

Evaluation of the Integrated Management Program for Acute Malnutrition in the Douentza Health District, Mopti Region, Mali

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Abstract

Introduction: Malnutrition is a major public health problem in Mali, despite the efforts of the government, its technical and financial partners. The aim of this study was to evaluate the integrated management program for acute malnutrition (IMPAM). **Methodology:** This was a descriptive cross-sectional study that took place from January to December 2020 in the Douentza health district. The study included anyone with at least one malnourished child aged 6 to 59 months in their care who agreed to take part in the study, community health center staff who had given their consent, and the URENI manager at the Douentza reference health center. Data collected via questionnaires were entered into Excel and then analyzed using Epi-Info version 7 software. **Results:** A total of 138 acutely malnourished children aged 6 - 59 months, including 71 girls (51.45%), 138 accompanying mothers and 11 health workers, were included in our case study. Among the malnourished, 54.34% were in the 12 - 23 months age group and 69.57% had the severe form. 93% of the mothers interviewed were satisfied with the care provided, and all the health



staff interviewed stated that community conflicts had an impact on IMPAM's activities. Cure rates were 81% in Moderate Outpatient Nutritional Recovery and Education Unit (URENAM), 84% in Severe Ambulatory Nutritional Recovery and Education Unit (URENAS) and 92% in Recovery and Intensive Nutritional Education Unit (URENI). Drop-out rates were 19% in URENAM, 16% in URENAS and 0% in URENI. The death rate was 8% in URENI and 0% in URENAM and URENAS. **Conclusion:** This study confirms the high prevalence of malnutrition in the district (10.54%). It also reveals that factors such as inter-community conflict and insecurity have seriously affected the IMPAM program.

Keywords

Care, Acute Malnutrition, Children Aged 6 - 59 Months, IMPAM, Douentza

1. Introduction

Malnutrition is a universal problem that retards development and whose human consequences are unacceptable, but the conditions to end it seem more likely than ever. The United Nations Decade of Action for Nutrition (2016-2025) and the Sustainable Development Goals (SDGs) urge the international community and every country to fight malnutrition and accelerate progress [1]. According to the Committee on World Food Security, the nutrition problem facing countries continues to evolve and worsen. Worldwide, more than 3.1 billion people were unable to afford a healthy diet in 2021, representing 42% of the total population and an increase of 134 million people in this situation compared to 2019 before the COVID-19 pandemic. Worldwide, in 2022, 148 million children under 5 were stunted, 45 million were wasted and 37 million were overweight, most of them in low- and middle-income countries [2].

Africa, which accounts for around 10% of the world's population, is home to a very large number of undernourished people. According to World Health Organisation (WHO), every year in developing countries, severe acute malnutrition affects around 20 million children under the age of five, and is the cause of death for around one million of them [3].

In Mali, according to the 2018 Standardized Monitoring and Assessment of Relief and Transitions (SMART-2018) survey, the prevalence of global acute malnutrition was 10% nationally and 8.9% in the Mopti region, classifying this region at the precarious level threshold. In the Douentza district where we conducted this study, the incidence of global acute malnutrition was 11.8%. Moderate and severe acute malnutrition were 8.7% and 3.1% respectively, placing the district at a serious level [4].

Since 2012, the health district of Douentza, like the other districts of the Mopti region, has been affected by a multidimensional crisis that has favored the onset of all forms of malnutrition, especially in children under 5.

In January 2007, in order to harmonize the management of acute malnutrition, the Ministry of Health, with the support of its partners same United Nations International Children's Emergency Fund (UNICEF) and Non-governmental organization (NGOs), drew up and validated a national protocol, the reference tool for nutritional recovery activities and staff training. This protocol is revised every five years [5]. The aim of this study was to evaluate the integrated management program for acute malnutrition (IMPAM) in the Douentza health district, with a view to improving the management of acute malnutrition in children aged 6 - 59 months.

2. Methodology

Type of study: this was a descriptive cross-sectional study of the integrated management program for acute malnutrition (IMPAM) in the Douentza health district.

Study location and period: the Mopti region, Mali's 5th administrative region, comprises 08 health districts (cercles), including 4 in flooded areas and 04 in flood-free areas, and a second referral hospital. This study took place from January 5 to December 31, 2020 in the Douentza health district, which is the 4th largest in the Mopti region.

