

Nutritional Status of Children under Five in Bamako's IDP Sites

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Abstract

Introduction: Malnutrition is one of the main causes of infant mortality worldwide. The advent of the security crisis in Mali in 2012 triggered major population movements both within the country and in neighboring countries. This population movement has given rise to numerous spontaneous sites and other areas hosting internally displaced persons (IDPs). The aim of this study was to assess the nutritional status of children aged between 6 and 59 months at IDP sites in Commune VI. **Method:** This cross-sectional study involved 120 mother-child pairs (0 - 59 months) selected using a two-stage simple random sampling technique. Information on the sociodemographic, health care (vaccination, deworming and vitamin A supplementation) and anthropometric characteristics of the index children were obtained using an interviewer-administered questionnaire. Weight, height, brachial circumference (BP) and the presence of bilateral buccal edema were measured according to standard procedures. The weight-for-height (W/H) and height-for-age (HFA) z-scores used were those of the World Health Organization (WHO). Analysis of the children's anthropometric data was carried out using ENA software, version February 2020, Excel and in relation to the WHO 2006 reference values for anthropometric data. **Results:** Among children aged 6 to 59 months, the prevalence of global acute malnutrition was 10.7% (7.1 - 18.6 IC 95%). SAM represented 0.8% (0.1 - 4.6 95% CI), MAM 9.8% (6.4 - 17.7 95% CI) and underweight 16.7% (11.1 - 24.3 95% CI). **Conclusion:** This study enabled us to assess the nutritional status of children under 5, who are the most vulnerable.

Keywords

Nutritional Status, Children, IDP Sites

1. Introduction

Malnutrition is a pathological condition caused by excess or deficiency of one or more nutrients [1]. Malnutrition, especially in early childhood, affects vital functions, particularly cognitive ones, and contributes significantly to poverty by weakening learning and production capacities [2]. Worldwide, 149 million children under the age of 5 continue to suffer from stunted growth and almost 50 million from wasting, a third of whom suffer from the severe form of malnutrition, the deadliest form, which increases the risk of death in children by a factor of 12, and 40 million (5.7%) are overweight [3]. In 2021, more than 5 million children under the age of 5 died, mainly in low- and middle-income countries in sub-Saharan Africa and parts of South Asia [4]. It is the leading cause of child mortality worldwide, accounting for around 45% of deaths in children under 5. Malnutrition is one of the major public health challenges in developing countries, particularly those experiencing security instability. Worldwide, it is estimated that 41% of all forcibly displaced people are children. In general, malnutrition affects a large number of people worldwide due to famines, wars, overcrowding, rural exodus and other disasters that prevent people from accessing food [3]. In Iraq, around one in five displaced children suffers from malnutrition. Many internally displaced people, especially children, suffer from health problems and malnutrition because of the conflict [5]. The nutrition of children in Africa, particularly those displaced by conflict, is a major global health issue. Adequate nutrition is essential to children's well-being and development, but displaced people face particular challenges, with a review of the literature on the nutritional status of internally displaced children showing a prevalence of chronic malnutrition (stunting) and acute malnutrition (wasting) ranging from 18.8% to 52.1% and 0.04% to 29.3%, respectively [6]. The advent of the security crisis in Mali in 2012 led to major population displacements both within the country and to neighboring countries [7]. The worsening of this crisis has led to community conflict in the center of the country, causing the forced displacement of a large part of the population to various areas in the interior. The number of internally displaced persons (IDPs) in Mali has almost doubled in less than two years, reaching 422,620 in August 2022 [3]. Despite surplus food production, malnutrition remains very high and is a major public health problem [8]. Moreover, in Mali, more than 80% of children under 5 and more than 65% of women suffer from iron deficiency, one of the highest rates in the world [9]. These figures are all the more worrying when we consider that iron deficiency greatly reduces intellectual development and learning capacity in children [9]. The aim of this study is to assess the nutritional status of displaced children aged 6 - 59 months in Bamako's Commune VI, in order to provide baseline information for future humanitarian interventions for these children.

