOMMENDATIONS

Conclusion

In conclusion, the results show satisfactory overall coverage of vitamin A supplementation **(**82.12% overall), with rates of 85% in Kayes, 79% in Koulikoro and 84% in Ségou. As for deworming, the overall level is 73.86%, with coverage rates varying: Ségou stands out with 83%, followed by Kayes at 75% and Koulikoro at 70%,

The analysis of socio-demographic characteristics also highlights some interesting statistics: 95% of heads of household are men, a figure that is consistent across the three regions; the low level of schooling among custodial mothers in the different regions is also a notable fact noted during the survey; economic disparities were also noted, particularly in Ségou, where the poverty level is relatively high, with 33.5% of households in the lowest quintile.

The level of information among heads of households and custodial mothers is relatively low in most regions, ranging from 49% in Kayes, 51% in Koulikoro, and only 45% in Ségou. Another major factor remains the involvement of health workers in raising awareness among custodial mothers: they were cited by only 10% of households as a source of information.

Recommendations

The results of ***the "Evaluation de la qualité et de la couverture de la supplémentation en vitamine A lors de la Semaine d'Intensification des Activités de Nutrition Communautaire (SIAN-C) 1er Passage juillet-aout 2024 chez les enfants âgés de 6 à 59 mois dans les régions sanitaires de Kayes, Koulikoro and Ségou health*** regions, and the conditions under which it was implemented, enabled us to formulate a number of recommendations for future studies and support for vitamin A supplementation and deworming campaign activities for children aged 6 to 59 months,

To the Ministry/Directorate of Nutrition:

 Improving access to specialized and local healthcare services :

- Access to district and regional hospitals remains limited, particularly for specialized care. To alleviate this problem, it is recommended to increase the capacity of community health centers (CSCom) to offer vitamin A supplementation and deworming services, which will enable more households to be reached, especially those in areas far from the main centers,

 Improve household awareness and information:

- Lack of awareness is a major obstacle, with 52% of households unaware of the campaign, Awareness needs to be stepped up in regions like Ségou (where 55% of households are unaware), Health promotion could include intensive communication on the benefits of vitamin A and deworming through diversified channels (radio, door-to-door campaigns, public posters),

- Since informed households are much more likely to participate in their children's supplementation (OR = 8.17), targeted information efforts could greatly improve coverage.

 Balancing coverage across wealth quintiles :

- This could be linked to a lack of information or negative perceptions about the need for supplementation. More appropriate awareness-raising messages, explaining the benefits for all children regardless of socio-economic level, should be developed and disseminated, emphasizing the risks for unsupplemented children,

 Optimize logistics and guarantee availability of vitamin A capsules:
- Shortages of capsules have been reported, indicating logistical difficulties, Improved stock management is needed to ensure sufficient availability in all regions, even the most remote, Supply chains need to be strengthened to avoid disruptions and ensure that each center has the necessary resources for the duration of the campaign,

 Increase the number of supplementation records in health diaries:
- Currently, recording rates of vitamin A supplementation in health diaries are very low (only 5.83% in Kayes). For effective follow-up, the campaign should promote the importance of documenting supplementation in health diaries and other child follow-up documents, and reminders could be given to health workers to ensure that each dose administered is correctly recorded,

 Reinforce the campaign outside the national supplementation period:
- Off-campaign supplementation remains low, with only 14.09% in Ségou, 13.22% in Kayes and 11.24% in Koulikoro. Stronger support for off-campaign awareness campaigns would help maintain vitamin A coverage throughout the year, reducing dependence on the national campaign,

To Helen Keller International:

 Review tool design policy
- The design of data collection tools is a crucial phase in the success of a study, especially an evaluation study. The design of data collection tools must first and foremost take into account the professional, socio-cultural and environmental realities of the country concerned,

 Organize a tool adaptation workshop
- The workshop on adapting data collection instruments or tools will bring together the various players involved in the evaluation activities, including: the Ministry of Health; INSP DNS, INSTAT, MCDs, DTCs, Health Agents and Relais involved in vitamin A and deworming administration,
  The aim of the workshop, which will bring together participants for a minimum of four (4) days, is to examine, adapt and validate the instruments that will be used to collect the data,

 Review the implementation of the two types of study
- The separation of the different studies: the quantitative study and the qualitative study are two different studies in terms of methodology, and often do not have the same targets,
  To achieve their objectives, these two studies must each be staffed and logistically autonomous. This reserved autonomy has the advantage of organizing and conducting the focus groups and, above all, ensuring good note-taking without time constraints,

 Increase the number of days per cluster

Collection time must be dissociated from the travel time of the teams. The aim is to allow time for the interviewers to work without pressure, while taking into account the travel time between two clusters,

 Extend the results workshop to regional and local **players**
- These include district doctors, DTCs, health workers and community relays or distributors,

