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Nutrition and food security in Mali from 2010 to 2020

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Abstract

Mali, a Sahelian country in West Africa, faces many climatic, natural and security constraints. This situation has accentuated the nutritional issues which are largely responsible for the high morbidity and mortality rates. The aim of the current review is to understand the main issues related to nutrition and diet among vulnerable groups in Mali during the last decade. The exclusive breastfeeding rate remains relatively low (40%). The Complementary feeding practices are inadequate 49%. These practices are coupled with chronic food insecurity, limited access to health care and services and water coverage and inadequate hygiene practices. The 2019 nutrition survey showed a wasting prevalence of 9.4% in children under the age of 5 and a prevalence of stunting of 27% in young children 0-23 months. In addition, there is a nutritional transition limited to the urban environment, where almost one in three adult women is overweight or obese. Simultaneously, undernutrition perseveres among women, particularly in rural areas (18.5%). The persistence of micronutrient deficiencies is accentuated, especially anemia with a prevalence rate of 82% in children under 5 years. The strategy of universal salt iodization has led to a marked reduction in iodine deficiency disorders. Vitamin A deficiency is a public health problem in women with a retinolemia rate of 35%. There is a Nutrition Policy document, an intersectoral coordination unit with a view to strengthening interventions to better achieve the Sustainable Development Goals.

Keywords: Malnutrition, Infants under 5, Micronutrients, Food Insecurity, Mali.

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1 Introduction

The population of Mali is estimated at 20,252,586 in 2019 with an annual growth rate of 3.36% for an area of 1,246,816 km^2 [1]. The strong demographic growth accentuates the pressure on resources. The mainly young population, representing more than 50% of the whole population, is principally rural and largely engaged in agriculture being the pillar of the country's economy [1]. The agricultural sector is strongly influenced by the vagaries of the weather and the prices of raw materials at the level of the international market. Growth is going up and down and economic performance is uncertain. The agricultural sector has developed strongly as a result of policies that have had a positive impact on cereal production, in particular on rice production which has increased considerably.

In recent years, Mali has become the third-largest producer of gold in Africa, with gold accounting for 70% of export earnings and 15% of Gross Domestic Product [1]. Nutrition is playing an increasingly important role in health programs in Mali because nutritional problems are largely responsible for the high morbidity and mortality rates among the most vulnerable groups, namely children under five years and pregnant or lactating women. There is a political will to reduce malnutrition at the highest level with the adoption of a national nutrition policy in 2013 and the establishment of a Nutrition coordination Department in June 2016. Furthermore, a national food and nutritional security policy (PolSAN) has been adopted since 2017. PolSAN is a part of Mali's economic and social development priorities defined by the Strategic Framework for Economic Recovery and Sustainable Development of Mali (CREDD). The development objective of this policy is to ensure food security for the Malian population, to improve the nutritional status of the most vulnerable people and their resilience capacities, within the framework of the CREDD perspective, to achieve the Development Goals Sustainable (SDG) of Mali by 2030 [2]. Moreover, with a view to integrating multi-actor, multi-sector actions of nutrition, Mali joined the REACH partnership of the United Nations in 2011 and the SUN Movement in 2012.

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2 Dietary intake: quality and quantity of macro and micronutrient intake/ food groups

In Mali, two types of diet predominate: a diet essentially based on plant products (millet, rice) and animal-based products diet (milk, meat). These two types of diets are however both based on cereals, enriched with sauce in a sedentary environment and milk in a pastoral environment [3]. Both diet patterns are generally quite monotonous and vary according to the seasons, socio-cultural and economic levels of every family. The basic cereals of the diet are millet, sorghum and corn, consumed in the form of dough, tô, or couscous and white rice, mixed with different sauces, of which there is a considerable variety according to the zones and times of the year [3]. To this, is supplemented cereal-based porridge (millet, sorghum). Pasta (macaroni) and fonio are eaten occasionally. Urbanization and rising incomes in cities have caused some dietary changes. Thus, the consumption of rice and tubers (yam, cassava, sweet potato, potato, and taro) is now dominant in cities, ahead of that of millet and sorghum. Sources of micronutrients such as tubers, vegetables, legumes (especially cowpeas), seasonal fruits (mangoes, melons, bananas, etc.) are less consumed while picking products (shea, néré, Baobab fruit, etc.) occupy an important place in rural food, especially during the lean season [3].

