

Impact of dietary diversification on the nutritional status of children aged 0 to 59 months in the municipality of Tori-Bossito

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Abstract

In order to capitalize on the achievements for the sustainability of the NECDP (Nutrition and Early Childhood Development Project) in the municipality of Tori-Bossito, the impact of the Promoting Food Diversification (PFD) on the nutritional status of children aged 0 to 59 months was evaluated. Anthropometric data (weight, height, age) in children aged 0 to 59 months and dietary data (consumption of salt with iodine, source of drinking water, practice of hand washing, frequency and quality of meals served to children aged 6 to 59 months) were collected in the households of beneficiary women. These data were collected from 2019 to 2020 (considered as the period before PFD) and from 2021 to 2023 (considered as the period after PFD) through home visits, quarterly screening sessions and monitoring and promotion of growth and stimulation and awakening of children from 0 to 23 months on a monthly basis. Significant differences through the analysis of variance were carried out at the 5% threshold according to the Student Newman-Keuls test. It appears from this study that after the PFD, the majority of households practice hand washing (85.12%), use a source of drinking water (80.39%), serve children more than three meals (58.3%) containing the three food groups (97.52%) per day but consume poor salt in iodine in a proportion of 70.4%. The study also reveals that PFD significantly contribute to reducing the prevalence of all forms of malnutrition among children aged 6 to 59 months (from 3.52% to 1.59% for severe underweight, from 3.34% to 1.97% for severe wasting and from 7.18% to 3.93% for severe stunting). On the other hand, PFD does not contribute to reducing the prevalence of severe underweight in children aged to 0 to 5 months (from 4.85% to 11.97%). Promoting Food Diversification stands out as an important activity to recommend for food and nutrition projects/programs in the fight against malnutrition in all its forms.

Keywords: Nutritional status, food diversification, children, Tori-Bossito, Benin

Introduction

Malnutrition results in deficiencies, excesses or imbalances in a person's quantitative and/or qualitative intake and manifests itself as « a perceptual or non-perceptual pathological state » (Mudékéréza, 2017 & Traoré and others, 2020, Camara and others, 2021). It also includes non-communicable diseases linked to poor nutrition, in addition to undernutrition (wasting, stunting and underweight), vitamin or mineral deficiencies, overweight and obesity (WHO, 2021). The most affected targets are children under 5 years old. For this target category, it constitutes the cause of at least

half of deaths worldwide, 45% of which are associated with undernutrition (WHO, 2018 & WHO, 2021). In sub-saharan Africa, the prevalence of stunting is 30.7% higher than the global average of 22% (WB, 2019 & Yasbeck et al., 2023). In Benin, malnutrition constitutes a public health problem with an overall prevalence rate of 43% (EDS, 2017-2018). The consequences of malnutrition on the Human Capital Index (HCI) are serious and persistent for individuals and their families, for communities and for countries (Yasbeck and others, 2023). The HCI in saharan Africa is 40% compared to the world average which stands at 57% (WB, 2019). In Benin, the Human Capital Index is 41% (Chabi-Akoha and others, 2021). This value of HCI indicates that a beninese child only realizes 41% of his potential compared to what would have been possible if he had benefited from optimal conditions of health, food, nutrition and parental care. The consequences of malnutrition include death (WHO, 2018 & WHO, 2021), reduced productivity and economic growth of nations (Yasbeck and others, 2023), reduced cognitive and physical capabilities, reduced reproductive capacity and holistic development (Walker, 2007 & WB, 2019). Faced with the harmful consequences of malnutrition on individual human beings and the community, low-income countries, with the help of financial partners, have for years taken strong and urgent actions to eradicate malnutrition in all its forms. In this perspective, the Beninese State benefited from the support of the World Bank to fight against malnutrition through the implementation of the Multisectoral Food, Health and Nutrition Program (MFHNP) followed by Nutrition and Early Childhood Development Project (NECDP) based on the experiences and achievements of the MFHNP (FNC, 2017). Indeed, Benin in its march towards good nutrition after the consensus workshop held in Bohicon (one of the cities of Benin) in 2007, has institutionalized the national Food and Nutrition Council and its Permanent Secretariat (FNC-PS) for an efficient fight against malnutrition. Thus, forty municipalities benefited from the NECDP at start-up, based on the following criteria : percentage of municipal population spending less than on dollar per day, rate of moderate and severe food insecurity and chronic malnutrition within the municipality (FNC, 2017). The municipality of Tori-Bossito, which did not benefit from any nutrition project or program, was in critical situation with a chronic malnutrition rate of 25% and a rate of food insecure households reaching 82.5% (Lokonon et Amoussa, 2019). It was therefore eligible in this category of beneficiary municipalities and was supported by GERME, a Non-Governmental Organisation for the implementation of project interventions. The project's package of activities includes : Promoting Food Diversification, Culinary Demonstration, Home visit, Learning and Nutritional Rehabilitation Home, Play practices, Monitoring Promotion of Growth and Stimulation and Awakening of children from 0 to 23 months,