To the Institut National de la Statistique:

Update the maps of the clusters selected as part of the study

- Updating selected cluster maps where possible, spatial evolution and various environmental factors often affect the occupation of spaces reserved for the various clusters. Very often there have been cases of underestimation or overestimation of the size of populations in clusters, In many of these cases, this is not the case: there have been cases of relocation, transhumance and uninhabited constructions. We must also take into account the existence of spaces occupied by public services, cemeteries or simply empty,

11. Households and children by cluster and comparison with data from INSTAT

Geographic information					Count				INSTAT		Ratio	
Region	Circle	District	Municipality	Cluster	Population	Household	Eligible households	Target child	Population	Household	Population	Household
Kayes	Kayes	Kayes	Kayes Commune	1	829	39	30	89	752	42	110%	92,9%
Kayes	Kayes	Kayes	Kayes Commune	116	658	50	41	99	724	108	90,9%	46,3%
Kayes	Kayes	Kayes	Kayes Commune	2	948	71	48	134	855	73	110,9%	97,3%
Kayes	Kayes	Kayes	Kayes Commune	3	608	74	44	79	636	125	95,6%	59,2%
Kayes	Kayes	Kayes	Kayes Commune	4	218	29	15	24	650	135	33,5%	21,5%
Kayes	Kayes	Kayes	Guidimakan Keri Kaffo	6	772	41	34	100	921	51	83,8%	80,4%
Kayes	Kayes	Kayes	Logo	117	701	64	43	100	1061	72	66,1%	88,9%
Kayes	Kayes	Kayes	Marena Diombougou	7	551	15	15	82	955	22	57,7%	68,2%
Kayes	Kayes	Kayes	Sadiola	8	853	44	39	150	1124	49	75,9%	89,8%
Kayes	Bafoulabe	Bafoulabe	Bafoulabe	9	973	60	51	186	1079	73	90,2%	82,2%
Kayes	Bafoulabe	Bafoulabe	Koundian	11	868	59	48	147	1162	58	74,7%	101,7%
Kayes	Bafoulabe	Oussoubidiagna	Diakon	10	943	44	42	149	713	54	132,3%	81,5%
Kayes	Diema	Diema	Diema	13	372	28	19	44	803	58	46,3%	48,3%
Kayes	Diema	Diema	Bema	118	459	20	18	76	746	33	61,5%	60,6%
Kayes	Diema	Diema	Bema	14	617	51	44	111	840	80	73,5%	63,8%
Kayes	Diema	Diema	Lambidou	16	250	24	16	39	979	24	25,5%	100,0%
Kayes	Kenieba	Kenieba	Kassama	17	1269	121	93	204	1098	119	115,6%	101,7%
Kayes	Kenieba	Kenieba	Sitakilly	18	1068	111	78	176	926	101	115,3%	109,9%
Kayes	Kenieba	Kenieba	Sitakilly	19	791	87	67	123	844	109	93,7%	79,8%
Kayes	Kita	Kita	Kita Commune	20	668	78	56	108	518	93	129,0%	83,9%
Kayes	Kita	Kita	Djidian	21	1868	93	86	311	766	132	243,9%	70,5%
Kayes	Kita	Kita	Kobri	22	1084	63	59	233	878	78	123,5%	80,8%
Kayes	Kita	Kita	Sebekoro	23	1652	145	121	309	950	141	173,9%	102,8%
Kayes	Kita	Kita	Tambaga	24	1050	57	53	235	843	80	124,6%	71,3%
Kayes	Nioro	Nioro	Nioro Commune	25	649	43	35	89	517	48	125,5%	89,6%
Kayes	Nioro	Nioro	Guetema	26	528	44	31	87	916	78	57,6%	56,4%
Koulikoro	Koulikoro	Koulikoro	Koulikoro Commune	120	726	93	51	79	727	119	99,9%	78,2%
Koulikoro	Koulikoro	Koulikoro	Koulikoro Commune	27	967	85	62	159	663	120	145,9%	70,8%
Koulikoro	Koulikoro	Koulikoro	Koulikoro Commune	28	1092	150	85	128	881	153	124,0%	98,0%
Koulikoro	Koulikoro	Koulikoro	Meguetan	30	1240	98	80	199	1038	79	119,5%	124,1%
Koulikoro	Koulikoro	Koulikoro	Tienfala	32	784	53	44	97	1033	102	75,9%	52,0%
Koulikoro	Dioila	Doila	Kaladougou	33	899	86	65	161	818	86	109,9%	100,0%
Koulikoro	Dioila	Doila	Kemekafo	38	843	124	88	150	760	102	110,9%	121,6%
Koulikoro	Dioila	Doila	Massigui	39	771	70	54	117	961	67	80,2%	104,5%
Koulikoro	Dioila	Doila	Wacoro	42	975	85	63	164	723	35	134,9%	242,9%
Koulikoro	Dioila	Fana	Dolendougou	36	1087	85	65	147	1021	91	106,5%	93,4%
Koulikoro	Dioila	Fana	Guegneka	121	702	33	30	118	742	39	94,6%	84,6%
Koulikoro	Dioila	Fana	Guegneka	37	573	73	47	69	665	85	86,2%	85,9%
Koulikoro	Dioila	Fana	N'Dlondougou	40	845	51	42	122	704	49	120,0%	104,1%
Koulikoro	Dioila	Fana	Nangola	41	1542	107	91	239	785	71	196,4%	150,7%
Koulikoro	Kangaba	Kangaba	Balan Bakama	43	726	61	47	105	929	111	78,1%	55,0%
Koulikoro	Kangaba	Kangaba	Kaniogo	44	466	27	22	84	815	57	57,2%	47,4%
Koulikoro	Kangaba	Kangaba	Narena	45	1330	51	49	240	1123	32	118,4%	159,4%
Koulikoro	Kangaba	Kangaba	Selefougou	46	1334	70	62	223	1026	236	130,0%	29,7%
Koulikoro	Kati	Kati	Kati Commune	47	606	55	31	63	653	79	92,8%	69,6%
Koulikoro	Kati	Kati	Kati Commune	48	834	128	76	110	634	157	131,5%	81,5%
Koulikoro	Kati	Kati	Kati Commune	49	484	42	29	51	527	50	91,8%	84,0%
Koulikoro	Kati	Kati	Baguineda-Camp	50	505	68	50	85	716	77	70,5%	88,3%
Koulikoro	Kati	Kati	Baguineda-Camp	51	865	69	56	150	746	85	116,0%	81,2%
Koulikoro	Kati	Kati	Baguineda-Camp	52	975	116	88	162	660	120	147,7%	96,7%
Koulikoro	Kati	Kati	Bancoumana	53	2086	99	89	425	965	71	216,2%	139,4%
Koulikoro	Kati	Kati	Dio-Gare	58	447	44	28	64	785	129	56,9%	34,1%