Milk is consumed in all regions of the country. However, in the northern areas, it primarily supplements the basic diet such as curd mixed with millet. The diet also includes meat from poultry, sheep and goats and fresh or smoked fish. In rural areas, these foodstuffs are consumed occasionally, mainly because of their high cost and are often sold by producers to the urban populations [4]. The diversification of crops with the development of market gardening crops in the Office of Niger area, intensive livestock farming and the development of milk processing units, constitute dynamics that could probably improve the nutritional quality of the diet [3].

Food markets are also supplied by various manufactured products (milk powder, sugar, oil, and wheat flour), mainly imported from neighboring countries and Europe [3]. According to the 2018 food and nutritional security survey, it appears that 87.8% of households consume oils and fats. When milk and meat are consumed at 48.8% and 46,3% respectively. Fish are consumed up to 35% and legumes by 20.5% of the Malian population. The level of consumption of fruits and tubers is 11.8% and 17% respectively. However, eggs are the least consumed, i.e. 5.4% [5]. The intra-household distribution of meal consumption is linked to the socio-cultural habits of the household. In cities, especially in Bamako, street food is gradually spreading to all ages and in all social strata [6]. At the national level, we note a slight increase in the proportion of households with good dietary diversity (consuming 4 or more food groups) with 96.1% in September 2018 *versus* 94.9% in September 2017.

3 Micronutrient deficiencies: prevalence of iron, vitamin A and iodine deficiencies

Micronutrient deficiencies are among the most prevalent nutritional issues in Mali. According to the latest health survey report in 2018, at least 82% of children under the age of 5 and 63% of women of reproductive age suffer from anemia [7]. The low intake of iron-rich foods, the high frequency of infectious diseases, especially malaria and other parasitic diseases, pregnancies, and bleeding during childbirth constitute the main causes as displayed in Table 1. Severe anemia is responsible for 20% of maternal deaths and increases the proportions of prematurity and low birth weight [7]. In addition, we observed a low availability of iodine in soil and water. The last national survey of iodine deficiency, carried out in 2005 on preschool children, reported an iodide rate of 8.8%, showing a slight deficiency among the population [8]. Despite universal salt iodization, it was noticed in 2018 that 15.4% of households did not consume iodized salt compared to 35% in 2010 [4,8] Vitamin A deficiency also remains a concern with a rate of 35% of school children with low retinolemia [8,9]. The supplementation strategy introduced in the 2000s has led to a marked improvement in vitamin A deficiency. However, coverage of vitamin A supplementation in children 6-59 months remains average with a rate of 91% [10,11].

Table 1: Prevalence of micronutrient deficiency

Deficiency	Indicator	Status	Source [7]	Year	Severity
Vitamin A deficiency	School-age children suffering vitamin A deficiency	35%	MDHS VI	2018	poor
	Vitamin A supplementation coverage in children under 5 years	61%	MDHS V	2013	medium
Iron deficiency	Anemia in children under 5 years	82%	MDHS VI	2018	poor
	Anemia in women of childbearing age	63%	MDHS VI	2018	poor
Iodine deficiency	Urinary iodine level among school-aged children	8%	Health Survey	2005	good
	Households consuming iodized salt	84.6%	ENSAN	2018	good

EDSM: Mali Demographic and Health Survey; ENSAN: National survey of Nutrition and food security; MDHS VI: Mali Demographic and Health Survey VI

4 Prevalence of CVD, obesity/overweight, diabetes, and cancers

In Mali, chronic diseases constitute a real public health issue. The prevalence and the incidence are often poorly understood within the general population, due to a lack of in-depth studies.