It had one (01) reference health center and twenty-one (21) community health centers in 2019.

Study population: the study population consisted of children aged 6 to 59 months, mothers or caregivers of malnourished children and health center staff. The target population consisted of children aged 6 - 59 months admitted to the acute malnutrition management program (IMPAM), mothers or caregivers of children admitted to the program, technical directors of community health centers and managers of the intensive nutritional recovery and education unit (URENI) at the referral health center (RHC).

Inclusion and exclusion criteria: we included in this study all persons having in their care at least one malnourished child aged 6 to 59 months admitted to the IMPAM program and who had given their consent to participate. Also included were the technical directors of the selected community health centers (CHC) and the head of the URENI at the reference health center who agreed to take part in the study. Not included were anyone concerned by the study but who refused to participate, and children aged 6 to 59 months screened but not admitted to the program.

2.1. Sampling Method

Selection of health areas: the method used was non-probabilistic and purposive sampling. A total of ten (10) health areas out of twenty-one (21) were selected. In each health area, one (01) community health center was selected. In addition to these first-level community contact health structures, the district reference health center was also chosen. These health facilities were selected ac-

cording to the following criteria:

- geographical accessibility;
- functionality of Integrated Management of Acute Malnutrition (IMPAM) services;
- level of insecurity.

Selection of mothers or caregivers of malnourished children aged 6 - 59 months: the probability sampling method was used through simple random sampling in the selected health areas.

The sample size was calculated according to the following formula:

$$n = \frac{Z^2 PQ}{I^2} = \frac{1.96^2 \times 0.089 \times (1 - 0.089)}{0.05^2} = 125$$

n: Size = 125; *Z*: Accuracy = 1.96.

P: Prevalence = 8.9% according to SMART 2018; *I*: Risk = 5%.

For the sample to be representative, we added 10% of the calculated sample size. A total of 138 mothers or carers of malnourished children aged 6 - 59 months were surveyed, *i.e.* 12 people per health area and 18 at the URENI of the reference health center.

Selection of health personnel: ten (10) technical directors of community health centers (TDCHC) out of twenty-one (21) and the head of the URENI of the health district's reference health center were selected. A total of 149 subjects participated in the study.

Data collection procedure and tools used:

The literature review was carried out using a tabulation sheet. Once verbal informed consent had been granted by the local and village authorities, we asked for a community liaison officer to guide us in administering the questionnaire to the participants. The questionnaire was used to collect data from 20 participants during the pilot phase of the study and then validated by the research team. Under the guidance of three supervisors, six trained interviewers visited the selected facilities to collect data using questionnaires designed for this purpose. In addition to the questionnaires, the other tools used were:

- The reference table of the new WHO curves;
- Individual follow-up sheets for malnourished people at URENI;
- Copies of the national protocol for the integrated management of acute malnutrition;
- The district nutrition report to highlight performance indicators;
- Integrated malnutrition management plan (IMPAM) for community health centers (CHC).

Data collected: the information collected included.

- Socio-demographic data;
- Performance indicators;
- IMPAM difficulties;
- IMPAM implementation constraints;
- Degree of user satisfaction;

- Accessibility to health services.

2.2. Data Processing and Analysis

Once the data had been processed, we corrected them to ensure completeness, consistency and concordance.

The data collected was entered into Microsoft Excel and then analyzed using Epi-Info version 7 software.

Given the purpose of the study, data analysis was limited to a descriptive analysis. All variables were described in percentage terms.

2.3. Ethical Considerations

The purpose of the study was explained to the district's political and administrative authorities and to the participants in order to obtain their consent.

Verbal consent was obtained from all participants. Confidentiality and anonymity were respected throughout the study process.

Description of integrated management of acute malnutrition in Mali (Figure 1)

According to the IMAM (Integrated Management of Acute Malnutrition) approach in Mali, there are three malnutrition management units:

- URENI: Intensive nutritional recovery and education unit in the reference health centers (RHC);
- URENAS: Severe Ambulatory Nutritional Recovery and Education Unit in the community health centers (CHC);
- URENAM: Moderate Outpatient Nutritional Recovery and Education Unit in community health worker sites (CWS).