2. Method

2.1. Type, Population and Location of Study

This was a cross-sectional study of children aged 6 - 59 months in 3 IDP sites in

the commune VI health district of Bamako.

2.2. Inclusion Criteria

All children aged 6 - 59 months residing at the sites whose mothers agreed to answer our question.

2.3. Non-Inclusion Criteria

- All children under 6 months and over 59 months.
- Any mother refusing to answer our questions.

2.4. Data Collection Tools and Period

Data collection was carried out by a team of three (3) people deployed at the sites between July 18 and October 03, 2023. In addition to survey questionnaires, the team brought anthropometric measuring equipment to enable them to collect data from households on site. The questionnaire had been validated and tested before use, and the scales were tared.

2.5. Data Collection Techniques

Nutritional status is represented by anthropometric characteristics, food intake and physical activity. Analysis of children's anthropometric data was carried out using ENA software version February 2020, Excel and in relation to WHO 2006 reference values for anthropometric data.

2.6. Ethical Considerations

The study was carried out in strict compliance with the rights of all parties involved, and all mothers were clearly informed of the objective and methodological approach. Mothers signed an informed, free and voluntary consent to participate in the study. The information gathered remains confidential.

2.7. Materials

The following materials were used:

- Survey forms
- Mother-child scale
- Shoor measuring rod
- Shakir band
- Weight-for-height table

3. Results

Origin

We included 120 children at the three sites. More than half of the sample (55%) lived in the Faladié district (**Figure 1**).

- ***Profession of children's mothers***

All the children's mothers are housewives.

• **Profession of children's fathers**

Four out of 5 of the children's fathers are farmers.

The parameters of the mothers' age series are lower than those of the fathers on all lines. With coefficients of variation below 33%, both series follow a normal distribution (Table 1 and Figure 2).

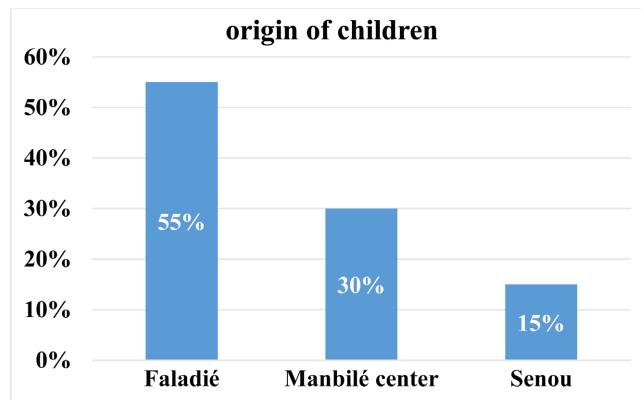


Figure 1. Origin of children.

Table 1. Statistics on parents' age.

| Age parameters | Mothers | Fathers |
|--------------------------|---------|----------|
| Maximum | 40 | 73 |
| Minimum | 17 | 21 |
| Average | 25,225 | 37,55833 |
| Mode | 25 | 35 |
| Median | 25 | 35 |
| Standard deviation | 5,58876 | 9,380132 |
| Coefficient of variation | 22% | 25% |

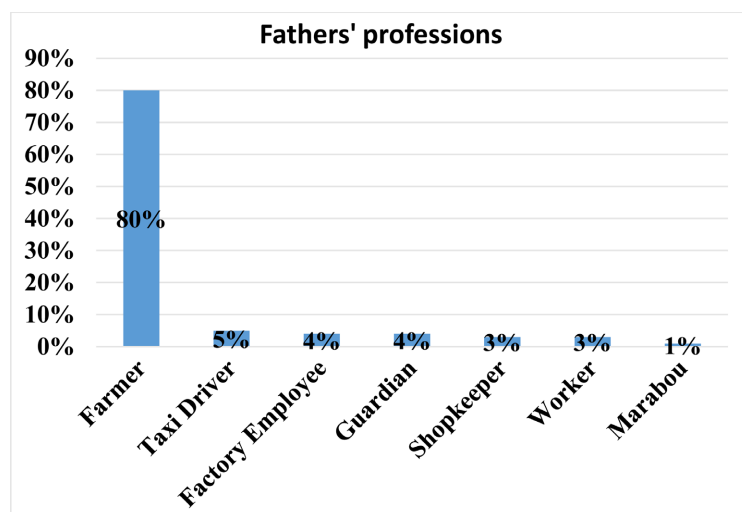


Figure 2. Fathers' professions.

