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Full Length Research Paper

Food and nutrition education; elaboration of a guide for children of 6 to 12 years

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A qualitative description of the food situation for 2196 Algerian healthy school children aged 6 to 12 years (Constantine, Jijel, Touggourt) by a qualitative meta-analysis. Our aim is to compare the observed and recommended diet (2001) to correct some food errors (quantity, quality, behaviour) with recommendations for nutrition education as a guide for children to prevent communicable diseases related to diet; in Algeria this type of study is rare due to lack of work on this age and because of lack of access to previous studies. The results obtained are: the decline of daily caloric intake, an unbalanced distribution of macro and micronutrients, a high intake of starch products, an average consumption of vegetables, fruit and fish rich in antioxidants biomolecules, breakfast is neglected, the morning snack and snack time food are formed by foods of high energy density, the snacking food type 'junk food' practiced the whole time watching television and a decrease in the practice of regular physical activity.

Key words: Algeria, nutrition education, children of 6 to 12 years, quantity, quality and behavioural food, guide.

INTRODUCTION

The increase in chronic no communicable diseases related to diet seems to initiate an epidemiological and nutritional transition, exacerbated by demographic changes that combine energy-dense diet to a life of increasingly sedentary-fed refined products too fat, too salty and too sweet (Maire et al., 2002), it is urgent to establish an appropriate prevention. Currently, nutrition education is difficult to apply because the child's diet depends on not only family but also society. Our work aims to compare between observed and advised diet in quantity, quality and behavioural for safe Algerian children at school in 6 to 12 years to correct errors with recommendations for nutrition education as a guide.

MATERIALS AND METHODS

Our study is a qualitative description of the food situation for 2196 Algerian healthy children attending school 6 to 12 years (Constantine, Jijel and Touggourt). In our study we used a qualitative data analysis (summary of study results on the same issue); only seven (7) studies of 67 ones that talk about the nutritional status food of Algerian children aged 6 to 12. Then a comparison between the observed powers (the result of the meta-analysis) and the recommended diet (Martin, 2001) to correct some aspects as food quantity, quality and behavioural recommendations for nutrition education as a guide for children. We used Microsoft Excel 2007 in our study. The distributions were presented as percentages, averages and standard deviations.

RESULTS

Quantitative aspect of food

The results obtained are reduction of daily energy intake of children in relation to recommended daily allowance. Figures 1 and 2 shows the decrease in daily energy intake of children in relation to recommended dietary allowances according to sex. Figures 3 and 4 show the share of energy meals that are lower for breakfast (a tendency to obesity) and lunch but high for afternoon snack and dinner with the practice of snacking. Snacking, representing a significant share of 2.06% among children aged 7 to 9 years and 1.29% among children 10 to 12

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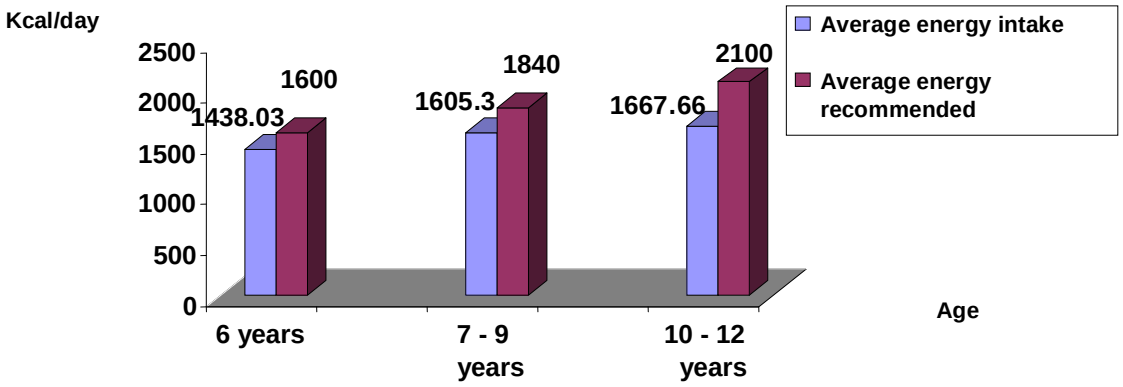

Figure 1. Comparison between average daily energy intake and recommended among girls aged 6 to 12 years.

