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FREQUENCY OF OBESITY AND EATING HABITS AMONG TEENAGERS OF CONSTANTINE, ALGERIA

Daoudi Hadjer[1]*, Lakehal Abdelhak[2], Sayed Amira [1], Abdelkader Rouabah[1], Zaamouche Adlen[3], Leila Rouabah[1]

[1]Laboratory of Molecular and Cellular Biology, Faculty of Natural Sciences and Life, University 1 of Constantine Algeria.

[2]Epidemiology and Preventive Medicine Service, public health facility near Mila; Algeria.

[3]Research Laboratory Metabolic Diseases, Faculty of Medicine, CHU Benbadis, Constantine, Algeria.

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***Correspondence for Author**
Daoudi Hadjer
Laboratory of Molecular and Cellular Biology, Faculty of Natural Sciences and Life, University 1 of Constantine Algeria.

ABSTRACT

Background: In recent decades, the number of children who are overweight or obese has increased rapidly in many countries, including countries in the developing world, which is a concern given the consequences of excess weight health. More obesity appears, the sooner consequences in adulthood are dramatic. **Objective:** Estimate the frequency of overweight and obesity in adolescents enrolled in the district of Constantine, during 2012/2013, and evaluate their eating habits according to their weight status. **Method:** This is a descriptive cross-sectional study, based on an elementary random sampling, on the list of names of all students enrolled in the 59 public colleges of the town of Constantine; the size of the sample was of the order of 449 college students. **Results:** The frequency of overweight and obesity were respectively 18.2% and 13.2%. 1.8% of adolescents had severe obesity. Only 54.7% of adolescents were of normal weight. Obese children are less to consume their breakfast, the less well-to-eat their breakfast and lunch at home, and with family compared to overweight children and normal weight. **Conclusion:** The high prevalence of overweight and obesity found in Constantine adolescents is a real wake-up call for those involved in public health in Algeria.

KEYWORDS: childhood obesity, epidemiology, nutrition, teen.

INTRODUCTION

The prevalence of obesity, especially childhood obesity is increasing rapidly in recent decades. This trend is observed in most industrialized countries and is now extended also to developing countries. The increase is such that the WHO considers since 1998, obesity as a major public health problem worldwide. [1] The situation in Algeria is not well known so far. Severe obesity is a risk factor for the development of several chronic diseases such as cardiovascular and respiratory diseases, type 2 diabetes, hypertension, and some forms of cancer, as well as early death. [2]

Overweight and obesity are influenced by many factors including heredity, environmental and behavioral factors. However, dietary and physical activity patterns strongly influence the energy balance and it is the major modifiable factors. In fact, diets rich in fat, high energy density and a sedentary lifestyle are the main characteristics associated with increased prevalence of obesity in the world. [3]

Monitoring of the epidemic and it's a factors crucial risk, especially in countries where the current economic development grows younger populations towards changing dietary habits and lifestyle, which probably led to an increase in the prevalence overweight.

MATERIALS AND METHODS

1. Type of survey

This is a descriptive cross-sectional survey of a representative sample of students from 59 colleges of public educational institutions located in the town of Constantine.

2. Target Population

The selection of the study population was made on the junior students, 1st, 2nd, 3rd, and 4th year average attending public colleges. This age group may be a good time for prevention strategies and therefore deserves special interest. The school is compulsory in Algeria, so we can be considered as almost all children attend public colleges. The staff of the 2012-2013 school years was used as the sampling frame for this survey.

3. Sampling

This is a basic random sampling on the list of names of all students enrolled in public colleges of the town of Constantine during 2012/2013 school year.

4. Sample Size

This study cross-type is based on a simple basic sampling: the draw was made from the list of names, so to determine college students in the sample by their name, class and school.

The sample size was calculated by the formula of schwarpz:

Confidence interval = 1.96 p +/- √ [(pxq) / n].

By taking a risk α of 5%, an accuracy of 2%, and expected obesity prevalence of 5%, the sample size was increased to 449 students.

Apart from the sample size required was around 449, we have drawn 500 to end to avoid problems of rejection of participation, absence, change of residence ... , in addition not included (excluded) for the reasons we talked and ultimately we were able to investigate 457. Note that more than 40 students were excluded from the survey for the following reasons:

• Date of birth unknown
• Children over 19 years
• Children under 11 years

In total, the study included 457 students.