- **Mothers' marital status**

98% of mothers are married and 2% widowed (**Figure 3**).

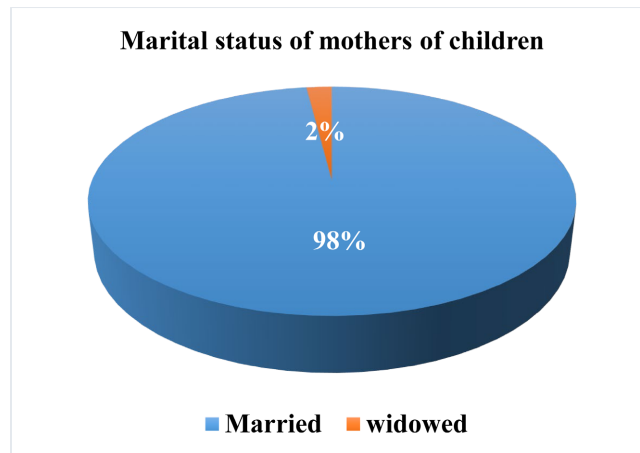


Figure 3. Marital status of mothers of children.

- **Parents' level of education**

None of the mothers attended school. However, 9% of fathers attended Koranic school (**Table 2**).

Table 2. Number of children in the family.

| Number of children | Frequency | Percentage |
|--------------------|-----------|------------|
| 1 | 15 | 12.5 |
| 2 | 25 | 20.8 |
| 3 | 23 | 19.2 |
| 4 | 20 | 16.7 |
| 5 | 23 | 19.2 |
| 6 | 6 | 5.0 |
| 7 | 6 | 5.0 |
| 8 | 2 | 1.7 |
| Total | 120 | 100 |

The number of children in households ranges from 1 to 8. Households with 2 children are in the majority, at around 21%.

The majority of children (39%) are in the 12 to 23 months age bracket (**Figure 4**).

- **Child gender**

More than half the children included in our study were female (**Figure 5**).

- **Presence of foot edema**

No children with signs of oedema.

- **Nutritional status (weight/height ratio)**

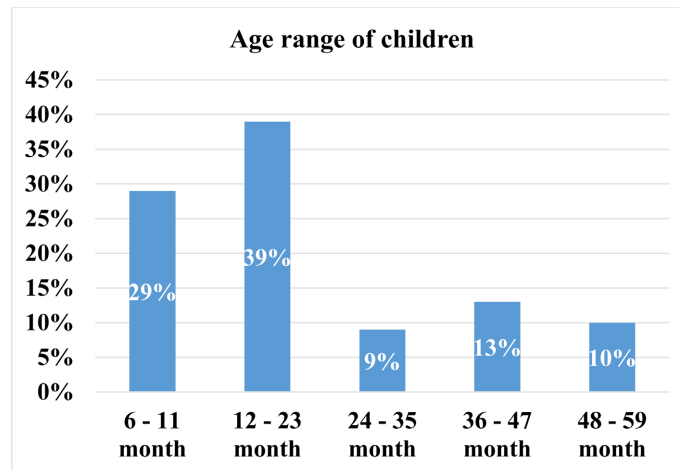


Figure 4. Age range of children.

