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Research Article

Assessment of Dietary Diversity of Children Between 6 and 23 Months: A Cross-Sectional Survey in the Savanes, Kara, and Maritime Regions of Togo

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Abstract

Dietary diversity refers to the consumption of foods from different groups, which is essential to ensure adequate nutrient intake in children. However, the situation remains critical in Togo, with only 12% of children aged 6 to 23 months being fed according to optimal infant and young child feeding (IYCF) practices. Available data on these children's diet must therefore be analyzed to better understand the situation and improve their nutrition. This research assesses the dietary diversity of children aged 6 to 23 months in the Savanes, Kara, and Maritime regions of Togo, using data from the SMART 2022 survey (Standardized Monitoring and Assessment of Relief and Transitions). The sample studied included 620 children and 1002 households selected by a two-stage cluster sampling in the regions considered. In terms of Infant and Young Children Feeding (IYCF) practices, the results reveal that approximately 85% of children in the Kara and Savanes regions continue to be breastfed beyond 12 months, compared to 68.2% in the Maritime region. Despite relatively frequent introduction of solid foods, the proportion of children achieving minimum dietary diversity remains low (20%) in all three regions. These results are corroborated by the rates linked to malnutrition indicators observed during the study. It is therefore important to implement sustainable nutritional programs and projects to improve dietary diversity and meet the nutritional needs of children in vulnerable regions in Togo.

Keywords

Dietary Diversity, Children 6 to 23 Months, Malnutrition, Savanes, Kara and Maritime Regions, Togo

1. Introduction

Undernutrition remains a major public health issue, particularly in developing countries Chong et al [1], Popkin et al [2]. It is characterized by insufficient energy and nutrient intake, leading to serious consequences for children's growth and development. Globally, undernutrition contributes to an alarming number of child deaths. In fact, it is estimated to be responsible for 2.7 million deaths annually, or 45% of all child deaths UNICEF [3]. Infant and young child nutrition is a key area for improving child survival and promoting healthy growth and development. The first two years of a child's life

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are particularly important because optimal nutrition during this period reduces morbidity and mortality rates, decreases the risk of chronic diseases, and contributes to better overall development WHO [4], Y. F. Djoumessi [5]. However, the proportion of children aged 6 to 23 months receiving a minimum dietary diversity is 28.20% White et al [6]. Complementary feeding often starts too early or too late, and foods are often nutritionally inadequate and unsafe. Malnourished children who survive are more likely to be ill and suffer the lifelong consequences of impaired development. According to the FAO's annual report on world food security, the proportion of people suffering from undernourishment fell slightly in 2022 to 9.2% of the population, compared to 9.3% in 2021, a level that is, however, significantly higher than the 7.9% recorded in 2019 before the Covid-19 pandemic. In 2020, almost three-quarters of stunted children lived in Central and South Asia and sub-Saharan Africa (37%) UNICEF [7]. According to WHO and UNICEF, child malnutrition accounts for 30 to 50% of deaths in children under five worldwide WHO et UNICEF [8]. One in three people suffer from at least one form of malnutrition worldwide, according to WHO statistics WHO [9].

Sub-Saharan Africa has the highest rate of undernourishment on the planet John-Joy Owolade et al [10]. On the African continent, malnutrition begins very early in children, sometimes at birth WHO [11]. In West and Central Africa, 28.90 million children were stunted and 7.90 million were wasted in 2021 WHO [11]. In Togo, child nutrition remains a major challenge due to high malnutrition rates and its consequences on the physical and cognitive development of young children Jones et al [12]. Nearly 60% of the working population lives from agriculture, but the country is unable to feed its entire population, thus finding itself in a situation of undernourishment. Among the victims, children remain the most vulnerable because their developing bodies have specific needs. The population of children under five is estimated at approximately 14.20%. The minimum dietary diversity rate for breastfed children aged 6 to 23 months is 18.30% for the entire country MICS-6 [13]. Overall, only 12% of children aged 6 to 23 months, whether breastfed or not, are fed according to optimal infant and young child feeding (IYCF) practices WHO [14].