5. Definition of obesity in adolescents

In current clinical practice, the diagnosis of obesity in children is based on the regular and repeated measurement of weight and height of the children, calculation of body mass index and the postponement of it on the curves corpulence of the health record[4]. Unlike adults, for which there is a single threshold value of BMI for overweight (greater than 25 kg / m 2 BMI) and obesity (greater than 30 kg / m 2) in children thresholds evolve with age and sex due to changes in body size occurring during growth. The Body Mass Index (BMI) is commonly used for classification of thinness, overweight and obesity in adults and children.

WHO recommends the use of the term in z-score because it is better suited to summary statistics (mean, standard deviation); for this we used the 2007 WHO thresholds expressed in z-score by age and sex to calculate the prevalence of overweight and obesity.

6. Organization and data collection

Comprehensive training for a period of two days was conducted in order to learn well in all measurements more accurately and professionally; measuring the weight of children in

underwear and respect a good position to measure the size (joints, legs straight, heels touching the wall and staring out the horizon feet) .The standing height (m) was measured to the nearest mm using a stadiometer fixed beforehand and the ground height measuring boards were tested using a tape measure.

Data collection was carried out by an individual questionnaire;
A questionnaire consisting of more than 20 questions on sociodemographic characteristics, taken from their main meals, and eating habits of college students involved in the sample. The four recommended food intake at this age are observed in the questionnaire, including, breakfast, lunch, snack and dinner.

A preliminary survey conducted in December 2012 with 30 college students was conducted to test the feasibility and timing of the questionnaire. Also identified the various problems encountered in the field; this allowed us to obtain a clear and comprehensive questionnaire.

7. Analysis

The size of the sample was treated with Epi Info Version 6.04. While the nominal selection of college students was made by the Epi Info Version 3.3.2 Analysis of the results was performed by SPSS Version 20.0.

8. Ethical Issues

Data were collected in compliance with the confidentiality and anonymity. Authorization by the Academy of Education was granted us. The parents had been informed. The material used is validated by AFSSAPS, which has used equipment; A person weighs brand Terraillon TPRO 1000. A voltage meter mark Omron M3. A flexible but non-elastic tape. A square wood with a length of 200 cm.

RESULTS

1. Distribution of students by sex

	Effective	%
Boys	238	52.07
Girls	219	47.92
Total	457	100

The sex ratio boys / girls, is 1.08.

2. Weight status: Distribution of the fatness of children by sex, according to WHO reference 2007 z-score.

	Girls		Boys		Total	
	Effective	%	Effectifve	%	Total	%
Thinnes degr1	21	9.6	32	13.4	53	11.6
Thinnes degr2	2	0.9	8	3.4	10	2.2
Thinnes degr3	0	0	1	0.4	1	0.2
Normal weight	129	58.9	121	50.8	250	54.7
Overweight	39	17.8	44	18.5	83	18.2
Obesity	25	11.4	27	11.3	52	11.4
Severe obesity	3	1.4	5	2.1	8	1.8
Total	219	100	238	100	457	100

The prevalence of obesity is quite important; it is of the order of 13.2%, including 1.8% with severe obesity, overweight 18. 2%, 14% weight loss, and only 54.7% were normal weight. No significant difference in prevalence between boys and girls, p < o.2.

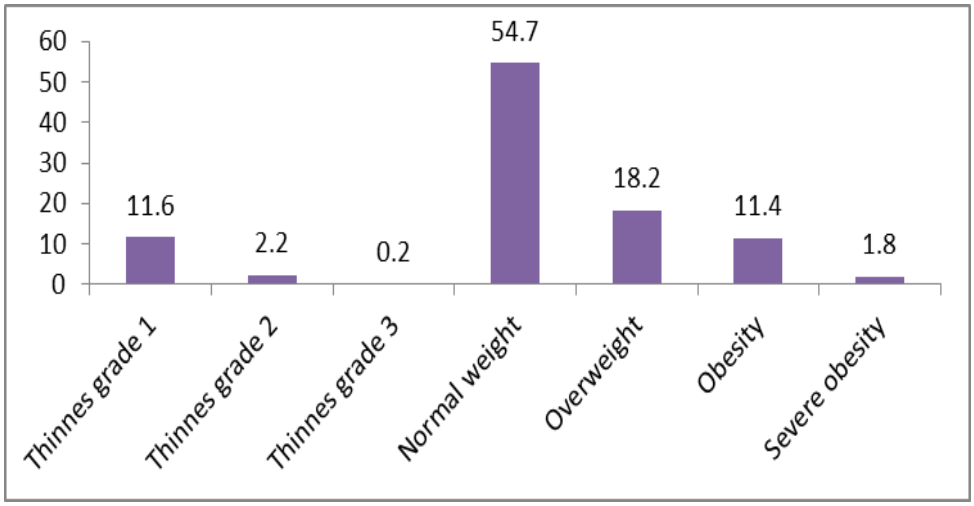

Fig.1. Breakdown of gross prevalence of body types of students according to the WHO 2007 references.