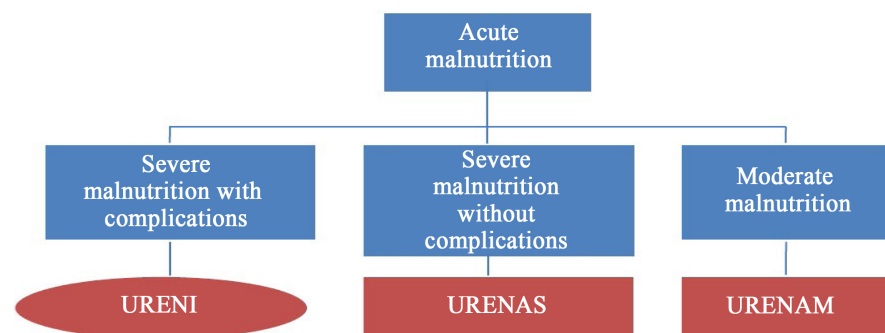


Figure 1. Distribution of acute malnutrition according to care units.

Principles of care for acute malnutrition and operational definitions

The principles for management of severe acute malnutrition (SAM), whatever the program type includes three phases:

- Acute Phase or Phase 1: During the acute phase of treatment anorexic patients with or without major medical complications are admitted to a hospital structure (URENI). The therapeutic product used during this phase is F75 which helps initiate the recovery of metabolic functions and restore electro-

lyte nutritional balance. Rapid weight gain at this stage is dangerous, so F75 is formulated so that patients do not gain weight during this period of treatment.

- Transition Phase or phase 2: The transition phase is introduced to prevent the patient from suddenly taking large quantities of food before their physiological functions are restored. Indeed, this can be dangerous and lead to electrolyte imbalance and “refeeding syndrome”. During this phase, patients begin to gain weight with the introduction of F100 or RUTF, which increases the patient’s energy intake by 30% and their weight gain should reach approximately 6 g/kg/day. The expected energy quantity and weight gain are lower than in the Rehabilitation Phase.

Exit: is defined as a patient leaving a care unit (URENI/URENAS/URENAM) or completely leaving the PCIMA program. This is the sum of patients; cured/successfully treated, deceased, dropped out, referred (including medically referred cases) and transferred.

Cured: is defined as a patient achieving the following cure criteria:

Child admitted with W/H (Weight/height) < -3 z-score only (A1): Achieved W/H (Weight/height) \geq -2 and no edema for two consecutive visits*;

Child admitted with AP (arm perimeter) < 115 mm only (A2): Achieved AP \geq 125 mm without edema during two consecutive visits;

Child admitted with W/H < -3 z-score and AP < 115 mm (A3): Achieved AP \geq 125 mm and W/H \geq -2 and no edema for two consecutive visits.

Deceased or Death: is defined as a patient who dies during their stay in the URENI/URENAS/URENAM program after registration. NB: This includes patients who die during transfer from one health facility to another. If the SAM patient dies during referral from URENAS to URENI, the death must be counted as a death in the program and noted in the URENAS report.

Abandonment: is defined as a patient absent for two consecutive weighing (in URENAS, 2 appointments at URENAM and 2 days in URENI).

3. Results

3.1. Sociodemographic Data (Table 1)

Among the mothers of children who took part in the study, 85.51% (n = 118) were housewives, 87.68% (n = 121) were married, 3.68 (n = 5) were divorced and 76.09% (n = 105) were not educated.

Among malnourished children, the female sex, the 12 - 23 months age group and the severe form of malnutrition were the most represented, with 51.45%, 54.34% and 69.57% respectively. Only 48.55% of these children were fully vaccinated.

Concerning the characteristics of the health personnel surveyed, 100% (n = 11) were male, 81.82% were doctors, 18.18 (n = 2) were nurses and 90.90% (n = 10) had less than one year’s professional experience. Of these health professionals, 90.90% (n = 10) had received training in integrated management of acute

malnutrition (IMPAM) and only 01 (9.09%) in policy, standards and procedures (PNP).

Table 1. Socio-demographic characteristics of children.

