ISSN NO. 2320-5407

Journal homepage: http://www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH

RESEARCH ARTICLE

DIVERSITY IN FOOD AND NUTRITIONAL STATUS IN CHILDREN FROM 6 TO 59 MONTHS IN THE MUNICIPALITY OF ABOMEY CALAVI-SOUTHEAST OF BENIN (WEST AFRICA)

YESSOUFOU Abdou Ganiou.[1], VINOU Alfred Yémalin [1, 3] , GBAGUIDI Bertin[1], AFFOGNON John Kouami [3], BABA-MOUSSA Lamine Saïd [2] , SEZAN Alphonse.[1]

1- Laboratoire de Biomembranes et de Signalisation Cellulaire, Département de Physiologie Animale, Faculté des Sciences et Techniques, Université d'Abomey-Calavi,09 BP 196 Cotonou (Bénin).
2- Laboratoire de Biologie et de Typage Moléculaire en Microbiologie. Département de Biochimie et de Biologie cellulaire, FAST, Université d'Abomey-Calavi 05 BP 1604 Cotonou (Bénin).
3- Centre d'Action Régionale pour le Développement Rural Atlantique/Littoral (CARDER ATL-LIT) 01 BP 648 Cotonou (Bénin).

Manuscript Info

Manuscript History:

Received: 18 December 2015
Final Accepted: 26 January 2015
Published Online: February 2016

Key words:
Benin, dietary diversity, nutritional status, growth retardation, dietary diversity score

Corresponding Author

YESSOUFOU Abdou Ganiou.

Abstract

Background: Dietary diversity is the number of food groups consumed over a specific period of time and its measurement is a tool to assess the quality of the diet at the household and individual level.
Goal: Analyze the relationship between dietary diversity and nutritional status of children 06-59 months in the town of Abomey.
Materials and methods
This is a cross-sectional survey with descriptive and analytical referred through questionnaires and targeted anthropometric measurements of 331 children aged 6 to 59 months with 52.3% male and 47.7% female and their mothers . For the size of our sample we selected 377 households randomly in two (02) Rural Districts and (02) Urban Districts of the Commune of Abomey. Several types of data were collected: anthropometric data, health and socio-economic data on agricultural diversity, consumption and dietary diversity of children. From these data were calculated Z-scores of weight for age, weight for height, the height-for-age and dietary diversity score.
Results
The results show that the prevalence is higher in rural than urban areas regardless of the form of malnutrition. Also, stunting is the form of malnutrition that affects more children 40.8% in rural areas and 29.6% in urban areas. Furthermore, the average dietary diversity score was 6.51 ± 1.2 in rural areas against 6.31 ± 1.5 in urban areas.
Conclusion
The dietary diversity score apparently has no effect on the nutritional status of children under 5 years in the Commune of Abomey.

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Introduction:-

Dietary diversity is the number of food groups consumed over a specific period of time and is recognized as a means of determining the quality of diets (Becquey et al., 2009). The measurement of dietary diversity is a tool to assess the quality of the diet at the household and individual level. It is expressed in dietary diversity score is calculated by adding the number of foods or food groups consumed over a reference period. Research has shown that dietary diversity is associated with an adequate level of nutrients in the diet, anthropometry of children, women and the

socio-economic (FAO, 2010). In Benin, very little research has been published both on food diversity on food composition. Moreover, different strategies against malnutrition, practiced in Benin are no major noticeable results since the prevalences remained high: 44.6% of children under 5 are stunted accuse of which 28.2% in severe form (INSAE / Internationnal ICF, 2012). Many studies have revealed that there is a strong relationship between dietary diversity and nutritional status of children aged 6 to 59 months (Yessoufou et al, 2014;. Kennedy, 2007; Onyango et al., 1998; et al Taren . 1993; Fanta et al, 2007).. By cons, other studies have shown that there is no relationship between dietary diversity and nutritional status of children (Arimond et al., 2004; Nyambose, 2005; Hatloy et al., 2000). It is in this context that this research on children's dietary diversity fits of 6-59 months in the Commune of Abomey and analyze its relationship with the nutritional status of children.