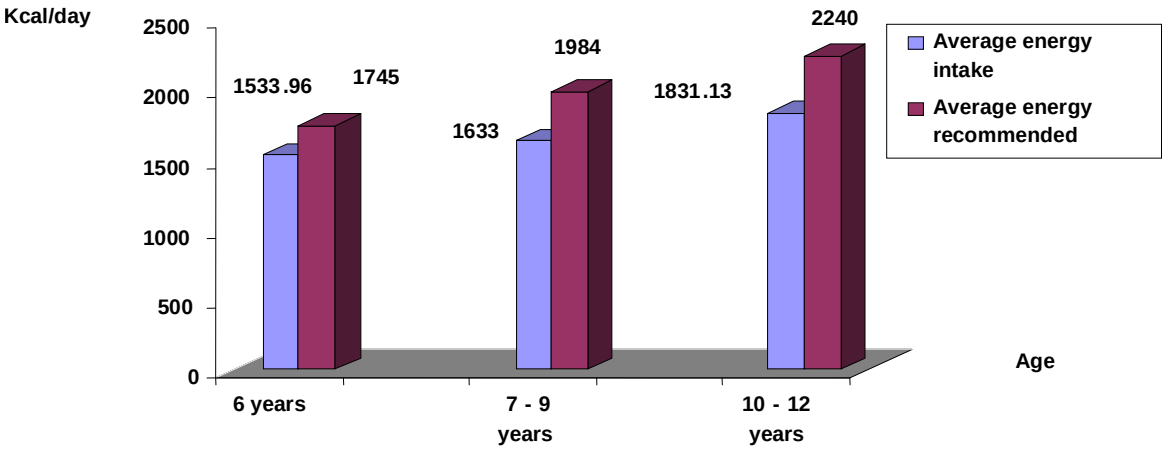

Figure 2. Comparison between average daily energy intake and recommended among boys aged 6 to12 years.

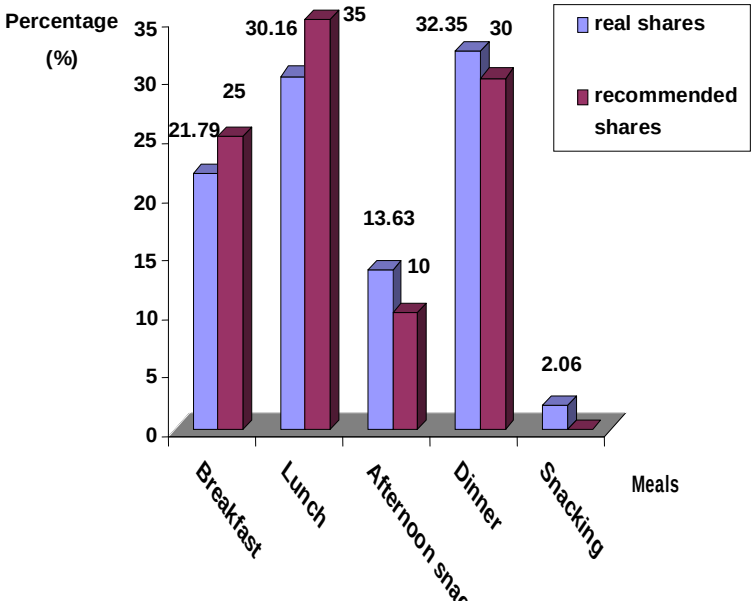

Figure 3. Comparison between energy real and recommended shares for children aged 7 to 9 years.