Few data is available on diabetes and hypertension in Mali. One study was carried out at the level of Bamako hospitals [12]. The prevalence of high blood pressure was estimated at 10%, and the rate of people with a clinically detectable heart condition can be around 1% [13]. This situation is exacerbated by the economic transition, urbanization, industrialization and changes in lifestyles such as smoking, lack of physical activity and inadequate feeding practices, especially the excessive consumption of salt. The prevalence of diabetes was estimated to 4.8% [14]. Among the favoring risk factors, we can list the above-mentioned factors mainly an unhealthy lifestyle with a high consumption of processed and sweet products. The mortality rate linked to diabetes in Mali is 2% [13]. The annual incidence of diabetes varies between 12 and 16% [10]. In Mali, the incidence of cancer is estimated at around 120 cases per 100,000 inhabitants. The hematology and medical oncology service at Hospital Point G is the unique medical department for patients with cancer in Mali. From January 2007 to October 2009, 2 144 new patients were admitted in consultation and 853 patients were hospitalized (primarily breast cancer, lymphoma, chronic myeloid leukemia and brain cancer. The government offered free chemotherapy in January 2009.

In 2018, more than 2,000 patients benefited from chemotherapy [14]. There has been a radiotherapy center since 2000. Mali recorded more than 783 new cases of cancer in 2018, with an increase of 10% compared to 2013 [8].

Table 2: Prevalence of micronutrient deficiency

Deficiency	Indicator	Status	Source [13]	Year	Severity
High blood pressure	Prevalence of hypertension	10%	Report NDH	2012	poor
	Hypertension in adult women	34%	NCD-RisC	2016	medium
Diabetes	Prevalence of Diabetes adult	4.8%	NCD-RisC	2016	poor
	Diabetes in women	6.4%	NCD-RisC	2016	medium
Obesity / overweight	Prevalence of overweight among women of childbearing age	36%	NCD-RisC	2005	Poor
Cancers	Cancer incidence	120 / 100000	Hospital Report	2013	Medium

NCD-RisC Non-Communicable Disease Risk Factor Collaboration: National direction of health.

5 Special focus on infants and children under 5 years

Despite the progress being made, challenges remain to be met for certain childhood illnesses whose prevalence is still increased (malaria, diarrhea, pneumonia infections) [8]. The infant and child mortality rate in Mali is among the highest in Africa, it is estimated at 101 per thousand according to a health survey [7]. Among the causes of death, five pathologies represent nearly 75%; these are malaria, diarrhea, measles, pneumonia, and malnutrition which forms the backdrop. Nationally, only 39.0% of children, aged 12 to 23 months, received all the basic vaccines in 2012/2013, compared to 45.0% in 2018 [7,15]. Despite the improvement noted for the vaccination coverage of children aged 12 to 23 months, the situation remains worrying in certain regions of the North, where the proportion of children who received all the basic vaccines is below 1%, probably due to the security crisis [7].

Malnutrition is affecting children's health and may increase the risk of illness and death. It has been shown that 50% of the deaths among children under five-years are due to malnutrition. In addition, 26.6% of children aged 0 to 59 months suffer from chronic malnutrition [7]. Chronic malnutrition is worsened by childhood illnesses, low access to water and sanitation services, low household income, low education level of women and chronic food insecurity in communities. Wasting affects 9.4% of children under five years, creating a serious nutritional situation, as shown in table 3 [10]. This situation was observed in four (4) regions out of the eleven (11) surveyed with a prevalence of global acute malnutrition of between 10 and 14%. The concerned regions are: Gao (11.6%), Timbuktu (13.1%), Kidal (11.0%) and Taoudénit (11.0%). In addition, the Menaka region (15.3%) is in a critical situation as its prevalence exceeds 15% according to WHO standards [1]. All the other regions (Kayes, Koulikoro, Sikasso, Ségou and Mopti) as well in the Bamako district are in a precarious situation (9 and 7%) [16]. Wasting emanates from successive crises since 2012 especially in conflict zones where the market supply system was disrupted. Furthermore, populations with difficult access to food have caused population movements with great pressure on resources. Over the past five decades, underweight was significantly improved to reach 18.1% [16]. However, the different forms are usually associated with minerals and vitamins deficiencies.