2. Eating Habits

1.1. Meals taken during the day

	Breakfast		10 am Snack		Lunch		17 am Snack		Dinner	
	Eff	%	Eff	%	Eff	%	Eff	%	Eff	%
Yes	334	73.2	77	16.8	449	98.2	239	52.3	440	96.3
No	122	26.8	380	83.2	8	1.8	218	47.7	17	3.7
Total	456	100	457	100	457	100	457	100	457	100

The majority of students (73.2% or more) take usually the main meal in the day, including lunch (98.2%) and dinner (96.3%), except for the morning snack that is taken by 1 student for 8.

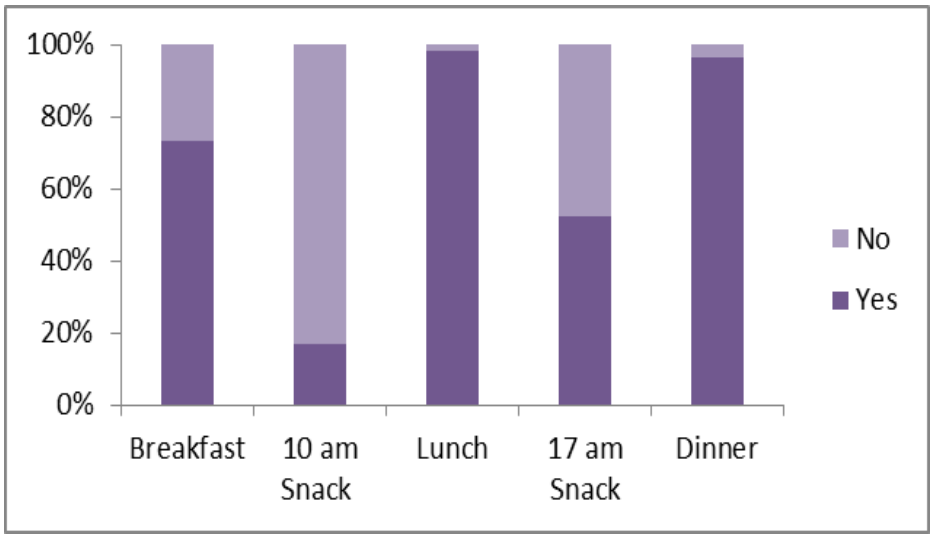

Fig.2. Frequency of catches of main meals.

1.2. Study of the correlation between body size and eating meals

We used the chi-squared to test, develop whether or not a relationship between various parameters and body size. Taking α risk of 5%, an accuracy of 1%.

	Normal Weight		Overweight		Obesity		p-value
	Eff	%	Eff	%	Eff	%	
Breakfast, Yes	182	72.8	58	69.9	35	58.3	p < 0.0001
Breakfast, No	68	27.2	25	30.1	25	41.7	
Total	250	100	83	100	60	100	
Snacks 10 am, Yes	47	18.8	11	13.3	9	15	p < 0.6
Snacks 10 am, No	203	81.2	72	86.7	51	85	
Total	250	100	83	100	60	100	
Lunch, Yes	247	98.8	83	100	57	95	p < 0.1
Lunch, No	03	1.2	00	00	03	05	
Total	250	100	83	100	60	100	
Dinner, Yes	245	98	79	95.2	52	86.7	p < 0.001
Dinner, No	5	2	04	4.8	8	13.3	
Total	250	100	83	100	60	100	

58.3% of obese students eat breakfast, vs 69.9% of overweight and 72.8% of normal weight. Concern the taste of the morning, we found that only 16.8%, take it (this result we prevent having to describe her if there is a relationship with the other parameters studied in relation to body size). For lunch, almost students take their meal (98.2%), with prevalence's among obese children, overweight, normal weight, by; 95% vs 100% and 98.8%, as shown in the table below.