Faced with this reality, Togo, like most of the countries in sub-Saharan Africa and around the world, has made multisectoral efforts to address the specific needs of child and maternal nutrition. The Togolese government, after joining the Scaling Up Nutrition (SUN) movement in March 2014, has taken into account the major internationally recommended nutrition intervention strategies and initiatives in its nutrition policies and strategic plans. The WHO global strategy recommends early initiation of breastfeeding within one hour of delivery, exclusive breastfeeding up to 6 months, safe, appropriate and adequate dietary diversification from this age and continued breastfeeding up to 24 months WHO [14], Prentice [15]. From the age of 6 months, breast milk becomes quantitatively insufficient for infants whose nutritional needs become increasingly high Gewa et al [16]. Food diversification, which corresponds to the introduction of any solid or liquid food other than breast milk, except rehydration solutions or vitamin and mineral supplements, becomes essential to supplement the intake of breast milk WHO [17], Tareke et al [18].

Despite significant efforts, heavy gaps remain in improving infant and young child feeding (IYCF) practices in Togo Paulo et al [19]. In particular, only 13.20% of children aged 6 to 23 months receive a minimally acceptable diet Turck et al [20]. Mothers of these children face various obstacles, such as limited access to health services, low knowledge, poverty, societal influence, and unreliable sources of information. However, these challenges are not uniform across all regions of Togo. According to the 2025 Regional Report on Food and Nutrition Security in the Sahel and West Africa, in the northern regions of the country, particularly in the savannahs and Kara, pressure on livelihoods is high due to the massive displacement of people from the Sahel fleeing terrorist attacks: 0.6 million people are experiencing an acute food insecurity in these regions CILSS and FSIN zone [21]. This acute food insecurity undoubtedly affects the quality of nutrition for children aged 6 to 23 months. Furthermore, existing research does not provide a clear analytical picture of the nutritional status of children aged 6 to 23 months in the northern and southern regions of Togo. These challenges are particularly pronounced during dietary diversification, a critical period marked by an increased risk of nutritional deficiencies.

It is therefore necessary to highlight the available data on the quality of the diets of children aged 6 to 23 months in order to guide actions aimed at improving early childhood nutrition in Togo. According to this background, the research aim to assess the dietary diversity of children aged 6 to 23 months in the Savanes, Kara, and Maritime regions of Togo.

2. Material and Methods

2.1. Study Erea

As illustrated in Table 1, the study focused on three administrative regions of Togo, Savanes, Kara, and Maritime, which have varied demographic and socioeconomic conditions that influence dietary practices. The Savanes region, located in the north, is particularly vulnerable due to harsh climatic conditions and high poverty, which limit agricultural production INSEED [22]. The Kara region, in the center, benefits from more favorable agricultural conditions but continues to face nutritional challenges linked to socioeconomic inequalities. Finally, the Maritime region, more urbanized and developed, offers better access to health services and greater dietary diversity, although some areas remain vulnerable. These three regions were chosen for their representativeness of the country's different geographic and soci-

oeconomic contexts, allowing for a comparative analysis of young children's dietary practices. (Main Text Paragraphs)

Table 1. Data on research sites.

Region	Geographic location	Erea (Km^2)	Inhabitants number	Climate	Poverty Incidence (2021)
Savanes	between 0° and 1° longitude east then between 10° et 11° north latitude	8 470	1 143 520	Sudanian climate	52,5
Kara	between 0°15' et 1°30' east longitude then between 9°10' and 10°10' north latitude	11 738	985 512	Sudanian climate	40,4
Maritime (Greater Lomé included)	between 0°40' et 1°545' east longitude then between 6°10' et 6°55' north latitude	6 100	3 534 991	Guinean tropical climate	15,85

Sources: INSEED [22-26]

2.2. Research Approach

The research is based on a nutritional two-stage cluster cross-sectional survey carried out in Togo in 2022. It is carried out using the Standardized Monitoring and Assessment of Relief and Transitions methodology (SMART). This method provides reliable and accurate estimates of key nutrition indicators, monitor nutrition trends over time, and facilitate evidence-based decision-making.

