

# Nutritional rehabilitation of special cases of malnourished children aged 0 to 6 months at the Maradi Regional Hospital, Niger

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## ABSTRACT


Malnutrition is a pathological state resulting from the relative or absolute deficiency or excess of one or more essential nutrients, whether this state manifests itself clinically, or whether detectable only by biological, anthropometric, or physiological analyses. This study uses a cross-sectional survey conducted on a representative sample of 60 mothers with their children aged 0–6 months (special cases) admitted at the Intensive Nutritional Education and Recovery Center of the Maradi Regional Hospital from May 23 to July 23, 2022. The main objective of this study is to evaluate the nutritional rehabilitation of children in special cases within this service. Data collection was done on 60 children with severe acute malnutrition. A questionnaire was addressed to the mothers of malnourished children. The hospital records were also used to access information on the anthropometric parameters, thus determining the nutritional status of the children studied. The study results show that children aged 0–3 months are the most affected by malnutrition and are special cases with a weight/height ratio below minus 3 z-score. They most often suffer from diarrhea with a rate of 41.6% and fever with a rate of 21.7%. These children generally come from parents with no schooling and with limited resources. It can also be noted that most of these malnourished children come from mothers who practiced mixed breastfeeding. To get done, during treatment, the majority of patients have to use the diluted F100 as the type of diet and a mode of feeding with the cup. The supplementary suckling technique was applied to get heal the special cases in need. In conclusion, the study affirms that socioeconomic and environmental factors play a very important role in the persistence of malnutrition in this part of the world.

**Key words:** Maradi, Nutritional rehabilitation, Severe acute malnutrition, Special cases, Supplementary suckling technique

The world in general is hit by several seasonal or temporary diseases or pandemics that havoc on demography causing not only depopulation of the population but also a downturn in the global economy. Among these diseases is malnutrition, which disrupts public health. The World Health Organization defines malnutrition as a pathological state resulting from the deficiency or excess, relative or absolute, of one or more essential nutrients, whether this state is clinically manifest or is detectable only by biochemical, anthropometric, or physiological analyses [1]. The United Nations joint report geos representing the most recent global and regional figures that 22.0% of all children under 5 years were stunted in 2020; 13.6 million children under 5 years were affected by wasting in its severe form in 2020 and 5.7% of the same age children also were overweight. Moreover, more than nine out of ten malnourished children live in Africa or Asia, with high mortality. Indeed, about

1/3 of deaths in this age group are due to malnutrition [2,3]. Although, the issue of malnutrition remains one of the major concerns for developing countries [4]. One of the most troubling current topics in our societies is the malnutrition crisis. The current government is very keen to investigate this issue to find a solution, and health professionals are particularly interested [5]. To deal with malnutrition, the government is fully committed through its Ministry of Health and its technical and financial partners working in the field of nutrition in developing countries, to find ways and means to curb this very dangerous disease [6]. Knowingly, diverse factors are influencing malnutrition directly or indirectly in developing countries as described as insufficient resources and their control, low literacy of parents, inadequate health care for mother and child, unsanitary environment, community dependence on assistance, irregular meals for the child, and imbalance in eating habits [6,7].

The management of malnutrition in a country such as Niger follows a well-codified national protocol [8] which is the

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flagship document in the fight against malnutrition and infant mortality, which includes the methods and supplementary suckling technique (SST). The SST, by which action of sucking, of drawing a liquid or a semi-liquid into the mouth to create a vacuum in the oral cavity by strong suction by the fact of using a nutritional supplement to compensate for a deficiency or to improve the child's performance. In fact, malnutrition is a real public health problem in this region due to its high infant mortality, especially among children under 5 years old. Techniques such as therapeutic milk (F-75 and F-100) to initiate rehabilitation and weight gain of severe malnutrition cases, and the supplementary suckling technique is another option that showed effectiveness in the management of malnutrition. This is a very simple and very ingenious method that teaches a baby how to suckle and relaunch his mother's milk production. This research aimed to identify the different ways of preventing or fighting malnutrition in children who are nutritionally deficient. Furthermore, to rehabilitate, special cases of malnourished children aged 0–6 months admitted into the health care center by the use of SST.

## MATERIALS AND METHODS

### Materials

A proper survey was conducted using the children's hospitalization records which served as the child's identifier, anthropometric measurements, and complications related to malnutrition. An interview guide with the mothers of malnourished children at the Regional Hospital Center (CHR) of Maradi city, Niger was used.

### Diagnostic tools and equipment

Height was measured using the United Nations Children's Fund (UNICEF) height chart. The height was taken in the lying position for children with a height  $\leq 85$  cm, and in the standing position for children, whose height reaches and exceeds 85 cm. For weight, a manual scale was used for children aged 0–6 months, or up to 24 months. Temperature and cardiac frequency were taken respectively, with an electronic thermometer and a stopwatch. The Middle-Upper Arm Circumference tape measure was used to measure arm circumference. Nutritional status was determined from the 2006 World Health Organization weight/height table and a register [1].