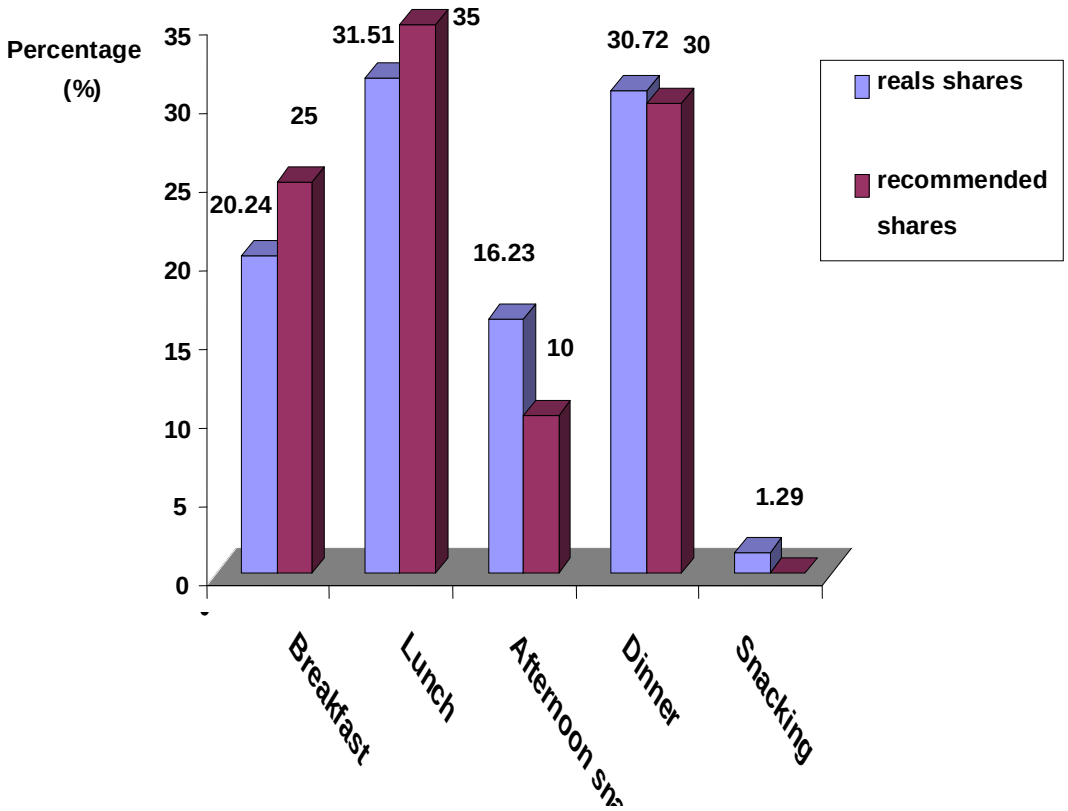

Figure 4. Comparison between energy real and recommended shares for children aged 10 to12 years.

Table 1. Distribution of recommended macronutrients.

Proteins 11 - 15 (%)	Lipids 30 - 35 (%)	Carbohydrates 50 – 55 (%)
½ animal protein (5.5 – 7.5%)	1/3 saturated fatty acids (8 à 10%)	1/5 simple sugar (10%)
½ plant protein (5.5 – 7.5%)	2/3 unsaturated (20 - 25%): 1/3 monounsaturated fatty acids (10- 15%), 1/3 polyunsaturated fatty acids (5 à 10%)	4/5 sugar complex (starch) (40 – 45%)

Table 2. Distribution of observed macronutrients.

Proteins 16.34% (15.34 – 17.56)	Lipids 22.49 % (20.32 – 24.96)	Carbohydrates 60.92% (57.78 – 63.87)
43% animal protein (7.02%)	9% saturated fatty acids	15.49% simple sugar
57% plant protein (9.31%)	11.67% unsaturated (8% monounsaturated fatty acids, 3.67% polyunsaturated fatty acids	45.43% sugar complex (starch)

years for the body compensates for its daily energy expenditure.

Qualitative aspect of food

An imbalanced distribution of macro and micronutrients.

Macronutrient intakes

According to Tables 1 and 2, the children's food is characterized by a total protein intake in excess consists of too many foods containing proteins of plant origin in relation to animal protein. A lack of overall consumption of total lipids with saturated fatty acid intake is sufficient,

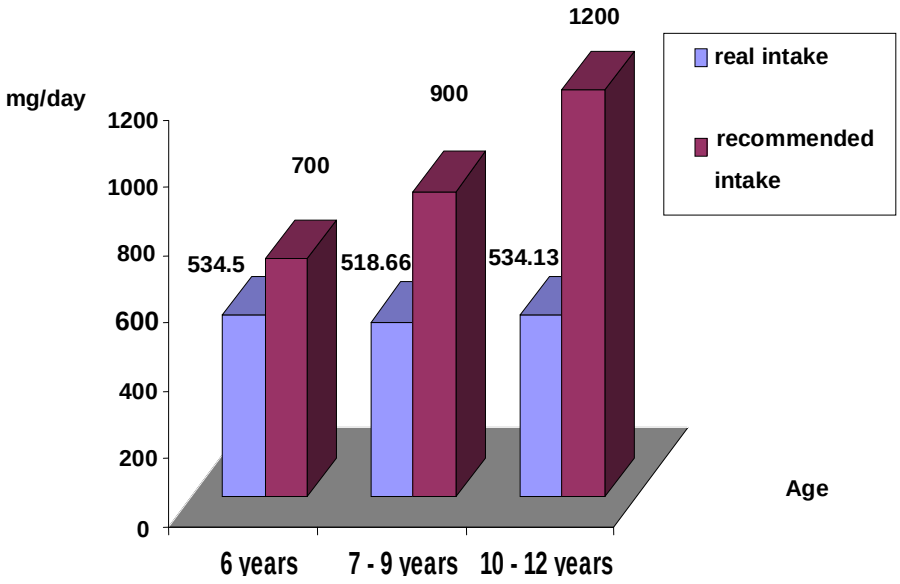

Figure 5. Comparison between real and recommended calcium intakes for children aged 6 to 12 years.