Essential Family Practices, Essential Awareness Practices, Promotion of hygiene measures and rules, Screening and management of malnutrition. Overall, the package of activities of this project had a positive impact on the nutritional status of 80% of children aged 0 to 59 months within the beneficiary community (FNC, 2022). However, the evaluation of the impacts of one activity in relation to the other within the package of activities for choice of activities to promote for the sustainability of the achievements has remained marginal and very poorly documented. The lack of dietary diversification is the primary cause of all forms of malnutrition (WFP, 2008 & Bodjrenou and others, 2018). Its implementation is simple, less expensive and adapted to the community whose members are mostly farmers (INSAE-RGPH4, 2016 b). It produces a significant impact in the fight against malnutrition better than the adoption of an adequate diet and the therapeutic treatment of childhood illnesses (pneumonia, malaria, diarrhea, infections, etc.) in a situation of malnutrition (WFP, 2008). As part of this study, the promotion of food diversification was carried out through training, support and monitoring of women beneficiaries from households most vulnerable to malnutrition through three key themes : the home garden, small-scale poultry and small ruminant breeding, food processing of cassava tubers and the formulation of enriched flour (complementary feed) based on cereals and legumes or protein-oleginous crops. The implementation of most of the aforementioned activities constituting the project's package of activities started in 2019 but the promotion of food diversification was implemented from 2021 to 2023, i.e. two years after the start of the interventions. Thus, in view of the enthusiasm that this activity has generated and with the aim of capitalizing on the achievements of the project for its sustainability, the present work aims to evaluate the impact of the promotion of food diversification on the nutritional status of children aged 0 to 59 months in the municipality of Tori-Bossito.

Material and methods

- **Study zone**

The municipality of Tori-Bossito is located in the southwest of Benin in the Atlantic department. Covering an area of 328 km² with a density of 136 inhabitants/km² (INSAE RGPH4, 2016b), this municipality is characterized by a low plateau relief cut by valleys with marshy depressions which in the rainy season constitute a real body of water. The subsistence poverty index based solely on the living conditions of households is 41.9% (INSAE-RGPH4, 2016 b). Agriculture, fishing and hunting represent 53.4% of economic activities. The population is mainly exposed to diseases such as malaria, diarrhea and vomiting and pneumonia (See community relay notebook, 2015). This municipality is home to a Territorial Agricultural

Development Agency (TADA) which promotes agricultural advisory support. The promotion of food diversification component through the training and support of women trained on the various themes for the promotion of food diversification within the farmework of the NECDP is ensured in synergy with TADA technicians.

- **Echantillonnage**

Around three hundred and fifty (350) women were selected from twenty-one villages out of the fifty-eight in the municipality of Tori-Bossito. These different villages are distributed in five (05) out of the six (06) Districts of the municipality. These are nine (09) villages in the District of Azohoue-Cada, three (03) in the District of Tori-Bossito, four (04) in the District of Tori-Gare, two (02) in the District of Avamè and three (03) in the District of Tori-Cada. Chosen in descending order of vulnerability, these villages are the most vulnerable in terms of malnutrition and critical food and nutritional insecurity (INSAE-RGPH4, 2016 b). Taking into account the assets and constraints of the beneficiary villages, 22% of women (i.e. 77 women) benefited from support training on home gardening, 50% (i.e. 175 women) benefited from support training on small livestock farming, and 28% (i.e. 98 women) benefited from support training on the food processing of cassava tubers and the formulation of enriched flour based on cereals, legumes or protein-oilseeds. The women beneficiaries were selected for their status as a priority adult target of the NECDP and their involvement in the nutrition mutual established by the project. They are mothers of children under five years old, breastfeeding women (children under 2 years old) and/or pregnant women.