### Methods

#### *Type, period, and framework of the study*

This was a prospective, descriptive, and evaluative study, extended over 2 months, from May 23, 2022, to July 23, 2022, period that corresponds to an extremely lean period in the area. The study took place at the Intensive Nutritional Education and Recovery Center (CRENI) of the CHR of Maradi.

### Study population

Malnourished mother-child couples from 0 to 6 months (special cases) and admitted to the CRENI of the CHR of Maradi during the period covered by this survey.

### Sampling

To carry out this study, we used the simple random method: One which consisted in interviewing all the mothers of malnourished children whose age was between 0 and 6 months, met at the CRENI of the CHR during the period devoted to this investigation. Thus, over the period from May 23, 2022, to July 23, 2022, we carried out discussed with 60 mothers of malnourished children, which is also the sample size of the present study.

### Statistical Analysis

Data cleaning, tables, and figures constructions were made using Microsoft Excel 2016© software. The analysis was carried out with the analysis software Epi info version 3.5.1. Text. The software Statistical Package for the Social Sciences for IBM version 20 was used to analyze the data to make averages and for the qualitative data, and then, frequencies were determined to see the difference between the results of the perceptions of the different individuals surveyed.

### Ethical Considerations

All rules of confidentiality and ethics were respected according to the Declaration of Helsinki of 1975 revised in 2008. The protocol of the study received the approval of the Regional Ethics Committee, the Science Academic Council of Dan Dicko Dankoulodo University of Maradi, as well as the various authorities in charge of health. Consent had been previously obtained from the parents or guardians of the children surveyed before their participation in the study. In addition, the possible commitment to communicate the results of the survey after the publication had also been made.

## RESULTS AND DISCUSSION

Characterization of the parents of malnourished children helps to locate responsibility for the situation of management of malnutrition [6]. Thus, in this case, 87% of the mothers of malnourished children are <35 years old and 13% are over their thirties (Fig. 1). The majority of mothers are illiterate (83%), and only 17% of them have a basic education level school (Fig. 1). Most of the questions that have been addressed in the study revealed that the level of education of a mother is a fundamental element to comprehend the situation, in which those malnourished children found themselves. This is due to the early marriage that persists in some developing countries such as Niger precisely in the Maradi region, girls are often married at the young age of 14–15 years

old. In addition, ignorance or illiteracy combined with poverty are among the main contributors. These results are similar to early works that showed this phenomenon of the early girl marriage can lead to various problems such as suicide, pustular girls, child severe malnutrition, and inter-family conflict [9-12]. The issue of leaving standards has to do with hygiene which contributes significantly to treating the health of children mostly in rural areas and the origin of the majority of mothers of malnourished children. Table 1 presents the leaving conditions of the admitted children's mothers; indeed, 97% of breastfeeding mothers have cereals as a regular meal and talk less about eating protein food sources [13].

In this part of the world, parents are responsible for the family that mostly children's father has the obligation to feed, shelter, and secure the family. These results show us that the most affected children by malnutrition come from parents with limited resources and income. Data show that 63% of the malnourished children's fathers are polygamous and 37% are monogamous. However, 58.4% are fathers of <7 children; though over 12 children up to 15% (Fig. 2). In addition, 53.3% of the malnourished children's fathers are local farmers and 18.3% are migrant workers, with over 88% of them being illiterate [14].

Findings have shown that the majority of children under the age of 6 months (special cases) who suffer from malnutrition are between 0 and 3 months old (55%) and aged from 3 to 6 months (45%). The results show a significant gap among the admitted malnourished children between males (60%) and females (40%), 83% of them came from rural areas, and only 17% live in urban sites. The most common reason for admission is diarrhea (41.6%) followed by insufficient breastfeeding (30%) (Fig. 3). It was revealed that 61.7% of mothers practice mixed breastfeeding (MBF), 20% do exclusive breastfeeding (EBF), and 18.3% practice artificial breastfeeding (Fig. 4). Knowingly, all the admitted malnourished children were referred from the health centers in the region to CRENI of CHR, Maradi [15,16]. Similarly, results were reported by Dadié and Balla [17] that 66.5% of children were able to benefit from MBF against 33.5% of children who had the chance to have EBF, and this is due to insufficient breast milk.