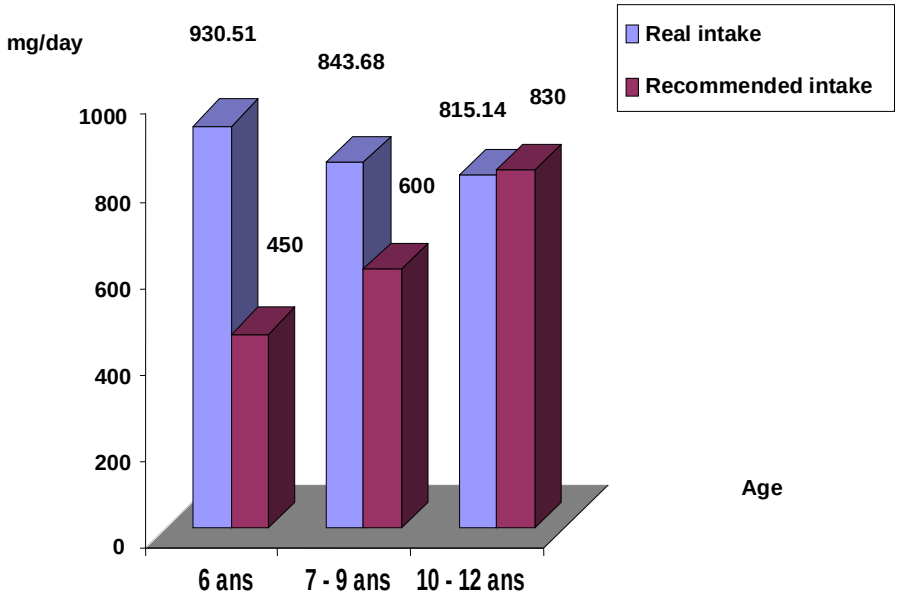

Figure 6. Comparison between real and recommended phosphorus intakes for children aged 6 to 12 years.

fewer foods containing monounsaturated fatty acids and polyunsaturated fatty acids. An overall excess carbohydrate intake, too many foods high in simple sugars and complex sugars.

Micronutrient intakes

According to Figure 5, all children suffer from severe deficiency in calcium during growth. According to Figure 6, phosphorus inputs are covered extensively for children aged 6 to 9 but a slight deficiency has occurred for children 10 to 12 years.

According to the Table 3, reports of Ca/P children are out of balance for all ages. According to Figure 7, iron intake is largely covered for children 6 to 9 years, but children aged 10 to 12 mild deficiency is notable in early adolescence especially for girls.

Table 3. Comparison of Ca/P real l and recommended for children 6 to 12 years.

Ages (years)	Report real Ca/P	Report recommended Ca/P
Children 6	0.57	
Children 7 - 9	0.63	1.2 to 1.6
Children 10 - 12	0.6	

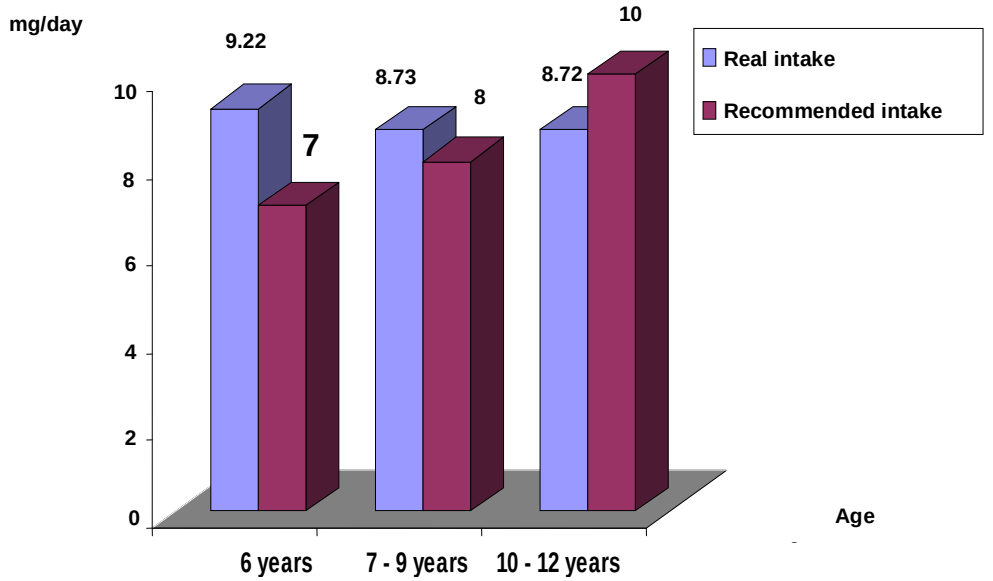

Figure 7. Comparison between real and recommended iron intakes apports for children aged 6 to12 years.

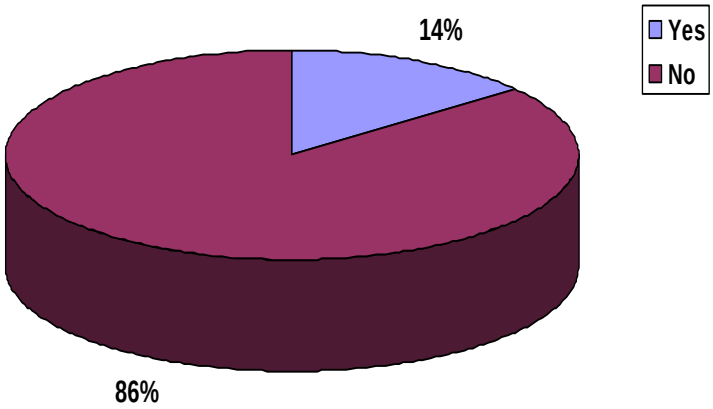

Figure 8. Distribution of children aged 6 to 8 years depending on the sport outside school.