Variables	Number (n)	Percentage (%)
Children's characteristics (n = 138)		
Age range (months)		
[6 - 11]	35	25.36
[12 - 23]	75	54.34
[24 - 59]	28	20.30
Gender		
Male	67	48.55
Female	71	51.45
Vaccination status by age		
Fully vaccinated	67	48.55
Incomplete vaccination	28	20.29
Vaccination in progress	14	10.14
Not vaccinated	29	21.01
Type of malnutrition		
Moderate acute malnutrition (MAM)	42	30.43
Severe acute malnutrition (SAM)	96	69.57

3.2. Data on Breastfeeding and Weaning of Malnourished Children Admitted to the Program (Table 2)

Breast-feeding was observed in 63% of malnourished children, and more than half the mothers (58.62%) gave ready-to-use therapeutic food (RUTF) before their children breastfeeds.

Among breastfed children, 64.37% benefited from breastfeeding frequency in line with standards (greater than or equal to eight times a day).

Thirty-seven percent (37%) of children had already been weaned prior to admission, and 82.35% of them had undergone abrupt weaning. Pregnancy was the main cause of weaning (68.63%).

3.3. Data on the Evaluation of the Integrated Management of Acute Malnutrition Program

3.3.1. Assessment of Structures for Integrated Management of Acute Malnutrition

This study revealed that anthropometric equipment, the national protocol for the management of acute malnutrition and nutritional inputs were available and in good condition. It also revealed that two centers out of ten (18.18%) did not have functional drinking water points. With regard to governance, the centers

Table 2. Distribution of children admitted to the program according to breastfeeding and weaning data.

Variables	Number (n)	Percentage (%)
Breast-feeding child on admission (n = 87)		
Yes	87	63
No	51	37
Breastfeeding frequency		
More than 8 times a day	56	64.37
Less than 8 times a day	31	35.63
Breastfeeding mode		
Breastfeeding before RUTF	36	41.38
Breastfeeding after RUTF	51	58.62
Weaned before admission (n = 51)		
Yes	51	37
No	87	63
Age at weaning		
9 months	1	1.15
12 months	3	3.45
18 months	18	20.69
24 months	65	74.7
Cause of weaning		
Pregnancy	35	17.65
Illness	9	3.92
Insufficient milk supply	2	1.96
Travel	1	7.84
Other	4	17.65
Preparation for weaning		
Yes	9	17.65
No	42	82.35

evaluated had notes on the distribution of tasks between staff and a schedule for organizing nutrition education sessions and management committee coordination meetings (**Table 3**).

Table 3. Results of the evaluation of integrated management structures for acute malnutrition, Douentza 2020.

Variables	Number (N)	Percentage (%)
Status of available anthropometric equipment (n = 11)		
Good	10	90.91
Fair	1	9.09
Availability of malnutrition management aids other than the protocol (n = 11)		
Yes	8	72.73
No	3	27.27
Availability of a functional drinking water point (n = 11)		
Yes	9	81.82
No	2	18.18
Compliance with acute malnutrition management protocols (n = 138)		
Yes	128	92.75
No	10	7.25
Frequency of nutrition education organized by centers (n = 11)		
Every two weeks	1	9.10
Twice a week	1	9.10
Daily	2	18.20
Monthly	2	18.20
Weekly	5	45.40
Influence of community conflicts on the IMPAM program (n = 11)		
Yes	11	100
No	0	0
Availability of drugs and nutritional inputs during the study period		
Yes	11	100
No	0	0

3.3.2. Performance Indicators for Acute Malnutrition Units

The number of malnourished people admitted to the program was significantly higher than expected in seven out of ten facilities. The highest admission rate was observed at the Debere community health center (352.42%), and the lowest at the Bore CHC (24.62%). Rates exceeding one hundred percent can be explained by the fact that patients from outside the health areas concerned were also admitted to the program for various reasons, notably those linked to the internal displacement of populations due to insecurity (**Figure 2**).

Cure rates were 81% in URENAM, 84% in URENAS and 92% in URENI. Drop-out rates were 19% in URENAM, 16% in URENAS and 0% in URENI. The death rate was 8% in URENI and 0% in URENAM and URENAS respectively (**Table 4**).