2.3. Sampling

Cluster random sampling was used to select participating households. This method ensures a representative sample of the targeted population in three regions of Togo: Savana region, Kara region and Maritime region. Clusters are defined geographically, and households are randomly selected within each cluster. Children aged 0 to 23 months are primarily considered in the production of this paper. Women of childbearing age between 15 and 49 were also taken into account. The children surveyed enabled the assessment of breastfeeding and complementary feeding practices. Women of childbearing age were interviewed to assess nutritional status and dietary diversity. According to the SMART survey sampling method of 2022, the sample size is estimated based on the following parameters for each region: 3% precision with a 95% confidence level (normal distribution), the proportion of children under 5 in the population, the average household size, the sampling plan effect (1.5%), and the non-response rate (3%). ENA software was used to calculate the sample size for the three regions based on data from the 2017 MICS-6 survey. The non-response rate considered is 3% in order to include households not reached due to absence or refusal to participate. In the Savanes region, the estimated prevalence of malnutrition is 8.1%. It was 6.5% in Kara and 5.6% in the Maritime region.

The sample data is summarized in the table below:

Table 2. Split sample composition.

Clusters	Average proportion of children under 5 years of age	Average household size	Sample size of children	Sample size of households
Savana region	16,4	5,7	245	300
Kara region	15,0	4,4	209	362
Maritime region	14,0	4	166	340
Total			620	1002

Source: MSHPAUS et UNICEF [27]

2.4. Data Collection

Data collection was conducted by trained field teams using standardized questionnaires covering Anthropometric data (brithday; age; height; weight); measurements, dietary practices such as the frequency of consumption of different food groups, and household sociodemographic characteristics as parental education and economic status. Smartphones running the Android operating system and the KoboCollect app (version 2022) were used to collect the data. The data was then transferred to a Kobotoolbox server. Data accuracy was assured by strict quality control measures implementation, such as ongoing training for interviewers, field checks by supervisors, regular reviews of collected data, correction of potential errors, reinterviews and cross-checks.

2.5. Data Analysis

An in-depth analysis of the collected data was conducted to identify trends and factors influencing children's dietary diversity. This analysis included a description of the demographic and nutritional characteristics of children aged 6 to 23 months, an assessment of dietary diversity using specific indices such as the Minimum Dietary Diversity Index (MDDI), and an identification of factors associated with high or low dietary diversity. Several tools and methods were employed to analyze children's nutritional data. Microsoft excel and ENA (Emergency Nutritional Assessment) softwares were useful for data analysis.

The following nutritional indices calculated as part of the survey enabled discussion of the results relating to the diversity of the diets of children aged 0 to 23 months: Early initiation of breastfeeding, exclusive breastfeeding before the age of 6 months, introduction of solid, semi-solid, or soft foods for children aged 6 to 8 months, continued breastfeeding from 12 to 23 months, minimum dietary diversity, minimum meal frequency, Minimum dietary diversity for women of childbearing age.

3. Results

3.1. Sociodemographic Characteristics Among Children

Table 3 presents the socio-demographic distribution of children aged 6 to 23 months by region, sex and age group over the three studied regions. The number of children was higher in the Savanes region, with a total of 258 children, including 148 males and 110 females. In the Kara region, among a total of 200 children, there was a slight predominance of males (106) over females (94). A similar number of children in all three age groups was recorded in the Maritime region. The gender difference was also very little noticeable with 85 females versus 77 males, for a total of 162 children. The Savanes region has the largest number (258) of children, while the gender distribution shows a slight predominance of males in all three regions.

Comparing the age groups between the three regions, the highest proportion of children aged 6 to 11 months (39.9%) was recorded in the Savanes region, while the lowest proportion in this age group (29%) and a higher proportion of children aged 12 to 17 months (41.5%) were measured in the Kara region. The Maritime region shows a more balanced distribution, with similar proportions in each age group (34.6% for 6 to 11 months, 32.7% for 12 to 17 months and 32.7% for 18 to 23 months).