Materials and methods:-

This is a cross-sectional survey with descriptive and analytical referred through questionnaires and targeted anthropometric measurements of 331 children 6-59 months and their mothers. This study was conducted from July to September 2015 in 377 households randomly selected in two (02) Rural Districts (Zinvié Gbodje and Hêvié Adovié) and (02) Urban Districts (Calavi Agori, Godomey Togbin) of the Municipality of 'Abomey. Anthropometric measurements (weight, height) have been taken, information on food consumption and diversity of children, mothers practices in food, access to food and socio-economic data, health was collected

Collection of anthropometric data:-

Weight gain has been made with a person weighs electrical Salter brand, with a maximum capacity of 150 kg and precision 0,1 Kg. Height was measured using a length board for children less than 2 years and a height board for other children. These measures were collected according to WHO recommendations (WHO, 2008). The anthropometric indices were calculated:

- Weight for Age: This index allowed us to determine the percentage of children underweight (W/A below -2 SD)
- Length/height for Age: This index allowed us to determine the percentage of children with retarded growth (L/A below -2SD)
- Weight for height : This index allowed us to determine the percentage of wasted children (W / L below -2 SD)

The new growth standards and child development currently recommended by WHO (De Onis et al., 2006) were used for assessing the nutritional status of children

Collection of data on food consumption:-

They were collected only on children aged 6 to 59 months. It was asked to the mother or the guardian of remembering amounts of child forms of consumption, consumption and hours the accompaniments of each food, to fill assess food diversity of children in the 24 hours before the passage of the investigator according to FAO recommendations (2010). Food habits and dietary diversity levels were determined from these data.

Dietary diversity analysis:-

To better appreciate the food diversity of children, we calculated the Diversity Score Food (SDA) according to FAO recommendations (FAO, 2010) and used the tercile method (CFSVA, 2005) which consists of comparing the percentage 'children with SDA below the sample mean score to those whose chosen SDA is above the average score.

Statistic analysis:-

The information collected was analyzed using Excel and Epi-Info Version 6, Version 3.2.2 WHO Anthro, SPSS 12.0 and Mini-tab. Individual anthropometric measurements are compared to the new WHO growth standards.

The calculations of Weight for Height index , Height for Age , Weight for Age and the estimated prevalences were made with the same software. The chi-square test in univariate analysis was used to find an association between various factors and the nutritional status of children (the difference is significant with $p < 0.05$). Data were represented as mean ± standard deviation (SD).

Ethical considerations:-

The survey was carried out following the authorization of the competent authorities. The people interviewed gave their oral consent. Data confidentiality was guaranteed; the identity of the child and the household were not disclosed.

Results:-

Of a total of 331 children aged 6 to 59 months (52.3% male and 47.7% female), a child there is overrepresentation of the age range 12 to 35 months is 56.20 %.The results obtained, it appears that, whatever the form of malnutrition, prevalence is higher in rural areas (wasting: 7.3%; stunting: 40.8% and underweight: 29.5%) that 'Urban (wasting: 3.7%; growth retardation: 29.6% and underweight: 12.3%). Also, stunting is the form of malnutrition that affects children in both media (Table 1). Furthermore, comparison of the curves reflecting the Z-scores length/height for age and weight for age with the respective reference curves of WHO (WHO, 2006) showed that these curves were shifted to the left compared to the curves of reference (Figure 1; Figure 2). For against, the curve reflecting the Z-score of weigth for height is nearly superposed on the reference (Figure 3). The study of agricultural biodiversity has revealed that there are 36-69 varieties of edible plants (fruits, vegetables, legumes, roots and tubers and cereals) in different localities of intervention. The principal populations of staple foods are, in order of importance, corn (87.1%), cassava (13%), cowpea (9.5%) and rice (5.5%). The mean dietary diversity score was 6.51 ± 1.2 in rural areas against 6.31 ± 1.5 in urban areas (Table 1). The dietary diversity score apparently has no effect on the nutritional status of children ($p > 0.05$).