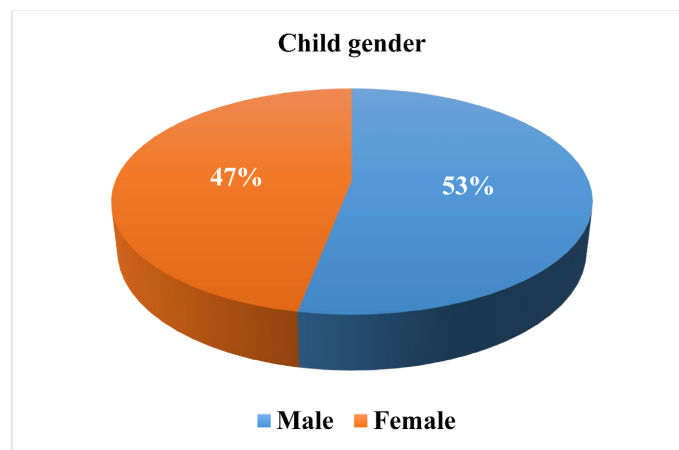


Figure 5. Distribution of children by gender.

Table 3. Prevalence of acute malnutrition based on weight/height (and/or oedema) z-scores and by gender.

| | All n = 120 | Boys n = 64 | Girls n = 56 |
|--|--------------------------------------|-------------------------------------|--------------------------------------|
| Prevalence of global acute malnutrition (<-2 z-score and/or edema) | (14) 10.7% (7.1 - 18.6 IC at 95%) | (8) 9.5% (6.5 - 22.8 IC at 95%) | (6) 8.7% (5.0 - 21.5 IC at 95%) |
| Prevalence of moderate acute malnutrition (<-2 z-score and ≥-3 z-score, no oedema) | (13) 9.8% (6.4 - 17.7 IC at 95%) | (7) 10.9% (5.4 - 20.9 IC at 95%) | (6) 10.7% (5.0 - 21.5 IC at 95%)x |
| Prevalence of severe acute malnutrition (<-3 z-score and/or edema) | (1) 0.8% (0.1 - 4.6 IC at 95%) | (1) 1.6% (0.3 - 8.3 IC at 95%) | (0) 0.0% (0.0 - 6.4 IC at 95%) |

The global acute malnutrition prevalence was 10.7% (7.1 - 18.6 95% CI), with 0.8% (0.1 - 4.6 95% CI) of severe form. The prevalence of severe acute malnutrition was higher among boys (0.8%) (Table 3).

Table 4. Prevalence of stunting based on height-age z-scores and by gender.

| | All n = 120 | Boys n = 64 | Girls n = 56 |
|---|---------------------------------------|---------------------------------------|-------------------------------------|
| Prevalence of stunting (<-2 z score) | (22) 18.3% (12.4 - 26.2 IC at 95%) | (13) 20.3% (12.3 - 31.7 IC at 95%) | (9) 16.1% (8.7 - 27.8 IC at 95%) |
| Prevalence of moderate stunting (<-2 z-scores and ≥-3 z-scores) | (16) 13.3% (8.4 - 20.6 IC at 95%) | (13) 20.3% (12.3 - 31.7 IC at 95%) | (3) 5.4% (1.8 - 14.6 IC at 95%) |
| Prevalence of severe stunting (<-3 z score) | (6) 5.0% (2.3 - 10.5 IC at 95%) | (0) 0.0% (0.0 - 5.7 IC at 95%) | (6) 10.7% (5.0 - 21.5 IC at 95%) |

The prevalence of overall stunting was 18.3% (12.4 - 26.2 95% CI) with 5.0% of severe forms (2.3 - 10.5 95% CI), with girls predominantly affected by stunting (Table 4).