Table 3: Prevalence of low birth weight, stunting, wasting and underweight

Deficiency	Indicator	Status	Source[16]	Year	Severity
Wasting	Global acute malnutrition in children 6- 59 months	9.4%	SMART	2019	medium
	Severe acute malnutrition	2%	SMART	2019	poor
Stunting	Global chronic malnutrition in children 0-23 months	26.18%	SMART	2019	medium
	Severe chronic malnutrition in children 0-23 months	8.6%	SMART	2019	poor
Underweight	Underweight in children 6-59 months	18.6%	SMART	2005	medium
	Severe underweight in children 6-59 months	4.83%	SMART	2018	medium

SMART = Retrospective nutrition and mortality survey (Standardized Monitoring and Assessment and Relief and transitions)

6 Exclusive breastfeeding practice versus early complementary feeding

Feeding practices are inadequate for the majority of infants aged 6-23 months, despite the fact that breastfeeding is fairly widespread in Mali. Indeed, almost 97% of children are breastfed while only 40% of infants are exclusively breastfed until 6 months[7]. This rate varies by region with the lowest level found in Bamako (9.7%) and the highest level in Ségou (57.3%) [7]. The early introduction of water remains the main determinant of the very low and stagnant prevalence of exclusive breastfeeding in the past decade. In 2018, 56.5% of newborns started breastfeeding within an hour of birth. The lowest rate is found in Mopti at 40.2% and the highest is in the Sikasso region 78.7%. Continued breastfeeding until the age of 2 years is 53.4% [7]. In addition, 6.0% of non-breastfed children aged 6-23 months received at least 2 milk meals and minimum dietary diversity C.F table 4 [4]. The minimum acceptable meal frequency for children aged 6-23 months is 37.7% while the percentage of those who benefit from a minimum acceptable dietary diversity is 10.4% [16]. These practices, which have deteriorated since 2006, coupled with limited access to care, chronic food insecurity and household poverty are the main causes of malnutrition in young children [1].

Table 4: Prevalence and practices in percent [16]

Indicators	Mali	Kaye	Koulikoro	Sikasso	Segou	Mopti	Tombouctou	Gao	Kidal	Ménaka	Taoudenit	Bamako
Percentage of infants 0-5 months who have been exclusively breastfed	40	31.2	48.4	55.6	57.3	25	48.2	44.6	416	72.2	16.7	9.7
Percentage of children aged 6 to 8 months who received semi-solid or soft solid foods	37.3	53.9	17.5	47.4	38.3	50	16.9	48.3	35.2	60.7	29.6	19.1
Percentage of children aged 6 to 23 months who received at least the 4 food groups	17.3	28.0	22.5	15.6	12.8	13.7	6.7	38.0	16.7	15.4	2.1	20.3
Percentage of children aged 6 to 23 months who received the number of meals required on the eve of the survey	37.7	48.1	27.2	50.7	39.8	67.0	20.9	37.5	32.1	48.5	23.7	19.3
Percentage of breastfed children 6- 23 months who received a minimum acceptable diet	10.4	25.4	16.3	8.4	4.2	10.3	2.9	15.6	15.9	11.3	1.8	7.6
Percentage of non-breastfed children 6-23 months who received a minimum acceptable diet	12.5	3.1	4.2	27.8	8.8	16.7	15.4	19.6	3.9	0.0	0.0	11.2