Table I presents the support received by women trained and equipped to promote food diversification.

Table I: Kits allocated to the different categories of trained women

Training themes for women	Kits
Home garden	Watering can, seeds (amaranth, nightshade, tomatoes, peppers), two fruit plants (soursop tree, orange tree or lemon tree)
Small breeding	A doe and a rabbit, 10 kg of feed, a feeder, a water trough, a cage
	Three hens and a rooster, 10 kg of feed, a feeder, a water trough
Food processing	Frying pan, plastic bucket, spatula
	Pot, ladle, 10 kg of corn and 10 kg of soya

Collection of data

Two types of data were collected in this study: these are anthropometric data of children aged 0 to 59 months and dietary data within the households of trained and equipped women.

Anthropometric data includes: height, weight and age of children 6 to 59 months. For children aged 0 to 5 months, the anthropometric data collected are weight and age.

Dietary data include: the number of meals served to children per day, the quality of the meal (presence of the three food groups: energy food, growth food and protective food), iodized salt consumption, source of supply in drinking water and the practice of hand washing. In accordance with the protocol implemented (MFHNP/NECDP flayers), the distinction between the three food groups is based on the food square, namely: energy food (rich in sugar or lipids), growth food (rich in proteins or proteins) and protective food (rich in vitamins and mineral salts). Two sources of water were considered, namely: drinking water (SONEB tap, well-protected and maintained borehole, human-powered pump) and non-potable water (poorly maintained and unprotected borehole, unprotected traditional wells, surface water, Untreated rainwater) following the intervention implementation protocol (FNC, 2017).

These data were collected from 27 children from 0 to 5 months and 547 children from 6 to 59 months before the promotion of food diversification (period from 2019 to 2020) and 29 children from 0 to 5 months and 529 children from 6 to 59 months after the promotion of food diversification (period from 2021 to 2023). These child targets are considered to be the number of children aged 0 to 59 months who have been screened in the households of the 350 women beneficiaries of training and support for the promotion of food diversification.

These different data were collected through screening, Growth Promotion and Stimulation and Awakening Monitoring (GPSAM) of children aged 0 to 23 months on a monthly basis and Home Visits (HV) to households covered by the survey study. Screening is a quarterly activity and HV and GPSAM are routine activities

- **Material**

For the collection of anthropometric data, the personal scale (type: Seca gmbh & co.kg, designed in Germany Made in China, Max: 150 kg, d1=0.1 kg) with a tare function and the measuring rod (Brand Shorren lying position for children under 2 years (Maximum height: 197.5 cm, d2= 0.1cm) were necessary. Weight was determined using the scale and height using the height chart. The age was determined from official documents (birth certificate, birth certificate, declaration form, RAVIP receipt or secure birth certificate) which bear the date of birth.

Dietary data was collected through Home Visits (HV) of the targets and iodized salt consumption was carried out using the iodine test (MBI kits international 85, G.N. Chetty Road, Nagar, Chennai-600 017 INDIA).

- **Data processing and analysis**

Anthropometric data were expressed in accordance with the WHO protocol, namely: weight in kilograms (kg), height in meters (m) and age in months. WHO Anthro software version 2.0.4 was used to assess z-scores and prevalences of wasting (Weight/Height), stunting (Height/Age) and underweight (Weight /Age) in children. The figures present the Z-score scales (Weight/Age) for girls and for boys from 0 to 59 months for illustrative purposes.

Dietary data and average prevalences were processed using Microsoft Excel version 2010. SPSS v 16.0 software was used for analysis of variance (ANOVA).