Behavioural aspect of food

Practice of physical activity

According to Figure 8, 86% of children have no regular physical activity promote obesity and diabetes. Reduction in the practice of regular physical activity.

Getting breakfast

Meals are taken on a regular basis, we noted that about

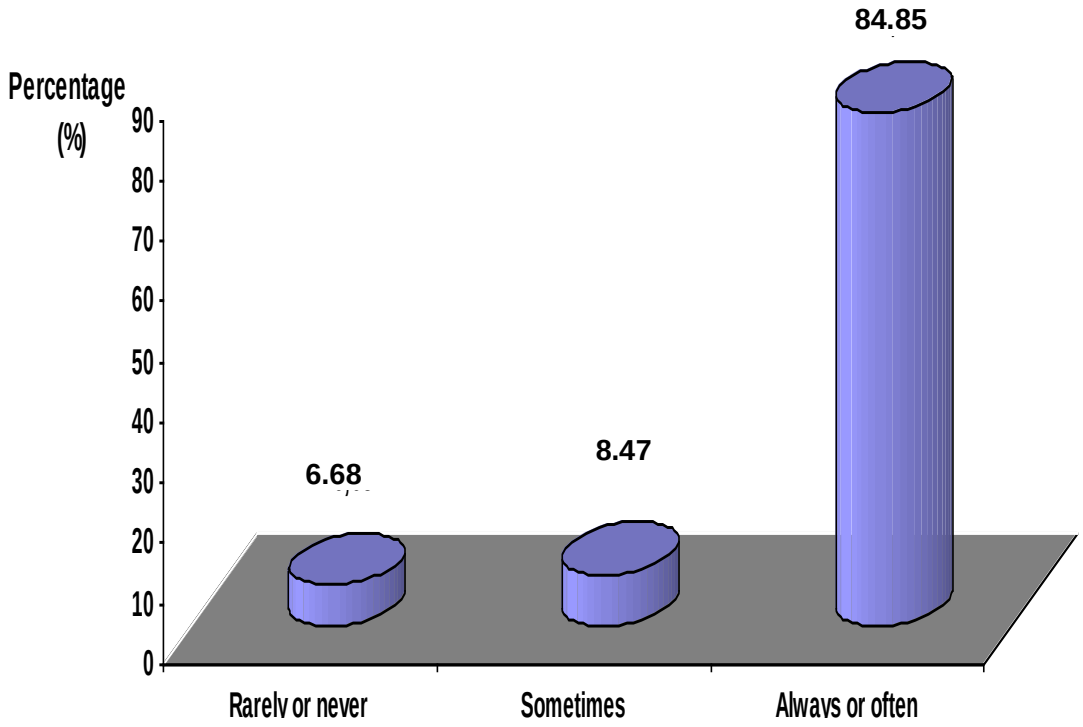

Figure 9. Average frequency per week of taking breakfast in children 6 to 12 years.

6.68 per 100 skip breakfast (tendency to obesity) (Figure 9) breakfast is skipped.

Composition of the morning snack and afternoon snack

The food component the morning snack and afternoon snack (Figures 10 and 11) are composed by candy, cookies and chocolate which is a very important energy supplement accompanied by an almost total absence of fruits rich in antioxidants biomolecules (Vitamin A, C and β carotene) against free radicals promote cancer. The composition of the morning snack and afternoon snack for energy-dense foods.

Taken in snacking

According to Figure 12, snacking is widespread among children; they nibble all the time watching TV (loss of attention to internal cues of satiety).

Frequency of consumption of foods such as junk food

The snack food of choice of food types are 'junk food' with high energy density (high in carbohydrates and lipids) (Figure 13).

DISCUSSION

Quantitative aspect of food

Our results have highlighted the importance of protein energy malnutrition in Algeria. In general, by sex and age group, the average daily energy intake of all children boys or girls are below the recommended daily caloric intake by (Martin, 2001), this can be explained by diet which does not suffice to meet the nutritional needs of children. That under nutrition caused the standard of living: the development of poverty which results in a decrease of purchasing power and the average socioeconomic status if they say no bottom of the Algerian population that relies primarily on its power grains (bread) and milk. These results are similar to results found by the national survey on the goals of the late decade health mother and child (MICS 2, 2000) and the National Statistics Office and Ministry of Health (MICS 3 Algeria, 2006).