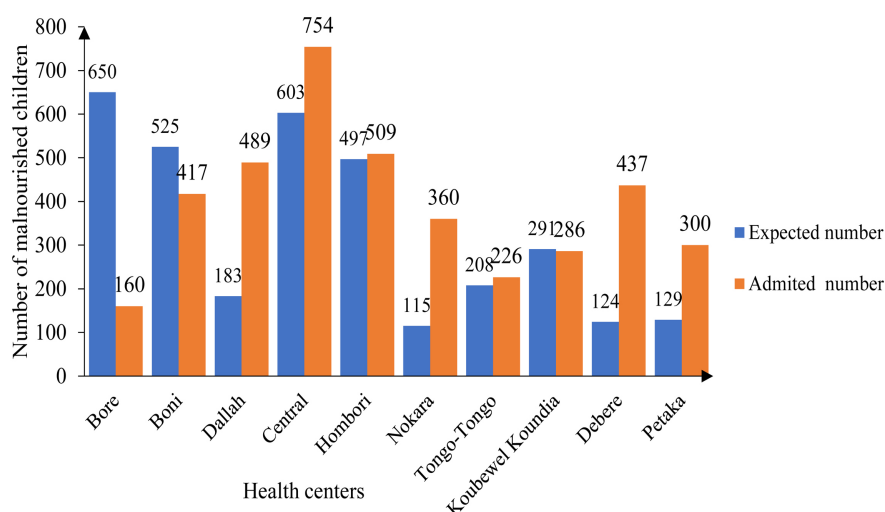


Figure 2. Expected overall number of acutely malnourished children and number admitted to the IMPAM program.

Table 4. Performance indicators in the various acute malnutrition management units, Douentza 2020.

Integrated malnutrition management units	Performance Indicators	Result of our study
URENAM*	Drop-out	19%
	Cured	81%
	Deaths	0%
URENAS*	Drop-out	16%
	Cured	84%
	Deaths	0%
URENI*	Drop-out	0%
	Cured	92%
	Deaths	8%

URENAM*: Moderate outpatient nutritional recovery and education unit, URENAS*: Severe ambulatory nutritional recovery and education unit, URENI*: Intensive nutritional recovery and education unit.

3.3.3. Level of Appreciation of Mothers of Children Aged 6 - 59 Months of the Integrated Management Program for Acute Malnutrition (IMPAM)

Among the women questioned, only 61.59% said they had been informed of their children's diagnosis, 84.78% had received nutritional advice, 63.77% knew the danger signs, and over 95% were assiduous in the program. More than half the mothers of malnourished children aged 6 - 59 months (67.39%) had a good assessment of IMPAM services (**Table 5**).

Table 5. Mothers' opinion and level of satisfaction with the process of caring for malnourished children aged 6 - 59 months.

Variables	Number (n)	Percentage (%)
Warm welcome (n = 138)		
Yes	101	73.19
No	37	26.81
Information on diagnosis (n = 138)		
Yes	85	61.59
No	53	38.41
Nutritional advice received (n = 138)		
Yes	117	84.78
No	21	15.22
Good knowledge of danger signs in malnourished children (n = 138)		
Yes	88	63.77
No	50	36.23
Mothers' attendance of program (n = 138)		
Oui	132	95.65
No	6	4.35
Mothers' assessment of IMPAM services (n = 138)		
Very good	93	67.39
Good	43	31.16
Poor	2	1.45
Mothers' satisfaction with care for their children		
Yes	129	93.48
No	9	6.52

3.3.4. Impact of Community Conflicts on the Implementation of the Integrated Management Program for Acute Malnutrition (Table 6)

All of the health workers (100%) surveyed affirmed that the community conflicts have a negative influence on integrated management program for acute malnutrition. According to them, the difficulties that hindered the correct implementation of the program were among others:

- difficulties in the supply and demand of health care and services due to insecurity leading to cases of abandonment (difficult movement of health workers for community screening of malnutrition, difficulty or even impossibility for mothers to travel due to either improvised explosive devices or embargoes);
- low attendance at health centers;
- difficulty accessing food due to embargoes in some places;

- difficulty in delivering nutritional inputs to health structures;
- non-compliance with appointments by mothers;
- delay in care.

Table 6. Opinions of the agents surveyed on the impact of community conflicts on the Integrated Management of Acute Malnutrition program.