Table 3. *Socio demographic characteristics of children aged 6 to 23 months.*

Region	Sex	Number of children by age range in month (proportion en %)			Total
		[6-11]	[12-17]	[18-23]	
Savanes	Female	44 (40,00)	34 (30,91)	32 (29,10)	110 (100,00)
	Male	59 (39,86)	51 (34,46)	38 (25,68)	148 (100,00)
	Total	103 (39,92)	85 (32,94)	70 (27,13)	258 (100,00)
Kara	Female	23 (24,47)	40 (42,55)	31 (32,98)	94 (100,00)
	Male	35 (33,02)	43 (40,56)	28 (26,42)	106 (100,00)
	Total	58 (29,00)	83 (41,50)	59 (29,50)	200 (100,00)
Maritime	Female	32 (37,65)	23 (27,06)	30 (35,29)	85 (100,00)
	Male	24 (31,17)	30 (38,96)	23 (29,87)	77 (100,00)
	Total	56 (34,57)	53 (32,72)	53 (32,72)	162 (100,00)

Source: MSHPAUS et UNICEF [27]

3.2. Continued Breastfeeding

Table 4 shows the breastfeeding continuation rates for children aged 12 to 23 months in the three regions. In the Kara region, 84.7% of children (122 out of 144) continued to be breastfed, with a 95% confidence interval (CI) of 77.5% to 90.0%. In the Savanes region, the rate was 85.5% (139 out of 159), with a CI of 78.8% to 85.4%. In the Maritime region, 68.2% of children (73 out of 107) continued to breastfeed, with a CI of 58.5% to 76.9%.

Table 4. *Continued breastfeeding.*

Regions	Continued breastfeeding			
	Age range	Children population (%)	n (%)	[95% CI]
Savanes	12-23 months	144 (100,00)	122 (84,72)	[77,5-90,0]
Kara	12-23 months	159 (100,00)	139 (87,42)	[85,4-78,8]
Maritime	12-23 months	107 (100,00)	73 (68,22)	[58,5-76,9]

n = number of children who were subjected to breastfeeding over 12 months, % = corresponding proportion of children, CI = Confidence Interval – Source: MSHPAUS et UNICEF [27]

3.3. Introduction of Solid, Semi-Solid or Soft Foods

Table 5 shows the percentage of introduction of solid, semi-solid, or soft foods in children aged 6 to 8 months in three regions considered. In the Kara region, 84.4% of children (27 out of 32) received solid foods, with a confidence interval (95% CI) of 67.2% to 94.7%. In the Savanes region, the rate is 74.5% (38 out of 51), with a CI of 60.4% to 85.7%. In the Maritime region, 76.9.

Table 5. *Proportion of children with introduction of solid, semi-solid or soft foods.*

Regions	Introduction of solid, semi-solid or soft foods			
	Group of age	Children population (%)	n (%)	[95% CI]
Savanes	6-8 months	51 (100,00)	38 (74,51)	[60,4-85,7]
Kara	6-8 months	32 (100,00)	27 (84,38)	[67,2-94,7]
Maritime	6-8 months	26 (100,00)	20 (76,92)	[56,4-91,0]

n = number of children who consumed solid, semi-solid or soft foods, % = corresponding proportion of children
CI = Confidence Interval, Source: MSHPAUS et UNICEF [27]

3.4. Minimum Dietary Diversification

Table 6 presents the percentages of minimum dietary diversification among children aged 6 to 23 months in the three regions considered. In the Kara region, 20.0% of children (40 out of 200) achieve minimum dietary diversification, with a confidence interval (95% CI) of 14.7% to 26.2%. In the Savanes region, 18.2% of children (47 out of 258) achieve this diversification, with a CI of 13.7% to 23.5%. In the Maritime region, 21.6% of children (35 out of 162) meet this requirement, with a CI of 15.5% to 28.7%.

Table 6. Minimum dietary diversity and minimum acceptable diet.