Table 5. Prevalence of underweight based on weight/age z-scores by gender.

| | All n = 120 | Boys n = 64 | Girls n = 56 |
|--|---------------------------------------|--------------------------------------|-------------------------------------|
| Prevalence of underweight (<-2 z score) | (20) 16.7% (11.1 - 24.3 IC at 95%) | (11) 17.2% (9.9 - 28.2 IC at 95%) | (9) 16.1% (8.7 - 27.8 IC at 95%) |
| Prevalence of moderate underweight (<-2 z-score and ≥-3 z-score) | (17) 14.2% (9.0 - 21.5 IC at 95%) | (10) 15.6% (8.7 - 26.4 IC at 95%) | (7) 12.5% (6.2 - 23.6 IC at 95%) |
| Prevalence of severe underweight (<-3 z score) | (3) 2.5% (0.9 - 7.1 IC at 95%) | (1) 1.6% (0.3 - 8.3 IC at 95%) | (2) 3.6% (1.0 - 12.1 IC at 95%) |

The prevalence of underweight was 16.7% (11.1 - 24.3 95% CI), of which 2.5% (0.9 - 7.1 95% CI) was severe; the majority was female, with 3.6% (1.0 - 12.1 95% CI) (Table 5).

- Vitamin A and albendazole distribution

Table 6. Distribution of vitamin A and albendazole to children on a routine or campaign basis.

| Vitamin and Albendazole | Frequency | Percentage |
|-------------------------|-----------|------------|
| Don't know | 32 | 26.7 |
| No | 60 | 50.0 |
| Yes with card | 2 | 1.7 |
| Yes without card | 26 | 21.7 |

Half the mothers said that their children had not received vitamin A and albendazole either routinely or during campaigns (Table 6).

- **Vaccination status**

Table 7. Distribution of children by vaccination status.

| Vaccination status | Numbers | Percentage |
|--------------------|---------|------------|
| Up to date | 16 | 13.3 |
| Not up to date | 66 | 55.0 |
| Not vaccinated | 38 | 31.7 |
| Total | 120 | 100.0 |

Only 13.3% of children are up-to-date with their immunization status (Table 7).

- **Hygiene and sanitation practices**

60% of children's households use tap water (Figure 6).

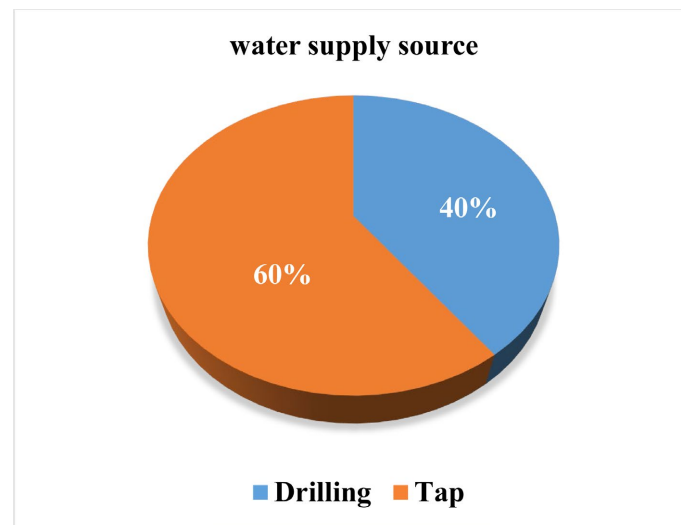


Figure 6. Distribution of households by water supply source.

- **Washing hands before each meal**

Table 8. Distribution of mothers according to hand washing before each meal.

| Washing hands before each meal | Numbers | Percentage |
|--------------------------------|---------|------------|
| No | 29 | 24.2 |
| Yes | 38 | 31.7 |
| Often | 53 | 44.2 |

Around 1/4 of our sample never washes their hands before eating, *i.e.*, 24.2%.

All the children's mothers stated that their toilets were far from their kitchens (Table 8).

4. Discussion

A total of 120 children under 5 years old were surveyed.

4.1. Socio-Demographic Characteristics

Children's origin: The majority of children came from the Faladié site (55%), followed by the Mabilé center (30%) and Senou (15%). This situation can be explained by the fact that the Faladié site received many more displaced people than the other sites. Gender of children: Our study included 52% girls and 48% boys. We have no explanation for this. Moreover, the poor anthropometric indices were higher in boys than in girls, with the exception of emaciation [10]. Age of children: the majority of children were in the 12 to 23 months age group, *i.e.*, 39%. This corresponds to the weaning period, making infants more vulnerable. Parents' level of education: none of the mothers had attended school, and the fathers had attended Koranic school in 9% of cases. In Iraq, a significant association was observed between undernutrition and the number of children in the family, their age and the level of education of the father and mother [11].