Résultats et discussion

The consumption of iodized salt, the source of drinking water and the practice of hand washing in the monitored households are presented in Table II. The majority of households use salt low in iodine (iodine content ≤ 15 ppm), i.e. 74.6% before and 70.40% after the promotion of food diversification. Most households use drinking water (tap water, maintained and well-protected borehole and human-powered pump), i.e. 81.44% and 80.39% respectively before and after the PFD. For hand washing, around 96.48% of households do not use the HWD before the PFD and 85.12% use it after the PFD. These results show that the proportions of households monitored before and after the PFD do not show a significant difference for the source of drinking water. This indicates that the source of drinking water used is not linked to PFD. Indeed, with the promotion of good hygiene practices by field agents within the framework of the MFHNP and NECDP, the community understood the need to install and maintain the boreholes to make it an Income Generating Activity (IGA) which facilitated access to drinking water for a large number of households. On the other hand, the difference observed in the proportions of households consuming iodized salt can be explained by poor salt handling conditions (exposure to the sun, heat, addition before cooking food). The difference in the proportion of households for the practice of hand washing is justified by the fact that the year of introduction of the PFD activity coincided with the requirement for hygienic conditions as preventive measures for contamination with Covid-19. Therefore, enthusiasm for the use of HWD was observed and supported by the Hygiene and sanitation component of the package of activities implemented by field agents. The source of drinking water and the practice of hand washing are important hygienic conditions in the fight against chronic malnutrition, as noted by Lokonon and Amoussa (2019) in their study on the profile of food security in municipalities of Tori-Bossito and Dangbo in southern Benin. The result of the high proportion of households

using drinking water (81.44% before and 80.39% after the PFD) is different from that of Lokonon and Amoussa (2019) which indicates 85.5% due to the size of households taken into account and the period of the study. Indeed, these authors carried out their study in 2018 with 104 households before the implementation of the interventions.

Table II : Iodine consumption, source of drinking water and hand washing practice in monitored households

Settings		Proportion of households before PFD (%)	Proportion of households after PFD (%)
Consumption of iodine/iodate	0 ppm	15,35 ± 2,44 ^a	14,45 ± 3,10 ^a
	≤15 ppm	74,60 ± 5,45 ^b	70,40 ± 7,45 ^c
	>15 ppm	10,05 ± 1,88 ^d	15,15 ± 3,95 ^e
Source of drinking water	Drinking water	81,44 ± 4,12 ^f	80,39 ± 5,85 ^f
	Non-Drinking water	18,66 ± 2,48 ^g	19,61 ± 3,84 ^g
Hand washing practice	Non usage DLM	96,48 ± 4,88 ^h	14,88 ± 2,92 ⁱ
	Usage DLM	3,52 ± 1,04 ^j	85,12 ± 4,99 ^k

On each line, the means followed by the same alphabetical letters do not present significant differences at the 5% threshold according to the Student Newman-Keuls test.

HWD : Hand Washing Device, PFD : Promotion of Food Diversification

The frequency and quality of meals served to children aged 6 to 59 months in the monitored households are presented in Table III. Before the PFD within households, the majority of women serve 2 to 3 meals to children aged 6 to 59 months (i.e. 40.51% and 45.68% respectively) while after the PFD, they serve at least three meals (i.e. 3 meals in 39.12% of households and more than 3 meals in 58.3% of households). In most households (97.52%) the quality of meals served to children aged 6 to 59 months contain the three food groups (energy food, growth food and protective food) after the PFD while before the foods served mainly contain two food groups (i.e. 90.48%). The proportions of households show a significant difference in the frequency and quality of meals served before and after the PFD. This difference would be linked to the training and support provided to women in households. Indeed, the women trained and supported on one of the themes of food diversification (home garden, small livestock and food processing) took care of the skills and support received to provide food and income to their household jointly with their husbands. The income generated from the activities allowed the trained and supported women to increase their purchasing power and easily obtain complementary foods to bring together the three groups in the dishes served in the household. It appears that the promotion of food diversification contributes

to the quality and frequency of meals served to children aged 6 to 59 months in households. The present study can serve as a basis on the aspects of food availability, food consumption and food diversification to assess food and nutritional security within the households of trained and supported women as reported by Lee and others (2016). It could also be used to assess an improvement in food and nutritional security in the commune of Tori-Bossito after the interventions of the NECDP as desired by Lokonon and Amoussa (2019).