Tableau 1: Anthropometric characteristic, Nutritional status and Dietary diversity Score of population studie

	Gbodje	Hêvié Adovié		Togbin	Agori	
Nomber (n= 331)	31	61		88	151	
Means Heigth (cm)	83,3±8,6	82,5±14,5	89,9±11,5	81,2±9,9	83,6±14	82,4±11,9
Means Weigth (Kg)	11,0±2,4	12,9±2,9	11,9±2,6	10,7±2,5	13,8±3,2	12,2 ± 2,8
Z-score Weigth for age means	-0,4 ± 0,9	0,03 ± 1,6	-0,3±1,1	-0,13 ± 0,8	-0,21 ± 0,8	-0,2±1
Z-score Length/Heigth for age means	-2,06 ± 1,8	-1,54 ± 0,4	-1,9±1,2	-1,48 ± 0,2	-0,74 ± 1,9	-1,0±1,2
Z-score Weigth for Heigth means	-1,42 ± 0,1	-0,87± 0,1	-1,1±1,1	-0,92 ± 0,6	-0,55 ± 0,5	-0,65±1,1
Dietary Diversity Score means	6,28±1,47	6,32 ± 1,5	6,3 ± 1,48	6,41± 1,33	6,61 ± 1,20	6,51± 1,26
Wasting (%)	12,9	1,7	7,3	3,4	4,1	3,7
Stunting (%)	51,6	30	40,8	36,8	22,4	29,6
Underweight(%)	38,7	20,3	29,5	13,8	10,7	12,3