Profile / Regions	Age range	Kara			Savanes			Maritime		
		n/N	%	(CI 95%)	n/N	%	(CI 95%)	n/N	%	(CI 95%)
Minimum dietary diversity	6-23 months	40/200	20,00%	(14,7%-26,2%)	47/258	18,21%	(13,7%-23,5%)	35/162	21,60%	(15,5%-28,7%)
Minimum acceptable diet	6-23 months	38/200	19,00%	(13,8%-25,1%)	44/258	17,05%	(12,7%-22,2%)	26/162	16,04%	(10,8%-22,6%)

N = total number of children in the region, n = number of children who met dietary diversity and minimum acceptable diet in each region, % = corresponding proportion of children
Source: MSHPAUS et UNICEF [27]

3.5. Minimum Meal Frequency and Milk Meals in Non-Breastfed Children

Table 7 shows the minimum frequency of meals and milk meals in non-breastfed children aged 6 to 23 months in the three regions considered. In the Kara region, 79.5% of children (159 out of 200) respected the minimum frequency of meals, with a confidence interval (95% CI) of 73.2% to 84.9%. In the Savanes region, 81.0% of children (209 out of 258) respected this frequency, with a CI of 75.7% to 85.6%. In the Maritime region, 70.4% of children (114 out of 162) reached this frequency, with a CI of 62.7% to 77.3%. Regarding the minimum frequency of milk meals in non-breastfed children, 20.0% of children in Kara (5 out of 25), 3.7% in Savanes (1 out of 27), and 7.7% in the Maritime region (3 out of 39) respect this frequency, with respective CIs of 6.8% to 40.7%, 0.1% to 19.0%, and 1.6% to 20.9%.

Table 7. Minimum meal frequency and milk feeding frequency among non-breastfed children.

Profile / Regions	Age range	Kara			Savanes			Maritime		
		n/N	%	(CI 95%)	n/N	%	(CI 95%)	n/N	%	(CI 95%)
Minimum meal frequency	6-23 months	159/200	79,50%	(73,2%-84,9%)	209/258	81,00%	(75,7%-85,6%)	114/162	70,37%	(62,7%-77,3%)
Minimum milk feeding frequency among non-breastfed children	6-23 months	5/25	20,00%	(6,8%-40,7%)	1/27	3,70%	(0,1%-19,0%)	3/39	7,69%	(1,6%-20,9%)

N = total number of children in each region, n = number of children who met minimum meal frequency and non-breastfed children who met minimum milk feeding frequency in each region, % = corresponding proportion of children; Source: MSHPAUS et UNICEF [27]

3.6. Percentage of Consumption of Eggs and/or Meat Foods

Table 8 shows the percentage of egg and/or meat consumption among children aged 6 to 23 months in three regions. In the Kara region, 49.5% of children (99 out of 200) consume these foods, with a confidence interval (95% CI) of 41.2% to 53.7%. In the Savanes region, 65.5% of children (169 out of 258) consume eggs and/or meat foods, with a CI of 59.3% to 70.6%. In the Maritime region, 63.6% of children (103 out of 162) consume them, with a CI of 57.4% to 68.1%.

Table 8. Frequency of eggs and /or meat foods consumption.

Profile / Regions	Age range	Kara			Savanes			Maritime		
		n/N	%	(CI 95%)	n/N	%	(CI 95%)	n/N	%	(CI 95%)
Consumption of eggs and/or meat products	6-23 months	99/200	49,5%	(41,2%-53,7%)	169/258	65,5%	(59,3%-70,6%)	103/162	63,6%	(57,4%-68,1%)

N = total number of children, n = number of children who consumed eggs and/or meat products
% = corresponding proportion of children. Source: MSHPAUS et UNICEF [27]

3.7. Consumption of Food Groups in Children Aged 6-23 Months

Table 9 shows the proportion of food group consumption by region among children aged 6 to 23 months. In the Kara region, 87.5% of children consume breast milk, 87.5% cereals, roots and tubers, 18.0% legumes and nuts, and 48.0% meat, meat products and fish. Only 2.0% consume eggs, and 54.5% fruits and vegetables rich in vitamin A. In the Savanes region, 75.9% consume breast milk, 77.2% cereals, roots and tubers, 29.0% legumes and nuts, and 63.0% meat and fish. Consumption of eggs is 8.6%, and that of fruits and vegetables rich in vitamin A is 48.8%. In the Maritime region, 89.5% consume breast milk, 86.4% cereals, 13.6% legumes and nuts, and 58.5% meat and fish. Egg consumption is 11.6%, and that of fruits and vegetables rich in vitamin A is 50.0%.