Table III: Frequency and quality of meals served to children aged 6 to 59months in monitored households

Proportion of households	Frequency of meals			Presence of food groups	
	2 meals per day	3 meals per day	More than 3 meals per day	2 food groups	3 food groups
Before PFD (%)	40,51 ± 4,24 ^a	45,68 ± 3,94 ^c	14,82 ± 2,64 ^e	90,48 ± 4,14 ^g	9,52 ± 2,20 ^e
After PFD (%)	2,58 ± 0,84 ^b	39,12 ± 3,42 ^d	58,30 ± 4,15 ^f	2,48 ± 0,84 ^h	97,52 ± 3,19 ^f

In each column, the means followed by the same alphabetical letters do not present significant differences at the 5% threshold according to the Student Newman-Keuls test.

PFD : Promotion of Food Diversification

Concerning the nutritional status of children in the monitored households, the weight-for-age (W/A) index reflects underweight according to WHO recommendations. Table IV below presents the average prevalence of underweight children aged 0 to 5 months in the households monitored. The average prevalence of severe underweight (Zscore < -3 (W/A Red)) is low (4.85%) before the PFD and high (11.79%) after the PFD. The average prevalence of moderate underweight (-3 < Zscore < -2 (W/A Yellow)) is 7.45% and 7.25% respectively before and after PFD. No significant difference is observed compared to the average prevalence of moderate underweight. On the other hand, the difference in average prevalence of severe underweight in children aged 0 to 5 months can be explained by the judicious implementation of Essential Family Practices (compliance with the vaccination schedule, exclusive breastfeeding, early breastfeeding) by the breastfeeding woman as advice given by field agents. In fact, children from 0 to 5 months are not allowed to feed directly on other foods or water or herbal tea other than breast milk during the first 6 months after birth for good development of the hoop, the immune system and important physiological functions. Thus, when the promotion of food diversification contributes to Food and Nutritional Security as reported by Lele and others (2016), it is not sufficient to guarantee the weight index of children aged 0 to 5 months. This result confirms the analyzes of Camara and others (2021) according to which

vaccination and Exclusive Breastfeeding contribute better to the well-being of children aged 0 to 5 months. These results indicate that the promotion of food diversification does not contribute to the weight index of children aged 0 to 5 months in households.

Table IV: Nutritional status of children aged 0 to 5 months from monitored households (weight/age index)

Weight index for age of children from 0 to 5 months	Avant la PDA		Après la PDA	
	Average number (n=27)	Average prevalence (%)	Average number (n=29)	Average prevalence (%)
Zscore > -2 (W/A Green)	24,04		23,48	
-3 < Zscore < -2 (W/A Yellow)	2,05	7,45 ± 1,04 ^a	2,10	7,25 ± 1,51 ^a
Zscore < -3 (W/A Red)	1,33	4,85 ± 0,98 ^b	3,4	11,79 ± 2,3 ^c

On each line, the means followed by the same alphabetical letters do not present significant differences at the 5% threshold according to the Student Newman-Keuls test.

PFD: Promotion of Food Diversification.

Table V : Nutritional status of children aged 6 to 59 months from monitored households (weight/age index)

Weight index for age of children from 6 to 59 months	Before PFD		After PFD	
	Average number (n=547)	Average prevalence (%)	Average number (n=529)	Average prevalence (%)
Zscore > -2 (W/A Green)	501		500	
-3 < Zscore < -2 (W/A Yellow)	26,7	4,88 ± 0,84 ^a	20,4	3,85 ± 0,91 ^b
Zscore < -3 (W/A Red)	19,3	3,52 ± 0,48 ^c	8,46	1,59 ± 0,48 ^d

On each line, the means followed by the same alphabetical letters do not present significant differences at the 5% threshold according to the Student Newman-Keuls test.

PFD: Promotion of Food Diversification.