4.2. Main Types of Malnutrition

Acute malnutrition or wasting: in our study, the prevalence of wasting was 10.7% ((7.1 - 18.6 95% CI), of which 0.8% ((0.1 - 4.6 95% CI) was severe. This result is comparable to that of the SMART 2022 survey, which found 10.8% with a more severe form than ours, *i.e.*, 2.1% [6]; but lower than those of Diarra L., Lafta R. in Iraq, Macki N. in Chad and Leidman E. and all in Bangladesh, who respectively found 11.6% wasting, 2.6% of which was severe; 14.6% including 6.9% severe and 24.3% (95% CI, 19.5% to 29.7%) including 7.5% (95% CI, 4.9% to 11.2%) severe [11]-[14].

Although the differences observed between boys and girls are not substantial, they do highlight a potential gender disparity in malnutrition within the population studied. It is important to consider factors that may contribute to this disparity, such as cultural norms, dietary practices and access to healthcare and resources. Despite existing interventions, ongoing monitoring and evaluation are essential to ensure their effectiveness in tackling root causes and achieving lasting improvements [6] [15].

Chronic malnutrition or stunting: the prevalence of stunting is 18.3% (12.4 - 26.2 95% CI) with a severe form of 5.0% (2.3 - 10.5 95% CI), with girls the most affected. Our results are inferior to those of Macki N with many more boys, Diarra L, SMART 2022 and Leidman E, with respectively 24.8% (95% CI: 19.8 - 30.5), 26.8% (10.3 severe form) and 43.4% (95% CI, 37.6% to 49.4%) [6] [12]-[14].

To develop effective interventions for stunting, further research is needed to explore the underlying factors that contribute to this condition, particularly in girls at this age. Studying the specific determinants of stunting in girls could help identify targeted interventions to address their unique needs. In addition, research into the long-term consequences of stunting is important to inform policies and pro-

grams aimed at improving children's health and well-being [6] [15].

Underweight: The prevalence of underweight is 16.7% (11.1 - 24.3 95% CI) with a weaning form of 2.5% (0.9 - 7.1 95% CI), with girls predominantly affected at a rate of 3.6%. Our results are lower than those of SMART 2022, with 23.5% underweight, including 4.5% weaning [6] and Macki N in Chad with 20.3%, 27.4% of whom were boys [13]. For cultural reasons, there are huge dietary restrictions in Mali after non-exclusive breastfeeding. This may expose them to a higher risk of malnutrition due to the nutritional benefits of breast milk. In addition, parents may be less likely to have access to healthcare services, including vaccination and growth monitoring, which can help prevent and treat malnutrition. Poverty and food insecurity may also be more prevalent, which could put them at higher risk of being underweight due to limited access to food and healthcare resources [6] [15].

4.3. Children's Immunization, Vitamin A Supplementation and Deworming Status

In terms of child health coverage, 50% of children had not received vitamin A supplementation and albendazole deworming. This result is close to that of Edowu OS, which noted that 45.4% had been dewormed in the previous six months, and is lower than that of SMART 2022, which reported that 89.9% of children aged 6 to 59 months received vitamin A and 85% of children were dewormed [6] [10]. Only 13% of children had their immunization status up to date, in contrast to Edowu OS in Nigeria, where 43.9% had up-to-date immunization. The health services most affected during conflicts are routine immunization, an important determinant of undernutrition [10].

With regard to hygiene and sanitation practices: around 1 quarter of our sample (24.2%) did not wash their hands before eating.