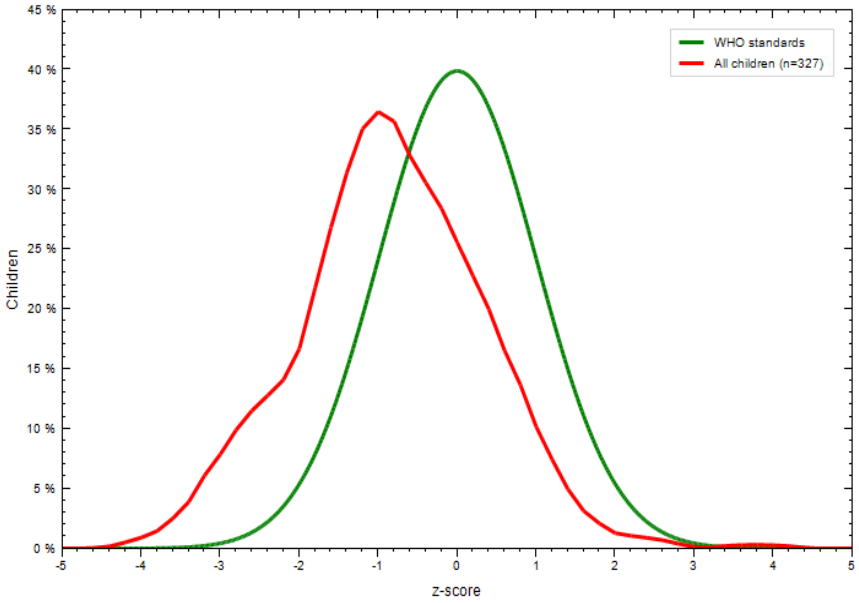

Figure 1: Distribution of z-score Weight for Age

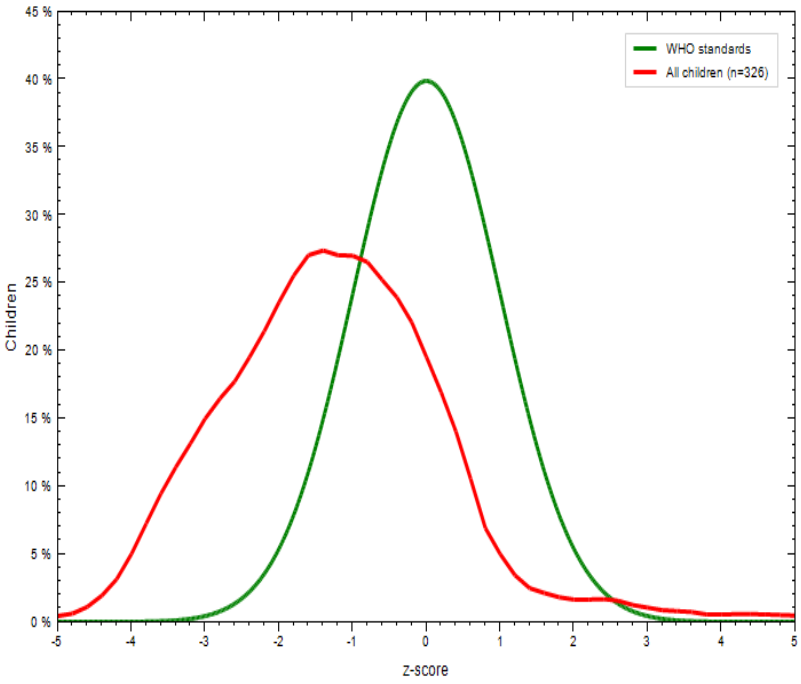

Figure 2: Distribution of Z scores Length/height for Age

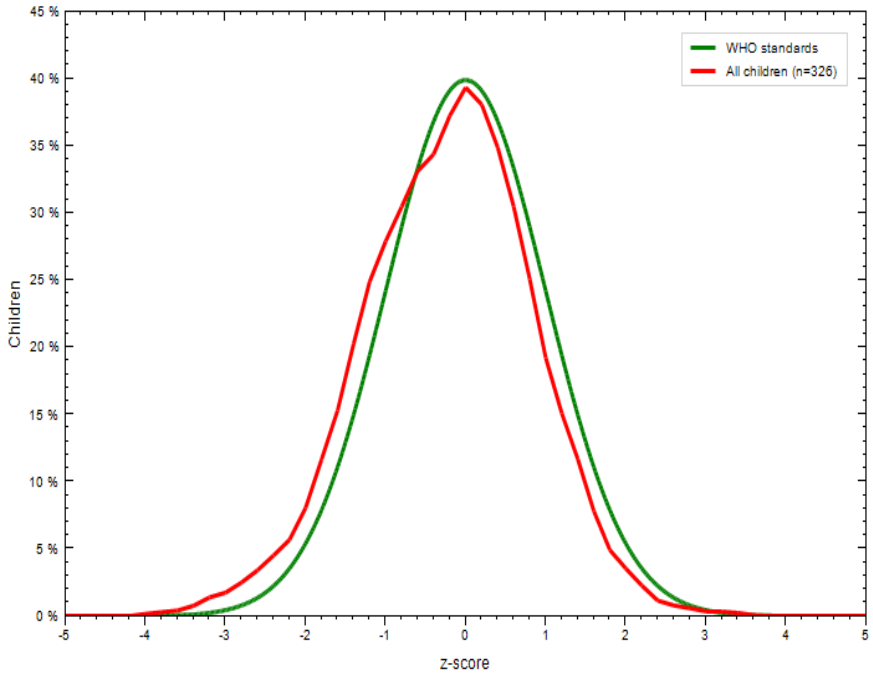

Figure 3: Distribution of z-score Weight for length

Discussion:-

Nutritional status:-

Stunting is the most prevalent form of malnutrition in the town of Abomey with a prevalence of 35.2%. This prevalence is comparable to the outcome of the Global Analysis of Vulnerability, Food Security and Nutrition (AGVSAN, 2009) in the Atlantic department, which is 36.3%. By cons, it is less than that resulting from the Demographic Survey of Health of Benin (INSAE / ICF International, 2012) in the Atlantic department is 47%. The prevalence obtained for other forms of malnutrition, were respectively 20.9% and 5.5% underweight and wasting. These values are also below those reported at the department level by EDSB (INSAE / ICF International, 2012), which are 25.6% for underweight and 5.9% for wasting. These differences can be explained by the made our study has focused on the communities of one common when the demographic and the overall analysis survey gave the prevalence of the whole department. Furthermore, comparison of the curves reflecting the Z-scores height for age and weight for age with the respective reference curves showed that these curves were shifted to the left compared with reference curves. This reflects a less satisfactory nutritional status than that of the reference population, suggesting a tendency to under-nutrition status as emphasized Yessoufou et al. (2015). This situation may find these roots in poor infant and young child feeding practices and inadequate care; but in this study our analyzes have focused mainly on food intake. For against, the curve reflecting the Z-score of P / T is nearly superposed on the reference; which explains the low prevalence (5.5%) obtained in the study population for this form of malnutrition (wasting). Moreover, the prevalence is higher in rural than in urban areas as those obtained by the AGVSAN (2009) which allows us to state that rural children are more exposed to various forms of malnutrition than those of Urban. If the nutritional status should depend on the existing biodiversity in the environment, it would, in rural areas, the lowest prevalence of malnutrition because they have the best varietal diversity. But this is not the case: 40.8% of stunting for rural areas against 29.6% for urban areas. Indeed, there are other factors such as nutritional needs and diseases that can have an impact on the prevalence and on which we have not emphasized in this study. The difference between agricultural biodiversity and dietary diversity already shows there is a gap between production and consumption as shown Maundu et al. (1999) in their study in Kenya.

Food consumption of children:-

The principal populations of staple foods are, in order of importance, corn (87.1%), cassava (13%), cowpea (9.5%) and rice (5.5%). These results are comparable to those obtained by Mitchikpe et al. (2001), which showed that there is a predominance of local products in the dietary habits of households of Abomey and that maize is the most consumed cereal in households of Benin. The nutrient point of view, energy foods such as corn and cassava are the