7 Food insecurity

Since 2012, Mali has a humanitarian crisis marked by structural weaknesses, chronic poverty, conflicts and natural disasters. These recurrent and successive shocks led to the weakening of the livelihoods of more than 2 million vulnerable Malians in 2019, who cannot ensure their food security and nutrition [5]. In the 2018 and 2019 agropastoral campaigns, a localized drop in production led to a rapid depletion of stocks, mainly for poor households [7]. Livestock constitutes an important component of the agricultural sector. National production is generally sufficient to meet the country's cereal needs, but the high sensitivity of agriculture to variations in precipitation makes the use of emergency food aid essential in certain years [5]. Food insecurity affects around 10% of the population, a proportion that has fallen slightly over the last decade. Although food security is improving, households are still very vulnerable and chronic food insecurity persists [5] c.f. Table 5. The prevalence of food insecurity is 19.1% of households, of which 2.6% is food insecure in the severe form. This rate is down compared to September 2017 (23.3%). The regions with the highest level of food insecurity are in order of importance: Kidal (46.7%), Mopti (34%), Gao (28.4%), Timbuktu (24.7%) [5]. Moreover, the prevalence of food insecurity is 23.6% in rural areas against 7.5% in urban ones. The trend of food insecurity compared to February 2018 is down in all regions, except Kayes (+ 10%) and Kidal (+ 6%). A significant decrease was observed in the Timbuktu and Gao regions with -24% and -14% respectively. In addition, there has been a marked increase in the Kidal region (+ 6%) [5]. The main factors of food insecurity in the regions of

Mopti, Gao, Timbuktu and Kidal are climatic shocks (droughts, floods), biophysics (predators), security (insecurity and population movements), economic (rise in prices and economic vulnerability) and the methods of cultivation and breeding (animal mortality, diseases and pests) [5]. Moreover, the economic profile of households and the food situation also give a fairly varied picture. Just over a third or 35% of households are food insecure for the poorest economic well-being quintile; the proportion of food-insecure households decreases with the improvement of economic well-being (increase in wealth) [5]. It is however interesting to note that households classified as rich, that is to say having the most goods and equipment, can be affected by food insecurity: indeed 12.3% of households considered as rich are in food insecurity [5]. However, in 2020, given the unstable security situation, increased population movements, Mali and the other Sahel countries, will continue to face challenges linked to food security and nutrition. So, it is essential to provide support to the agricultural sector in order to mitigate the effects of insecurity and natural disasters [17].

Table 5: Wealth quintile by household food security class [4]

Wealth quintile by household food security class	Food security%	Mild food insecurity%	Moderate food insecurity%	Severe food insecurity%
Poorest	5.9	59.4	27.8	6.9
Poor	17.5	58.2	21.0	3.3
Medium	30.8	52.3	14.6	2.3
Riche	40.5	47.1	11.7	0.6
Richest	59.0	33.7	7.1	0.2

8 Conclusion

In view of all these observations, it is imperative to act on malnutrition, given its impact on economic growth and human development in terms of the burden of morbidity, mortality and reduced productivity of the working population of the future. Strengthening short-term interventions are necessary to improve the nutritional status of the population, specifically improving the quality of food. Supported by the development of the agricultural sector and the observed improvement in food security, Mali currently has opportunities to improve agricultural diversification and the nutritional quality of food. Investing in nutrition will therefore save thousands of lives for children and mothers, maximize their potential, increase productivity and reduce poverty.

9 Recommendations

- Strengthen political commitment to food and nutrition:
  - Ensuring better multisectoral coordination of food and nutrition activities;
  - Respecting the international commitments made by Mali in terms of food and nutrition.
- Support the establishment of Support Groups for Nutrition Activities (GSAN) through specific and nutrition-sensitive interventions and increase coverage at the community level with focus on the first 1000 days as a means of preventing malnutrition:
  - Promoting integrated community and multisectoral approaches for improving child survival and development;
  - Advocate for the mobilization of funds for the implementation of multisectoral projects;
- Mobilize local partners in the supervision of data collection activities for regions in crisis;
- Organize a survey on the determinants of malnutrition including gender and social protection aspects;
- Improve the quality of treatment for acute malnutrition through the regular provision of inputs, human resources, continuous training, early detection, active monitoring and regular analysis of data at all levels;
- Continue advocacy with the Government for an annual institutionalization of nutritional surveys, chronic diseases and an allocation of resources in favor of nutrition;
- Conduct studies on the issue of micronutrient deficiencies, in particular anemia, and propose appropriate national strategies to alleviate it
- Strengthen the health system on the prevention and management of malnutrition

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