Diarrhea is the most common cause of admission of malnourished children in the hospital (41.6%), followed by insufficient breast milk, fever, and maternal death [4]. This high rate of diarrhea can be explained by the lack of hygiene and that the children do not receive EBF rather; they also eat all such foods sometimes insane to consumption, especially for children. However, vaccination could be excellent prevention for children's health status. The study reported that most of the malnourished children admitted to the CRENI/CHR of Maradi, Niger have vaccination status; in addition, 34.78% of the mothers breastfeeding their babies up to 10–15 times a day, 43.48% also practice up to 15–20 times, and 20–25 times were just 21.74% (Fig. 5). Similar reasons were found in other regions to affect children's nutrition status [18,19]. It is said that the use of therapeutic milk F-75 prevents deaths, and as soon as,

the child is stabilized on F-75, F-100 is used as a “catch-up” formula to rebuild wasted tissues. The SST is applied to assist and facilitate child feeding to the mother's breast close to the nipple by the use feeding tube at one end stuck to the breast and the other end of the tube lies in a bowl of milk with the careful dilution of the milk [20]. The study shows that the majority of the admitted malnourished children consume diluted F100 milk, which represents 88%, and only 12% of children consume F75 milk; though 88.33% use a cup as a mode of feeding while 11.67% use the supplementary sucking technique (Fig. 6). It happens that some mothers use mixed feeding for the newborn before the first 6 months of birth. This implies that the use of the SST is also low as more than 80% are on a “catch-up” formula to

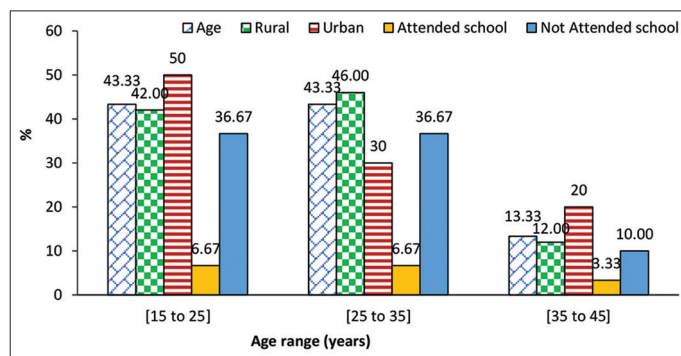


Figure 1: Age ranges, provenances, and educational levels of malnourished children's mothers

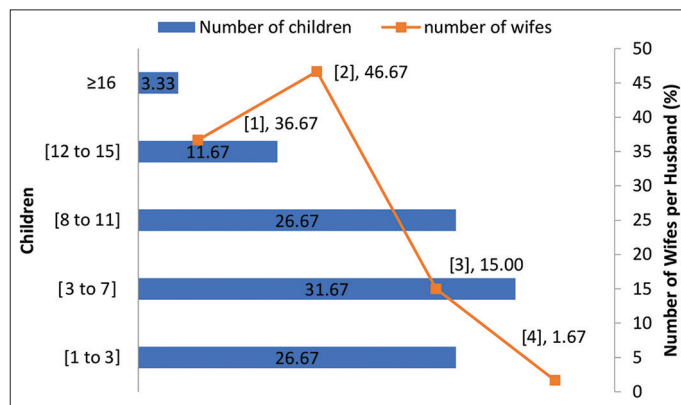


Figure 2: Numbers of wives ([1] to [4]) and children per father of malnourished children

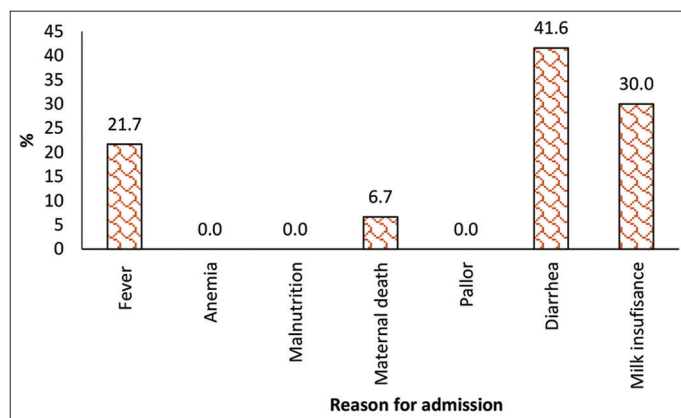
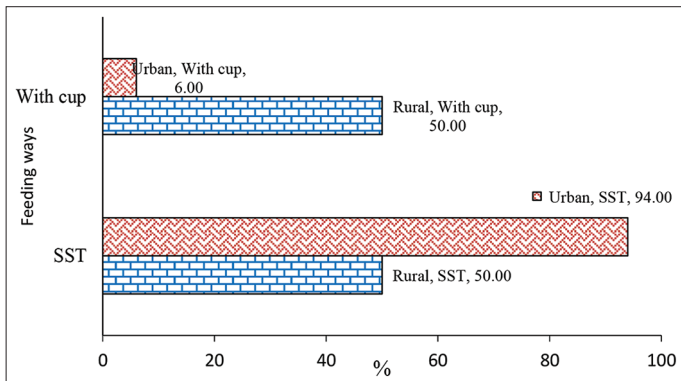