staple foods most consumed equally in different areas of study; by cons, the frequency of consumption of construction foods varies greatly from one locality to another and do not necessarily depend on the medium type. Thus, the results have shown that foods rich in good quality protein are consumed Agori (urban) and Hêvié Adovè (rural) than Togbin (urban) and Gbodjé (rural); why the prevalence of stunting obtained Agori (22.4%) and Hêvié (30%) are lower than those of the other two areas (51.6% and 36.8% for Gbodjè for Togbin). Indeed, animal products are sources of high biological value protein and are also rich in other nutrients including heme iron, which plays an important role against anemia (Sean, 2007).

Despite the level of diversity of production in the town of Abomey, there is a low consumption of fruits and vegetables (26.2% for vegetables and 22% for fruit); while representing foods rich in minerals and vitamins essential for the proper development of the organism as emphasized by several authors (Caulfied, 2009; Tangney, 2007).

Dietary diversity and nutritional status:-

The results of this study showed that there is no relationship between dietary diversity and nutritional status of children 6-59 months of the study area; which is consistent with results obtained by Arimond et al. (2004) and Nyambose (2005) in their respective study. By cons, many studies have revealed that there is a strong relationship between dietary diversity and nutritional status of children in the plain of Pendjari northwest of Benin (Yessoufou et al., 2014), the Philippines (Kennedy 2007), Kenya (Onyango et al., 1998), China (Taren et al., 1993) and Burkina Faso (Fanta et al., 2007). Also, Hartley et al. (2000) do not they have shown in their study in Mali, children with low dietary diversity score had twice the risk of suffering from malnutrition in urban areas but not In a rural area. Also, Hartley et al. (2000) do not they have shown in their study in Mali, children with low dietary diversity score had twice the risk of suffering from malnutrition in urban areas but not In a rural area.

Our results could be explained by the variability of dietary diversity in time and the instability of food availability. Indeed, the study was conducted at the end of the lean season in a context of food insecurity where households do not diversify their diet because of Cherete food and low financial capacity. We can say as demonstrated knew Fanta (2006) that the household dietary diversity is related to their access to food is a food security component.

Conclusion:-

Agricultural biodiversity is not a determinant of food diversity and there is no clear relationship between dietary diversity and nutritional status of children 6-59 months in the Commune in a context of insecurity food. However, it would be interesting to conduct a study on the relationship between dietary diversity and nutritional status of children living in households with a score of higher food safety.

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