Table V above presents the average prevalence of underweight children aged 6 to 59 months in the households monitored. The average prevalence of severe underweight (Zscore < -3 (W/A Red)) before and after PFD are 3.52% and 1.59% respectively. The average prevalence of moderate underweight (-3 < Zscore < -2 (W/A Yellow)) is 4.88% before and 3.85% after PFD. These results present a significant difference and indicate a drop in the average prevalence of underweight after the promotion of food diversification. This may be linked to the training and support provided to women for the promotion of food diversification. Indeed, in addition to training and support for the formulation of complementary foods (enriched flour based on the three food groups), the home garden (provision of fruits

and vegetables rich in minerals and vitamins) and small livestock of poultry and small ruminants (contribution of eggs and meat) to strengthen the nutritional status of children from 6 months, field agents organized feedback sessions (peer training) to share the knowledge received. In addition, some women beneficiaries have developed income-generating activities based on the training and support received. This allowed children aged 6 to 59 months from households with low purchasing power to have access to rich and balanced complementary food. These results agree with those obtained by Bodjrenou and others (2019) which indicate an improvement in the weight index following the introduction of complementary food into the diet of children aged 6 to 12 months in Sub-Benin. On the other hand, these results do not agree with those obtained by Marinda and others (2023) through the assessment of dietary diversity and nutritional status of children aged 6 to 59 months from rural fishing and non-fishing communities in Zambia. Indeed, improving dietary diversity did not lead to a significant improvement in weight index in children aged 6 to 59 months.

Table VI: Nutritional status of children aged 6 to 59 months from monitored households (weight/Height)

Weight-for-Height index for children aged 6 to 59 months.	Before PFD		After PFD	
	Average number (n=547)	Average prevalence (%)	Average number (n=529)	Average prevalence (%)
Zscore > -2 (W/H Green)	481		493	
-3< Zscore <-2 (W/H Yellow)	47,9	8,7 ± 1,2 ^a	23,6	4,46 ± 1,01 ^b
Zscore < -3 (W/H Red)	18,3	3,34 ± 0,98 ^d	10,42	1,97 ± 0,84 ^c

On each line, the means followed by the same alphabetical letters do not present significant differences at the 5% threshold according to the Student Newman-Keuls test.

PFD: Promotion of Food Diversification.

Table VI presents the average prevalence of wasting or acute malnutrition of children aged 6 to 59 months in the monitored households. The average prevalence of moderate acute malnutrition (-3< Zscore <-2 (W/H Yellow)) is higher before the PFD (8.7%) and lower after the PFD (4.46%). The average prevalence of severe acute malnutrition (Zscore < -3 (W/H Red)) is 3.34% and 1.97% respectively before and after the promotion of food diversification. The average prevalence of moderate or severe acute wasting shows significant differences and indicates a decline after the promotion of food diversification. These observed differences can be justified by the promotion of food diversification in households. Indeed, the training and support provided to women allows them to ensure the availability and quality of meals served to children aged 6 to 59 months. In addition, the fact that

some women use the training and support received to develop Income-Generating Activities (IGA) allows them to provide initial health care to children as quickly as possible to avoid complications. The benefits of IGA also allow women to put into practice their knowledge of processing technologies and formulation of rich foods that meet the nutritional needs of children during culinary demonstration sessions. Thus, promoting food diversification helps strengthen the capacity of women in households to guarantee optimal food, health and nutrition conditions for children aged 6 to 59 months. This same observation was made by Camara and others (2021) through their study on severe acute malnutrition with complications in children aged 0 to 59 months in Guinea Conakry. These authors reported that when breastfeeding women or mothers of children have alternative sources of income to help the family, food and nutritional coverage for children is better ensured. Taha and others (2014) also highlighted socio-economic factors and dietary practices in the increase in the prevalence of malnutrition in all its forms. However, these results contradict those obtained by Marinda and others (2023) which indicate no link between socio-economic status, dietary diversity of communities and the prevalence of acute malnutrition or wasting. Anchamo (2022) also reported other factors such as large family size, age of children, diarrhea and household insecurity as determining factors in the prevalence of severe acute malnutrition. It appears from this study that promoting of food diversification reduces the prevalence of wasting.