Table 9. Frequency of consumption of food groups by region.

Food groups/Regions	KARA (N= 200)	SAVANES (N=162)	MARTIME (N= 258)
Breast milk	87,5%	75,9%	89,5%
Cereals, roots, tubers	87,5%	77,2%	86,4%
Legumes and nuts	18,0%	29,0%	13,6%
Dairy products	8,5%	12,3%	5,8%
Meat, meat products and fish	48,0%	63,0%	58,5%
Eggs	2,0%	8,6%	11,6%
Vitamin A-rich fruits and vegetables	54,5%	48,8%	50,0%
Other fruits and vegetables	18,0%	21,0%	13,6%

N = total number of children in each region. Source: MSHPAUS et UNICEF [27]

3.8. Average Dietary Diversity Score

Table 10. Mean dietary diversity score.

Profile/regions	KARA (N= 200)	SAVANES (N=162)	MARTIME (N= 258)
Mean dietary diversity score (μ±0)	3.2 ± 1.3	3.4 ± 1.6	3.3 ± 1.3

Source: MSHPAUS et UNICEF [27]

Table 10 presents the average dietary diversity score for children aged 6 to 23 months in the three regions considered. In the Kara region, the average score is 3.2 ± 1.3, while in the Savanes region, it is 3.4 ± 1.6. In the Maritime region, the average dietary diversity score is 3.3 ± 1.3.

4. Discussion

The research results, in general, show that breastfeeding practice in the three targeted regions, beyond 6 months, varies between 68.2% and 85.5%. In the three regions, a considerable majority of breastfeeding women then attach major importance to maintaining breastfeeding for their children from 6 to 23 and apply themselves to it. However, the lowest rate observed in the maritime region (68.2%) unlike that of the savannas (85.5%) very close to the rate observed in the Kara region (84.7) is a priori an important indicator of the rapid weaning of children of the ages covered by the research in the largest urban center of the country as well as in the cities that are closer to it. This may be linked both to the professional concerns of the mothers of the children of the maritime region and their abilities to be able to provide these weaned children with an adequately balanced diet containing essentially all the macronutrients and micronutrients they need with important considerations related to the frequencies of the shots and the variation of the menus. It is then about the possibility of households of these more weaned children in the maritime region to have the direct financial capacities or the means of subsistence necessary for the minimum coverage of the balanced diet of these babies. Gahima, Niwemahoro [28] mentioned this in their research on the prevalence of early weaning of children and its determinants among maternal attendees at Remera Health Center in Kigali (Rwanda).

To further analyze the introduction of semi-solid foods in the diet of children targeted by the research, we realize that in the maritime region where weaning of children from 6 to 23 months is the highest (31.8%), the rate of introduction of semi-solid food and solid food is considerably higher, with 76.9% of women introducing complementary foods compared to 68.8% having weaned their babies. Moreover, it is the region where educated women reside and work in greater numbers in the secondary and tertiary sectors. It is also the region where it is easier, when one has the means, to put the child in a babysitter office or to entrust him to paid services that are offered for this purpose. The question of weaning children associated with the socio-professional occupations of mothers and the adequacy of the livelihoods of their households to the additional expenses necessary for providing food to weaned children seems to be confirmed in the region of savannas. In this region, weaning between 6 and 23 months reaches 14.5% but children who do not benefit from the introduction of semi-solid and solid foods under these conditions are of a higher proportion (25.25%). This may depend on the non-existence of means to access complementary foods. It is from this socioeconomic perspective that Janmohamed, Baker [29] conducted a study on west Africa according to the effects of socioeconomic conditions on young infants and children aged 6 to 23 months malnutrition. By far, the climatic conditions of the locality, soil fertility, difficulties in agricultural irrigation, access to inputs (pesticides, approved fertilizers) and to financing reflecting low agricultural productivity as well as the low economic and physical availability of cereals and vegetables compared to the maritime region may be a valid explanation. The higher poverty rate in the savannah region compared to that of the maritime region (the most urbanized and richest region of the country) is an element of confirmation. As for the Kara region, in living conditions more acceptable than those of the savannah and less acceptable than those of the "capital-region" of Togo, the difference between the weaning rate (15.3%) and the inclusion rate of solid and semi-solid foods (15.6%) is only 0.3%. This result reflects the argument of economic accessibility to a diversified diet for 6 to 23 months in climatic, soil, hydraulic conditions, microeconomic and availability of paid services for baby families more favorable than those of the savannah and less comfortable than that of the maritime.