Qualitative aspect of food

Excessive consumption of carbohydrates can be determined especially when added sugar which increases the energy density of food. The sweet part in hedonic food especially when combined with fat, it may well induce a passive over consumption (Simon, 2003). The high consumption of sugar induced lipogenesis and

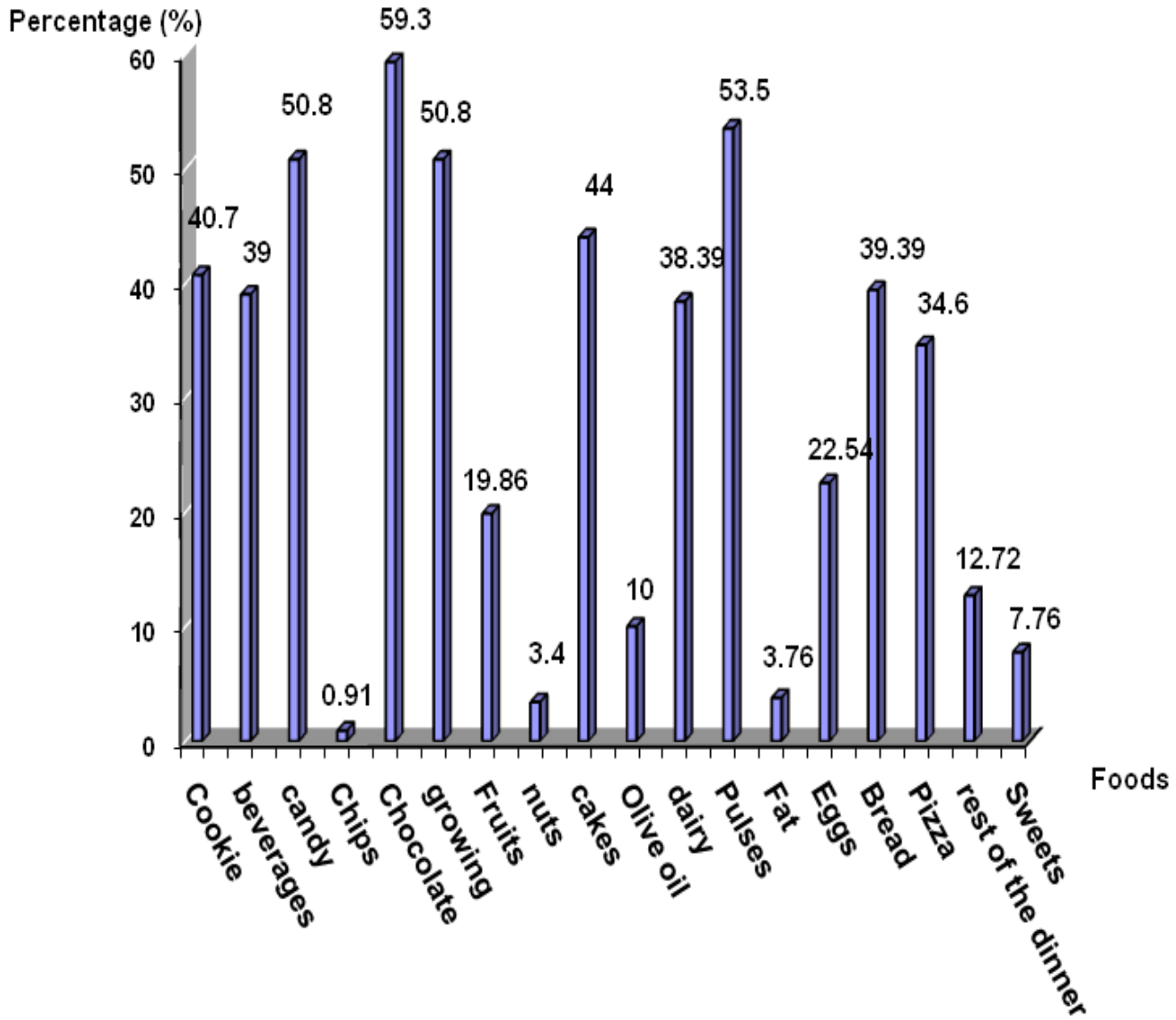

Figure 10. Average frequency of consumption of foods making up the morning snack among children 6 to 12 years.

thus obesity later. A high intake of protein during infancy induces adipocyte proliferation early (Rolland et al., 1995); also in our study, the vegetable protein consumed over 50% with small value biological compared to animal proteins that are a high biological value and very rich in Fe and B12; they can be explained by the cheret meat, offal and fish and reducing the power of purchase of the Algerian people. The fat intake is lower than the recommended dietary allowances due to the decreases consumption of food rich in animal and vegetable fats. All calcium intakes are very low capacity to recommended dietary reports by Maire et al. (2002) because of depletion of infant food sources of calcium are dairy products like milk, cheese, yogurt; this is due either because of the socio economic situation of households is that children do not consume milk.

Behavioral aspect of food

Practice of physical activity

Many studies suggest the existence of an association between increased prevalence of childhood obesity and the trend towards greater settling (Leynaud and Berthier, 1992).