Table VII: Nutritional status of children aged 6 to 59 months from monitored households (Size/Age)

Size index for age of children from 6 to 59 months	Before PFD		After PFD	
	Average number (n=547)	Average prevalence (%)	Average number (n=529)	Average prevalence (%)
Zscore > -2 (S/A Green)	459,84		474,08	
-3< Zscore <-2 (S/A Yellow)	47,9	8,75 ± 1,05 ^a	34,32	6,49 ± 0,52 ^b
Zscore < -3 (S/A Red)	39,3	7,18 ± 0,94 ^d	20,80	3,93 ± 0,42 ^c

On each line, the means followed by the same alphabetical letters do not present significant differences at the 5% threshold according to the Student Newman-Keuls test.

PFD: Promotion of Food Diversification.

The average prevalence of chronic malnutrition or stunted growth of children aged 6 to 59 months in monitored households is presented in Table VII below. The average prevalence of moderate stunting (-3< Zscore <-2 (S/A Yellow)) fell after the PFD (from 8.75% before the PFD to 6.49% after). Likewise, the average prevalence of severe stunting (Zscore < -3 (S/A Red))

increased from 7.18% before the PFD to 3.93% after the PFD. The different values of average prevalence of stunting present significant differences. This can be explained not only by the promotion of food diversification but also by better hygiene practices (hand washing and drinking water source). Indeed, when trained and supported women put the skills, they have received into practice, they bring the three food groups and earn income from the sale of products (fruits and vegetables, eggs, animals and enriched flour or gari) to meet the other vital needs of children (child care and hygiene measures) even before the support of their spouse. Thus, when women manage to meet the needs of their children first, they more easily apply the advice given by field agents in terms of hygiene (installation of the Hand Washing Device, maintenance and use, purchase of the hand washing device). water from sources recognized as potable) and recourse to the First Reference Health Center (FRHC) in the event of signs of danger of illness (persistent diarrhea, pneumonia and malaria) to avoid chronic malnutrition. These results confirm those of Lokonon and Amoussa (2019) who indicate a strong correlation between hygiene practices (hand washing and portable water source) and chronic malnutrition but did not emphasize the necessary resources to apply hygiene practices. On the other hand, the studies of Ahmad and others (2018) and those Marinda and others (2023) established a strong correlation between the lack of dietary diversity and stunted growth in children aged 6 to 23 months on the one hand and in children aged 6 to 59 months on the other hand. Furthermore, the prevalences of moderate (6.49%) and severe (3.93%) stunting obtained in the present study are different from those obtained by Rahimov and others (2019) respectively 14.6% and 4.8% through their study on the evolution of the nutritional status of children under 5 years old in north-west Syria. Nevertheless, these results confirm a predominance of the prevalence of moderate growth retardation compared to that of severe growth retardation in children aged 6 to 59 years. Furthermore, these authors did not highlight the correlation between hygiene practices and stunted growth but stated causes linked to increased food insecurity, lack of access to health services and loss of means of subsistence. These results indicate that training and support for women to promote dietary diversification contributes to reducing the prevalence of stunting in children aged 6 to 59 months in the households of beneficiary women.

Conclusion

The evaluation of the impact of the promotion of food diversification as one of the activities in the package of activities of the Nutrition and Early Childhood Development Project interventions in the municipality of Tori-Bossito was the opportunity to know that the households monitored mostly adopt better hygiene practices (hand washing practices and consumption of

drinking water). Most of these households consume salt low in iodine (content <15 ppm). The promotion of food diversification has contributed to food availability and the quality of meals served (more than three meals served per day and containing the three food groups: energy food (rich in sugar or lipids), growth food (rich in proteins) and protective food (rich in vitamins and minerals)) for children aged 6 to 59 months in households. In addition, the promotion of dietary diversification has contributed to reducing the prevalence of all forms of malnutrition (from 3.52% to 1.59% for severe underweight, from 3.34% to 1.97% for severe wasting and from 7.18% to 3.93% for severe stunting) in children aged 6 to 59 months. On the other hand, the study revealed that the promotion of dietary diversification does not contribute to the reduction of underweight among children aged 0 to 5 months. This activity is therefore important and recommended in food and nutritional intervention projects and programs in community settings to eradicate malnutrition in all its forms.

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