Opinions of the agents surveyed	Number (n)	Percentage (%)
Community conflicts have a negative impact on the correct implementation of the integrated management of acute malnutrition program?		
Yes	11	100
No	0	0
Don't know	0	0

4. Discussions

This study was carried out in the Douentza health district, which is the fourth cercle in the Mopti region of Mali. It took place from January to December 2020 and included a total of 138 on 3938 acutely malnourished children aged 6 - 59 months. It also involved 138 mothers or carers of malnourished children aged 6 - 59 months and 11 health workers.

4.1. Socio-Demographic Characteristics and Nutritional Status of Admitted Children

In our study, as in that conducted by I. Nantoume [6], females predominated, in contrast to several other studies in the literature [7]-[9]. From a sociological point of view, this predominance of females is a major advantage in terms of the quality of care provided to children and the quality of nutritional advice given.

The 12 - 23 months age group was the most represented with 54.34%. This finding has also been reported in several literature series [3] [6] [10] [11], and may be due to the fact that this age group is the most affected by poor complementary feeding, early weaning or ab lactation, due to mothers' lack of knowledge of good nutritional practice.

According to the form of acute malnutrition, 69.57% of our sample suffered from severe acute malnutrition. The dominance of the severe form of malnutrition could be explained by the late arrival of children in care. Added to this is their non-vaccination status (21%). This state of affairs has an influence on children's nutritional status, as the weaker the immune system, the more exposed it is to disease, which is one of the immediate causes of malnutrition.

As for the mothers of the children included in the study, most of them had no formal education, as some authors have also reported [8] [12]. This state of affairs has a negative impact on the application of good nutritional practice methods, as well as on child weaning. Women's lack of knowledge or education about

family planning is one of the factors associated with closely spaced pregnancies reported as a cause of abrupt weaning in our study and in the literature [8] [13]. As for the health workers who took part in our study, they were all male, doctors (81.82%) with more than five years' professional experience in only 9.09%, and 90.90 of them had received IMPAM and infant and young child feeding (IYCF) training. A similar trend was reported in the study conducted by these authors [8] [13] [14], but contrary to the data reported by Sangho H *et al.* [15]. Since 2022, there has been a major change in the capacity-building of health workers in the management of malnutrition, as almost all providers at operational level have been trained in the revised protocol, as well as in several other approaches and normative documents on nutrition.

4.2. Feeding Habits of Malnourished Children Admitted to the Program

The majority of children (82.35%) were not prepared for weaning, although this is necessary to prevent the onset of acute malnutrition. In our context and during the ablactation period, weaning foods are generally not sufficient in quantity and quality to cover growth needs, leading to deficiencies and greater fragility of the children in the face of infections that aggravate their immune deficiencies. Another explanation is that, in most cases, ablactation is not carried out under ideal conditions. In most cases, ablactation is not carried out under ideal conditions: it is usually decided abruptly, without taking the necessary measures for diversification, or it is carried out during an illness or because of a new pregnancy. In our study, the main cause of abrupt weaning was close pregnancy. These practices make it difficult for the child to cross the threshold, thus upsetting the nutritional balance.

With regard to feeding methods, the WHO protocol for the integrated management of acute malnutrition (IMPAM) [16] recommends observing breastfeeding before giving ready-to-use therapeutic food (RUTF), but in our study 58.62% of mothers of malnourished children did the opposite. This behaviour can be explained by the lack of knowledge among mothers and caregivers about the correct use of RUTF. However, after this study, cascade training of health workers on the revised IMPAM protocol and of several women's associations or groups on infant and young child feeding (IYCF) was carried out thanks to the support of financial and technical partners.

4.3. Evaluation of the Integrated Management Program for Acute Malnutrition

4.3.1. Assessment of Structures for Integrated Management of Acute Malnutrition

This evaluation revealed that anthropometric equipment, national protocols for the management of acute malnutrition, and nutritional drugs and inputs were available and in good condition. This positive finding is the fruit of the efforts made by health authorities and technical and financial partners to improve the

conditions under which malnourished children are cared for in our health facilities. However, our study revealed that two health centers out of ten, or 18.18%, had no functional drinking water points. This alarming finding could be linked to poor governance and insufficient community ownership of health facilities. Despite this relative lack of governance, the facilities had task allocation notes for staff, a schedule for organizing nutrition education sessions and periodic (monthly, quarterly and annual) management and coordination meetings.