However, rates of dietary diversification and minimum acceptability of the diet across regions are very low. In the first case, they vary between 18.21% and 21.60% and in the second case, they are between 16.04% and 19%, which is an overall difference of 3.39% in terms of minimum dietary diversity and a difference of 2.96% regarding the minimum acceptability of the diet. It is therefore understandable that regardless of the region, the standard of living, the quality of livelihoods, availability, accessibility or food stability, a work of populations mass education on food diversification of children aged from 6 to 23 months is urgent for all the regions targeted by the research, even for all Togo in the short, medium, and long term. In addition, the implementation of national, regional and local food and nutrition security policies, projects and programs needs to be strengthened to ensure stable food availability and accessibility [30, 31]. Indeed, permanent agricultural irrigation, stable availability of inputs, funding, and easy access to agricultural land and support for the populations of all targeted regions from an interregional and intermunicipal perspective can be the key that can help address the challenges observed [32].

It is generally found that the minimum meal frequency rate is satisfactory; it varies between 70.37% (maritime region) and 81.05% (savannah region), which is a significant difference of 10.68%. For this indicator, the rate observed in the Kara region (79.50%) is very close to the highest observed in the savannah region (81.05%). In this case, the gap analysis is done between Maritime and the other two regions taken together. Urban life, reflecting more the reality of the populations of the maritime region where the largest urban center of Togo is located, is characterized by a strong tendency of the populations to be occupied by their socio-professional activities. It goes without saying that most parents do the dietary monitoring of children in this region only at evenings when

they return tired from their activities, as well as on weekends. This implies that either the people or services to which these parents entrust the children, or even the parents do not have control over their children's food frequencies in terms of knowledge. The issue of education for mothers of babies, pregnant women and their spouses, partners, co-inhabitants or caregivers must be the subject of broad inclusive programs integrating all actors who can contribute to sustainable change of practices. These are pediatricians, nutritionists, midwives, media actors and national education actors. The latter can, through school programs, inculcate good practices in populations as soon as they are attending school or at a minimum, starting from the minimum age for fertility (15 years). The development of popular education programs on dietary diversification for children aged 6 to 23 months was proposed by Aboagye, Seidu [33] in their research on Dietary Diversity and Undernutrition in Children Aged 6–23 Months in Sub-Saharan Africa.

In the results obtained, some elements prove to be very worrying for the nutritional and physiological health of the child. This is the very low rate of children aged 6 to 23 months weaned benefiting from the introduction of milk in their diet. This rate is very low in the Savannas (3.70%) and in the maritime region (7, 69%), but it is less so in the Kara (20%). Indeed, for the three regions, the low consumption of milk for weaned children from 6 to 23 months old can expose them to vitamin D, calcium and iron deficiencies. They can suffer from growth failure, muscle weakness and bone fragility: Senbanjo, Owolabi [34] showed the importance of effect of a fortified dairy-based drink on micronutrient status, growth, and cognitive development of children in a study concerning Nigerian toddlers. The very low rate observed in the savannas can first be explained by the low availability and accessibility (financial and physical) of the mothers of these children to dairy products. The vegetation cover is low and unfavorable to the possibility of feeding dairy cows in the savannah region. In precarious economic and financial conditions and in the absence of production units and productive capacities that can cover the needs of the population, these people may have difficulty buying pharmaceutical milk for their children in pharmacies or even on the street market. In the second case, several risks of food poisoning threaten these children and may even complicate their future health as adults, reduce their lifespan or affect their economic productivity by indirectly influencing their quality of socio-professional and economic life. These health and socioeconomic implications of the deficiency in the feeding of children aged 6 to 23 months with milk may be valid for those whose breastfeeding is not interrupted but in perhaps lesser severity, since the deficiency varies between 87,7% and 94.2% in the three regions.