Geographic information					Count				INSTAT		Ratio	
Koulikoro	Kati	Kati	Dombila	122	472	54	43	87	923	19	51,1%	284,2%
Koulikoro	Kati	Kati	Dombila	59	700	22	21	130	801	54	87,4%	40,7%
Koulikoro	Kati	Kati	Mande	72	749	100	61	87	824	77	90,9%	129,9%
Koulikoro	Kati	Kati	Mande	73	687	72	41	79	824	77	83,4%	93,5%
Koulikoro	Kati	Kati	Mande	74	898	108	70	128	726	77	123,7%	140,3%
Koulikoro	Kati	Kati	Moribabougou	75	665	87	62	102	691	123	96,2%	70,7%
Koulikoro	Kati	Kati	Moribabougou	76	417	52	30	61	659	79	63,3%	65,8%
Koulikoro	Kati	Kati	N'Gabacoro	77	649	85	51	74	797	72	81,4%	118,1%
Koulikoro	Kati	Kati	Sangarebougou	83	702	78	50	118	585	62	120,0%	125,8%
Koulikoro	Kati	Kati	Siby	84	384	30	24	67	515	57	74,6%	52,6%
Koulikoro	Kati	Ouelessebougou	Bougoula	54	1177	50	45	181	1095	67	107,5%	74,6%
Koulikoro	Kati	Ouelessebougou	Dialakoroba	55	515	18	18	100	1016	43	50,7%	41,9%
Koulikoro	Kati	Ouelessebougou	Dialakorodji	56	690	79	50	109	683	90	101,0%	87,8%
Koulikoro	Kati	Ouelessebougou	Dialakorodji	57	714	77	50	111	777	73	91,9%	105,5%
Koulikoro	Kati	Ouelessebougou	Kourouba	71	1031	45	40	148	1008	49	102,3%	91,8%
Koulikoro	Kati	Ouelessebougou	Niagadina	79	771	27	25	111	846	25	91,1%	108,0%
Koulikoro	Kati	Ouelessebougou	Ouelessebougou	80	977	117	96	165	965	75	101,2%	156,0%
Koulikoro	Kati	Ouelessebougou	Sanankoro Djitoumou	81	772	60	45	98	960	73	80,4%	82,2%
Koulikoro	Kati	Ouelessebougou	Tiele	85	1269	62	57	251	1127	73	112,6%	84,9%
Koulikoro	Kati	Kalabancoro	Kalabancoro	60	743	107	54	86	707	97	105,1%	110,3%
Koulikoro	Kati	Kalabancoro	Kalabancoro	61	758	127	66	115	605	108	125,3%	117,6%
Koulikoro	Kati	Kalabancoro	Kalabancoro	62	590	68	46	79	619	110	95,3%	61,8%
Koulikoro	Kati	Kalabancoro	Kalabancoro	63	885	117	68	119	678	55	130,5%	212,7%
Koulikoro	Kati	Kalabancoro	Kalabancoro	64	690	70	53	106	777	61	88,8%	114,8%
Koulikoro	Kati	Kalabancoro	Kalabancoro	65	1002	122	83	164	739	103	135,6%	118,4%
Koulikoro	Kati	Kalabancoro	Kalabancoro	66	583	89	69	120	682	98	85,5%	90,8%
Koulikoro	Kati	Kalabancoro	Kalabancoro	67	1005	177	93	146	743	151	135,3%	117,2%
Koulikoro	Kati	Kalabancoro	Kalabancoro	68	889	137	73	115	700	76	127,0%	180,3%
Koulikoro	Kati	Kalabancoro	Kalabancoro	69	440	51	24	41	506	54	87,0%	94,4%
Koulikoro	Kati	Kalabancoro	Kalabancoro	70	979	132	95	174	588	115	166,5%	114,8%