4.3.2. Analysis of Performance Indicators

Program coverage for integrated management of acute malnutrition (IMPAM).

The number of malnourished people admitted to the program was significantly higher than expected in seven out of ten facilities. The fact that the majority of facilities exceeded the expected rate is explained by the fact that patients from outside the health areas concerned are also admitted to the program, for a variety of reasons, including the internal displacement of people due to insecurity. All this has been exacerbated by poverty and poor harvests in a context of inter-community conflict that has existed in the region since 2012.

1) Performance indicators for integrated management units for acute malnutrition (Table 7)

The results of our study revealed that the performance indicators (cure rate and death rate) were acceptable in the various integrated management units for acute malnutrition. However, the drop-out rates recorded in URENAM and URENAS exceeded the minimum acceptable threshold (15%) according to the National protocol for the integrated management of acute malnutrition in Mali (IMAM) [17], as our series reported 19% and 16% drop-out rates in URENAM and URENAS respectively. These rates are significantly lower than those reported by some authors in the literature [10] [13] [18]-[20]. The dropout rates above the reference threshold observed in our study can be explained, on the one hand, by the long distance between villages and health facilities in areas that are geographically difficult to access, thus corroborating the results of the SQUEAC (Semi quantitative Evaluation of access and Coverage) survey carried out in July 2016 in Douentza, in which distance emerged as a major barrier to access to treatment and regular follow-up of children. In addition, several localities in the Douentza health district had experienced blockades by unidentified armed men, seriously impacting access to healthcare and health services in general. In the work of A.T. Coulibaly, distance was also highlighted as an important factor in the abundance of treatment, since according to the study, almost all (96%) mothers of children travelled more than 5 km to reach the nearest health service [8]. In view of these findings, strengthening communication for development (C4D) activities is one of the communication approaches needed to help reduce this rate. This communication, focused on behavioral change, is an “interactive process for the development of specific messages and approaches using various communication channels with the aim of encouraging and supporting appropriate positive behaviors”. These desired behaviors include adherence to treatment,

and respect for therapeutic follow-up. At UNICEF, nutrition is one of the areas in which C4D principles and methodologies have been successfully integrated [21]. Other approaches, such as the use of community relays and community platforms, could play an important role in raising community awareness.

Table 7. Comparison of the performance indicators of the various units for the care of malnourished children aged 6-59 months with the reference rates of the national PCIMA protocol.

Integrated malnutrition management units	Performance Indicators	Result of our study	National PCIMA protocol Mali (%)
URENAM	Drop-out	19%	<15%
	Cured	81%	>70%
	Deaths	0%	<3%
URENAS	Drop-out	16%	<15%
	Cured	84%	>75%
	Deaths	0%	<10%
URENI	Drop-out	0%	<15%
	Cured	92%	>75%
	Deaths	8%	<10%

2) Mothers' satisfaction with the integrated management program for acute malnutrition

Satisfaction signals the disappearance of the tension of desire, the dissipation of displeasure, of the psychological pain that generally accompanies a state of lack or need. In most cases, satisfaction can be associated with the concept of joy [22]. In this respect, the majority of mothers or guardians questioned (93.48%) were satisfied with the care provided for their children, and 67.39% thought that the integrated malnutrition management program was very good. These data are higher than those reported by Konate S *et al.* in their study evaluating the management of severe acute malnutrition in the pediatric ward of the Gabriel Touré University Hospital (CHU) in Bamako, Mali [10]. In our study, mothers of malnourished children were most satisfied with the welcome they received and the free care they received.

5. Conclusion

This study confirms the high prevalence of malnutrition in the district (10.54%). The 12 - 23 month age group and females were the most affected. Despite the insecurity and inter-community conflicts that severely affected the provision of quality services and care, nutritional performance indicators were fairly satisfactory, thanks to the use of local intervention strategies and the support of humanitarian workers.

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Study Limitations

Unfortunately, this study did not cover all the district's health areas. Some of the cercle's communes, notably Mondoro, N'gouma, Gandamia, Kerena, Korarou and Dianwely, were not covered by the study due to insecurity, geographical accessibility and the absence of a telecommunications network in some of these communes.

Conflicts of Interest

The authors declare that they have no ties of interest.

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