The low introduction of legumes and dried fruits in the diet of children from 6 to 23 months in the target regions (from 82% to 86.4%) can deplete the synthesis of plant proteins, vitamins types B, C, E and mineral salts (magnesium, iron, calcium...) necessary for their growth, their immunity, the proper functioning of their organs, the proper renewal of their cells. They can also be deprived of the carbohydrate energy that they could benefit from not having a weak body. The same goes for the lack of fiber that can facilitate their digestion and prevent constipation. Furthermore, the inadequate fruit and vegetable intake of children aged 6 to 23 months in the three regions (79% to 86.4%) is another more important indicator than the deficiency in leguminous and nuts as regards vitamin deficiencies, minerals, fibrics and anti-oxidatives. Senbanjo, Owolabi [35] similarly demonstrated the nutritional importance of fruits and vegetables in the diets of children, adolescents, and adults in the Philippines.

The deficiency in nutritional intakes of eggs (88.4% to 98%) in children from 6 to 23 months of age in the three regions exposes them to risks of low intellectual performance and immunity below the minimum required due to insufficient intake of high-quality proteins, essential vitamins and minerals. Papanikolaou and Fulgoni Iii [36] also highlighted the crucial importance of consuming eggs as a nutritional source of vitality and longevity in a recent study. Similar researches were conducted by Tiwari, Balehegn [37] and Nakiranda, Malan [38]. These children, in adulthood, may face recurrent health problems. The same applies to the poor diet of these children with meat, although the rates are less worrying than in previous cases: 36.4% to 50.5% deficiency. However, regarding the intake of meat, consumption in the Kara is significantly lower (49.5%) than in the maritime region (63.6%) and savannas (65.5%) where rates are closer and above 60% [39, 40].

Considering all of the above, research reveals a quite high rate of continued breastfeeding in all three regions (68.2% to 85.5%). However, the introduction of vitamin-rich foods, essential mineral salts, vegetable and animal proteins and then in fiber are low although the food for these children in cereals and tubers that can provide basic calories is not below 77% at the level of the three regions. This fact then undermines the benefits of good growth, strong immunity, good cell formation and renewal, and good organ function that targeted children can benefit from continuous breastfeeding between 6 and 23 months.

5. Conclusion

This study provides an assessment of the dietary diversity of children aged 6 to 23 months in the Savanes, Kara, and Maritime regions of Togo. The prevalence of breastfeeding practices, and dietary diversification show notable variations between regions. Rates of minimum dietary diversification and acceptable diets are low in all regions, reflecting difficulties in accessing a varied and nutritious diet. Feeding practices, particularly the continuation of breastfeeding and the introduction of solid foods in these regions, have not had the same success rate. The high prevalence of malnutrition scores during the SMART survey confirmed the low rates of dietary diversity scores observed. In light of all the results of

this study, further investigations will help shed further light on the constraints linked to child nutrition in the Togolese context. It would also be appropriate to take pragmatic initiatives aimed at disseminating information on good child feeding practices, especially in national languages. Another major action will contribute to the promoting large-scale nutrition education campaigns, targeting not only mothers but also entire communities to create a supportive environment for child nutrition. It is also compulsory to strengthen ongoing nutrition training for health workers so they can offer up-to-date advice on child feeding practices, adapted to local contexts. Finally, strengthen monitoring of nutrition programs is useful to regularly assess their impact and adjust interventions based on the actual needs of the population.

Abbreviations

CI	Confidence Interval
DHS	Demographic and Health Survey
EDS	Demographic and Health Survey
ENA	Emergency Nutritional Assessment
INSEED	National Institute of Statistics and Economic and Demographic Studies
IYCF	Infant and Young Child Feeding
MDDI	Minimum Dietary Diversity Index
MICS-6	The Multiple Indicator Cluster Survey
MSHPAUS	Ministry of Health, Public Hygiene, and Universal Access to Healthcare
SMART	Standardized Monitoring and Assessment of Relief and Transitions
UNICEF	United Nations Agency for Children
WHO	World Health Organization

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Conflicts of Interest

The authors declare no conflicts of interest.

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