Getting breakfast

Food must represent 25 per morning percent of daily

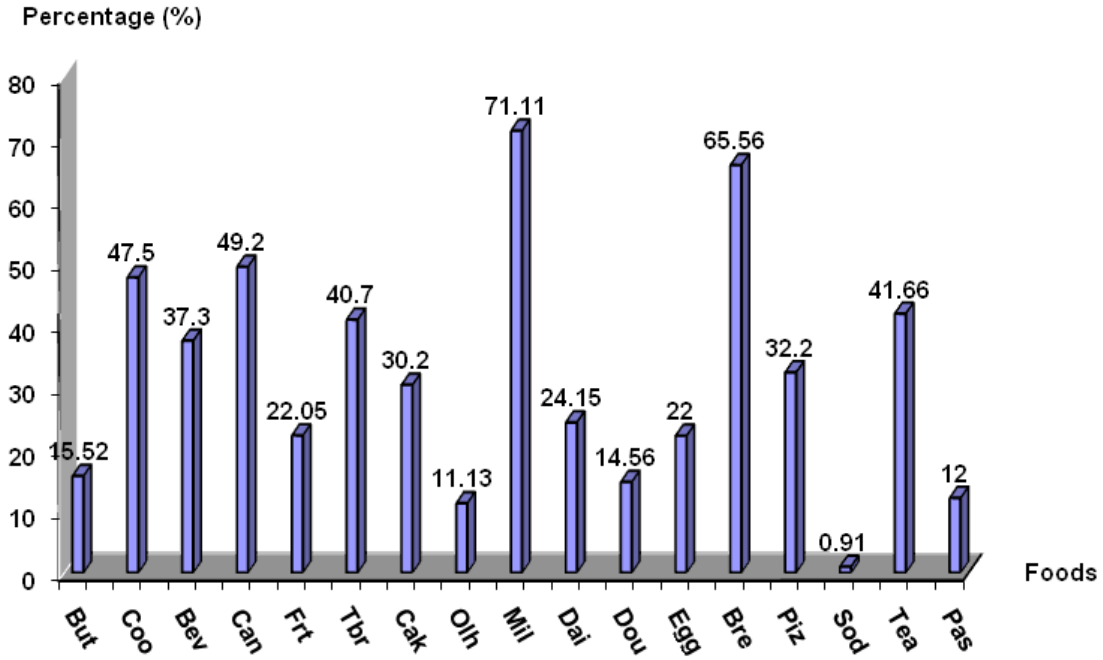

Figure 11. Average frequency of consumption of afternoon snack foods among children 6 to 12 years. But: butter, Coo: cookie, Bev: beverages, Can: candy Chi: chips, Jam: jam, Cho: choocolate, Gro: growings, Frt: fruits, Tbr: traditional bread, Cak: cakes, Olh: olive oil, Mil: milk, Dai: dairy, Dou: dough, Egg: eggs, Bre: bread, Piz: pizza, Sod: sodas, Tea: tea, Pas: pastries.

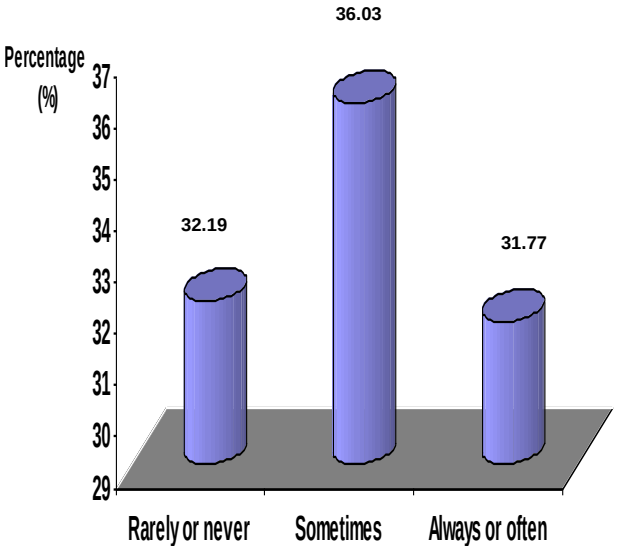

Figure 12. Average frequency per week for taking snacks among children 6 to 12 years.

energy intake. Its failure causes an imbalance in significant daily energy intake.

Composition of the morning and afternoon snack

As for the food consumed, the composition of the meals according to the Directorate of School Education in France (2004) should serve a diversified by focusing on water, fruit, pure fruit juices, milk and dairy products and avoiding energy-dense products rich in sugars and fat. What we observe in our children population is exactly the opposite.

Taken in snacking

Outside of main meals, children eat snack foods (Louis, 2000) such as sweets, chocolate, cupcakes; these products are then input result in sugar and fat that challenges the balance of meals daily, the combination fat and simple sugar is especially harmful to health. Suggested that snacking means the catch in the state of "no psychological hunger" or "satiety", that is to say, taken arising from boredom, stress or just because a little added pleasure is not neglected. A study among young Japanese reported that snacking is a factor in development of obesity (Takahashi et al., 1999).