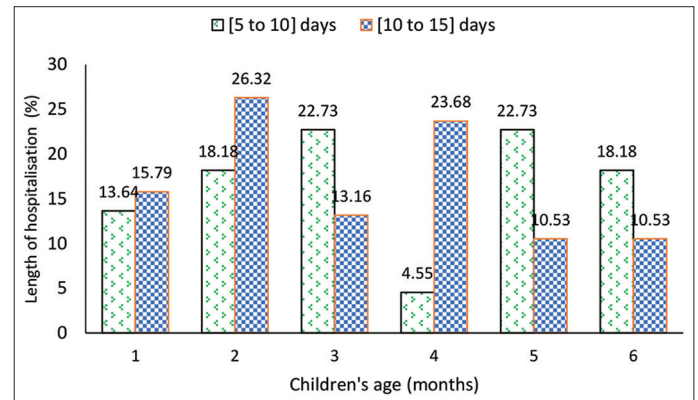
Figure 3: Reason for malnourished children's admission into hospital

**Table 1: Malnourished children’s mothers living conditions**

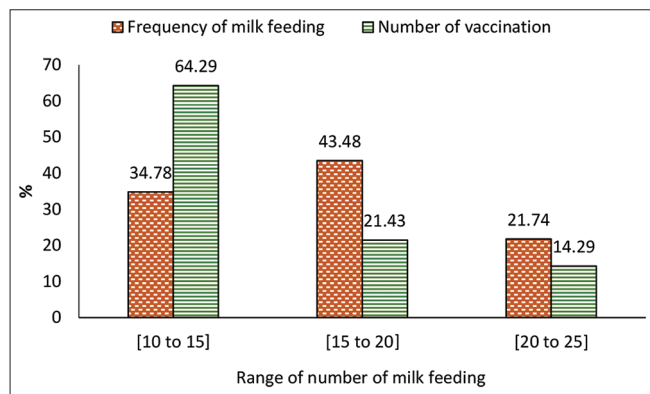
Percentages of Yes and No	Access to clean water	Food type	Food sources ion (Fe)	Knowledge in Vitamin A
Yes	28 potable water	97 cereals	3	8.3
No	72 water at risk	3 tubers	97	91.7



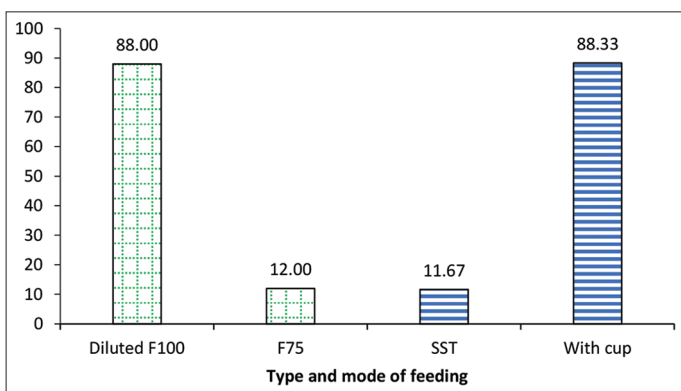
**Figure 4: Malnourished children feeding supply mode (Supplementary Suckling Technique; and *With Cup*) per provenance**



**Figure 7: Length of hospitalization of malnourished children in Regional Hospital Center**



**Figure 5: Vaccination and breastfeeding status of malnourished children before admission to Intensive Nutritional Education and Recovery Center/Regional Hospital Center**



**Figure 6: Type and mode of feeding of malnourished children admission to Intensive Nutritional Education and Recovery Center/Regional Hospital Center**

rebuild wasted tissues. At last, Fig. 7 shows an irregular length of stay at the hospital; though the youngest (1–3 months) admitted malnourished children tend to have the longest stay period in the hospital 10–15 days. Although, a majority of children are male special cases [21,22].

**CONCLUSION**

We can infer that malnutrition is still a problem for public health in this region of the world. After a 2-month investigation at the CRENI/CHR in Maradi on a sample of 60 infants aged 0–6 months (special cases), it was discovered that the majority of the male special cases are the children who are most impacted by the diseases. It should be highlighted that practically all families with malnourished children have two parents who are from rural areas, have very little education, and have few resources and income. The most common causes of hospitalization are fever and diarrhea. This situation is explained by the very high practice of MBF in addition to the early marriage, of which the majority of mothers of malnourished children were married at a relatively young age, 14–15 years old. Despite the efforts made by the government, malnutrition persists in rural areas.

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