5. Conclusion

A child's nutritional status is still a highly controversial subject because it is not always easy to define and measure. This study enabled us to assess the nutritional situation of children under 5, who are the most vulnerable. Malnutrition is still a topical issue in Mali, as various types of malnutrition are present in both moderate and severe forms in children.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Baudin, B. (2014) Malnutrition et sous-alimentation. *Revue Francophone des Laboratoires*, **2014**, 25-37. [https://doi.org/10.1016/s1773-035x\(14\)72709-1](https://doi.org/10.1016/s1773-035x(14)72709-1)
- [2] Demographic and Health Survey, Mali (2018).
- [3] UNICEF (2020) Nutrition, for Every Child: UNICEF Nutrition Strategy 2020-2030.

- UNICEF.
<https://www.unicef.org/supply/media/10996/file/UnicefNutritionStrategy.pdf>
- [4] UNDP (2021) Global Nutrition Report 2021, Update on the Global Nutrition Situation.
https://media.globalnutritionreport.org/documents/2021_Global_Nutrition_Report_aUfTRv0.pdf
- [5] Cinquenta, A., Buanamade, E.C., Abdulkarim, S. and Ramos, I.C. (2022) Avaliação do estado nutricional de crianças dos 6-59 meses de idade: Caso de deslocados internos de Cabo Delgado, Norte de Moçambique. *Research, Society and Development*, **11**, e293111739412. <https://doi.org/10.33448/rsd-v11i17.39412>
- [6] Gooding, C., Musa, S., Lavin, T., Sibeko, L., Ndikom, C.M., Iwuagwu, S., et al. (2024) Nutritional Challenges among African Refugee and Internally Displaced Children: A Comprehensive Scoping Review. *Children*, **11**, Article No. 318.
<https://doi.org/10.3390/children11030318>
- [7] Final Report of the SMART 2022-Mali Survey. P11, 50, 72 and 94.
https://www.instat-mali.org/laravel-filemanager/files/shares/eq/rafsmart22_eq.pdf
- [8] Kainoune, S.O. (2020) Assessment of the Nutritional Situation of Children Aged 0 to 59 Months in the Taoudéni Region. Medical Thesis, Bamako University of Science and Technology.
- [9] Malnutrition in Mali: A Public Health Issue. <https://www.unicef.fr/>
- [10] Idowu, O.S., Akindolire, A.E., Adebayo, B.E., Adebayo, A.M. and Ariyo, O. (2020) Determinants of Anthropometric Characteristics of Under-Five Children in Internally Displaced Persons' Camps in Abuja Municipal Area Council, Abuja, Nigeria. *Pan African Medical Journal*, **36**, Article No. 313.
<https://doi.org/10.11604/pamj.2020.36.313.21221>
- [11] Lafta, R., et al. (2017) Nutritional Status Assessment of Internally Displaced Children in "Dream City" -Iraq. *Journal of Food and Nutrition Sciences*, **5**, 122-130.
<https://doi.org/10.11648/j.jfns.20170503.19>
- [12] Diarra, L. (2021) Nutritional Status of Children Aged 6 to 59 Months and People Aged 50 Years and Older in Displacement Sites in Mali. MD Thesis, 23.
- [13] Minawir, N.M., Mbaga, D.S., Béchir, M., Sodio, B. and Yaro, A.S. (2025) Exploring Malnutrition Risk among Infants under Five Years in Guéra Province, Chad: A Cross-Sectional Study. *Food and Nutrition Sciences*, **16**, 95-119.
<https://doi.org/10.4236/fns.2025.161006>
- [14] Leidman, E., Humphreys, A., Greene Cramer, B., Toroitich-Van Mil, L., Wilkinson, C., Narayan, A., et al. (2018) Acute Malnutrition and Anemia among Rohingya Children in Kutupalong Camp, Bangladesh. *JAMA*, **319**, 1505-1506.
<https://doi.org/10.1001/jama.2018.2405>
- [15] Ministry of Health and Hygiene, Mali (2017) Protocole de Prise en Charge Intégrée de la Malnutrition Aiguë au Mali. Revised Version 2017.
<https://www.unicef.org/mali/rapports/protocole-de-prise-en-charge-integree-de-la-malnutrition-aiguë-au-mali-version-révisée>