Conclusion

Our goal is to maintain health and prevent the onset of chronic diseases and syndromes by correcting wrong attitudes practiced by children in their regular diet with a guide to healthy and balanced diet.

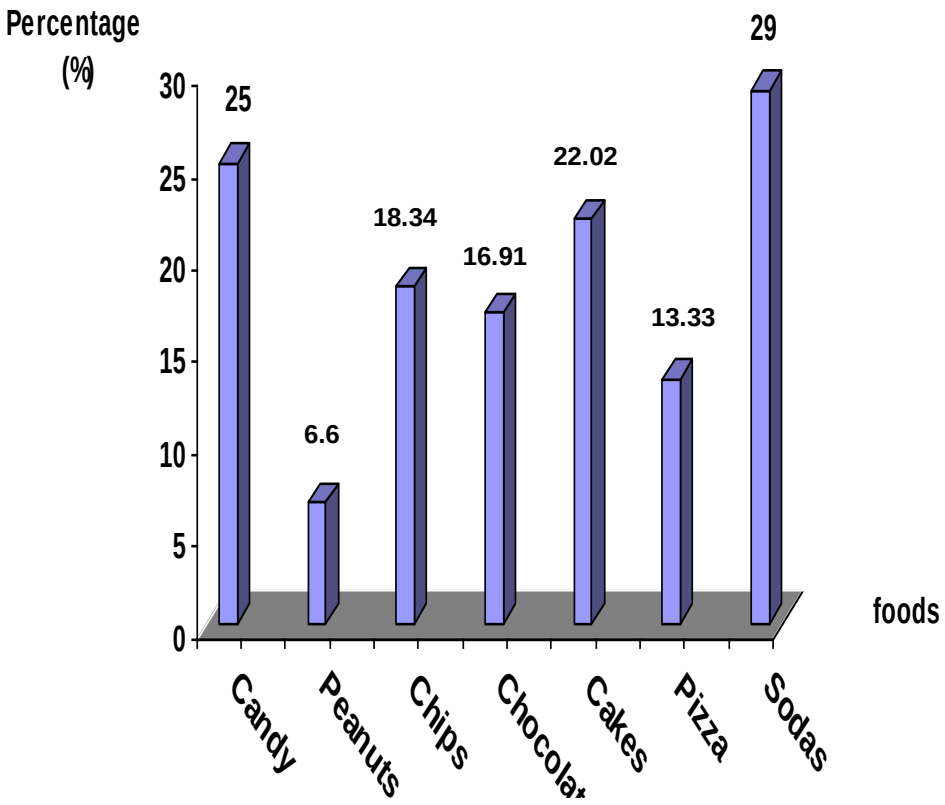

Figure 13. Frequency of consumption of foods like junk food among children 6 to 12 years.

RECOMMENDATIONS

1) The total daily energy intake is based mainly on macronutrient whose distribution is as follows:

i) Carbohydrates represent 50 to 55 %of total energy intake with one fifth of the total carbohydrate in the form of simple sugars and four fifths are complex sugars.
ii) Proteins represent 11 to 15% of total energy intake which half of the total protein is animal and half is of plantorigin.
iii) Lipids represent 30 to 35% of total energy intake with third saturated fatty acids and two thirds are unsaturated fatty acids.

2) Dairy products (milk, yogurt, a small Swiss cheese) the best source of calcium done both their richness in calcium and vitamin D plays an essential role in bone mineralization by increasing the intestinal absorption of calcium as they provide the protein necessary for bone health. Vegetables, fruits, grains, water beverage suppléments calcium intakes.
3) The coverage of iron requirements is ensured by proper intake of meat and fish that are rich in heme iron better assimilated and well absorbed (15 to 35%) than non-heme iron (2 to 20%) found in vegetables such as spinach, dairy products, eggs, chocolate ... Some elements can trap iron as fiber plants such as tea tannin, conversely, vitamin C in plants, the presence of meat, the increases.
4) Follow the regular rhythms of eating meals scheduled four main meals:

i) Morning: breakfast which is a 25% of total energy.
ii) At noon: lunch which represents a 35% of the daily diet.
iii) Afternoon to 16 pm: a snack that is 10% of the daily diet.
iv) Evening: Dinner representing 30% of the daily diet.
v) If breakfast missed or incomplete, a morning snack at 10 am to 5 p. percent of the daily diet.

5) Do not skip the four main meal because it encourages snacking.
6) Avoid repetitive food taken outside the main meals (snacks), especially watching TV or playing video games.
7) Limit consumption of foods such as junk food cakes, pizza, chocolate, soda, peanuts, and chips, except occasionally.
8) Promoting regular physical activity at least equivalent to half an hour of brisk walking per day.
9) During leisure time promote active play and sports, and entertainment not regularly active (video games, television).

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