Koulikoro	Kati	Kalabancoro	N'Gouraba	123	241	39	30	34	918	54	26,3%	72,2%
Koulikoro	Kati	Kalabancoro	N'Gouraba	78	945	57	52	149	879	55	107,5%	103,6%
Koulikoro	Kati	Kalabancoro	Sanankoroba	82	1142	127	85	136	531	87	215,1%	146,0%
Koulikoro	Kolokani	Kolokani	Kolokani	86	397	17	15	57	538	26	73,8%	65,4%
Koulikoro	Kolokani	Kolokani	Didieni	87	750	32	30	163	1181	34	63,5%	94,1%
Koulikoro	Kolokani	Kolokani	Massantola	88	676	39	36	118	754	47	89,7%	83,0%
Koulikoro	Kolokani	Kolokani	Nonkon	89	1100	63	54	180	1010	65	108,9%	96,9%
Koulikoro	Kolokani	Kolokani	Sagabala	90	1025	45	40	193	1019	43	100,6%	104,7%
Segou	Segou	Segou	Segou Commune	124	733	60	40	97	724	96	101,2%	62,5%
Segou	Segou	Segou	Segou Commune	91	565	85	30	62	591	78	95,6%	109,0%
Segou	Segou	Segou	Segou Commune	92	1224	200	79	140	951	167	128,7%	119,8%
Segou	Segou	Segou	Segou Commune	93	503	53	31	60	578	58	87,0%	91,4%
Segou	Segou	Segou	Segou Commune	94	636	53	33	75	671	61	94,8%	86,9%
Segou	Segou	Segou	Cinzana	95	1125	162	116	193	1112	171	101,2%	94,7%
Segou	Segou	Segou	Pelengana	98	1328	130	77	191	1094	121	121,4%	107,4%
Segou	Segou	Segou	Pelengana	99	1041	143	75	142	813	109	128,0%	131,2%
Segou	Segou	Markala	Markala	125	1304	116	85	214	1104	94	118,1%	123,4%
Segou	Segou	Markala	Markala	97	1362	142	96	263	1143	69	119,2%	205,8%
Segou	Segou	Markala	Sansanding	100	966	89	64	119	915	84	105,6%	106,0%
Segou	Segou	Markala	Sibila	101	603	84	41	72	916	115	65,8%	73,0%
Segou	Baroueli	Baroueli	Baroueli	102	858	61	52	133	730	76	117,5%	80,3%
Segou	Baroueli	Baroueli	Dougoufie	126	873	87	53	132	943	68	92,6%	127,9%
Segou	Baroueli	Baroueli	Somo	104	585	51	35	96	885	47	66,1%	108,5%
Segou	Bla	Bla	Bla	105	765	101	53	94	689	101	111,0%	100,0%
Segou	Bla	Bla	Diaramana	106	766	48	44	162	782	24	98,0%	200,0%
Segou	Bla	Bla	Niala	107	666	32	22	141	993	28	67,1%	114,3%
Segou	Bla	Bla	Touna	108	1195	54	50	245	1126	56	106,1%	96,4%
Segou	San	San	San Commune	109	765	60	41	110	746	80	102,5%	75,0%
Segou	San	San	San Commune	110	709	98	42	76	794	102	89,3%	96,1%
Segou	San	San	San Commune	111	635	80	44	88	757	108	83,9%	74,1%

Geographic information					Count				INSTAT		Ratio	
Segou	San	San	Dah	112	760	59	52	154	1124	55	67,6%	107,3%
Segou	San	San	NGoa	113	510	45	33	85	724	46	70,4%	97,8%
Segou	San	San	Tene	114	967	81	61	203	1119	190	86,4%	42,6%