Nearly, half of students (48.5%) did not answer the question of 17 am Snack, the prevalence of students who answered (51.5%) the question, not allow us to assess if there is a relationship between 17 am snack and weight status, only for the relationship17 am snack TV and corpulence, this may be due to the predominance of the prevalence of students who watch TV at afternoon's snack time; that equal to 27.4% vs 24.1%. A high prevalence of normal weight students take their dinner with 98%, vs 95.2% of overweight and 86.7% obese.

1.3. Location meals

	Breakfast		10 am Snack		Lunch		17 am Snack		Diner	
	Eff	%	Eff	%	Eff	%	Eff	%	Eff	%
Home	310	92.8	14	3.1	402	88	210	46	436	95.4
Outside	24	7.2	63	13.8	49	10.7	29	6.3	2	0.4
Total	334	100	77	100	451	100	239	100	438	100

Similarly, the vast majority of students (88% or more) eat the main meal at home except for the morning snack.

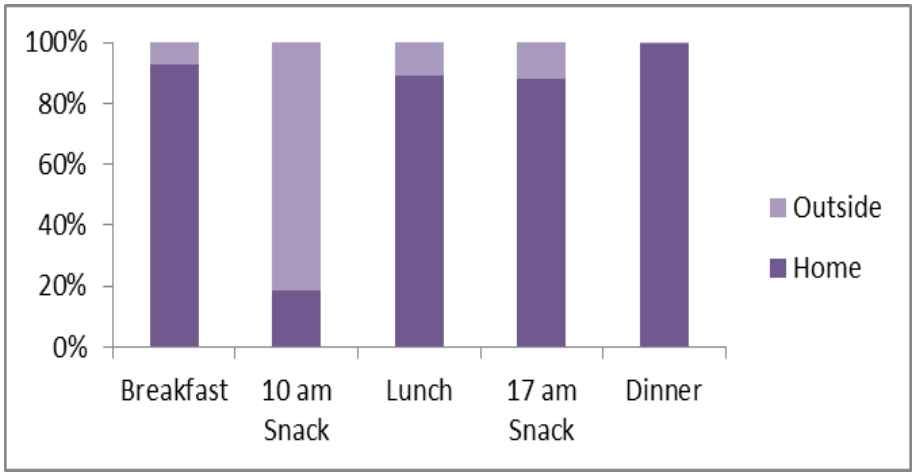

Fig.3. Location of meals.

1.4. Correlation location of meal-corpulence.

	Normal Weight		Overweight		Obesity		p-value
	Eff	%	Eff	%	Eff	%	
Breakfast, Home	174	96.1	52	89.7	28	80	p < 0.01
Breakfast, Outside	7	3.9	6	10.3	7	20	
Total	181	100	58	100	35	100	
Lunch, Home	225	90.7	74	89.2	49	87.5	p < 0.5
Lunch, Outside	23	9.3	09	10.8	07	12.5	
Total	248	100	83	100	56	100	
Dinner, Home	244	99.6	77	100	52	100	p < 0.5
Dinner, Outside	01	0.4	00	00	00	00	
Total	245	100	77	100	52	100	

From the results of the table, we have demonstrated that the prevalence of those who eat their breakfast at home is 80 % for obese, 89.7% for overweight and 96.1% for normal weight. The prevalence of obese children, overweight, normal weight, who take their lunch outside is respectively; 12.5%, 10.8% and 9.3%. All obese children, overweight and normal weight, take their dinner at home; the prevalence was respectively; 100%, 100%, and 99.6%, (from these results, we could not describe a relationship between body size and dinner location, because every students whatever their body size, take their dinner at home with a prevalence of more than 99%).

1.5. With whom they take meals.

	Breakfast		10 am Snack		Lunch		17 am Snack		Dinner	
	Eff	%	Eff	%	Eff	%	Eff	%	Eff	%
With Family	238	71.26	15	20	328	72.73	159	67.09	415	94.75
with Comrades	19	5.69	44	58.67	46	10.20	25	10.55	2	0.46
Alone	77	23.05	16	21.33	77	17.07	53	22.36	21	4.79
Total	334	100%	75	100%	451	100%	237	100	438	100

Most students take their meals with family (67 and over) except for the morning's snack that is taken with friends.

1.6. Correlation with whom meals-corpulence.

	Normal Weight		Overweight		Obesity		p-value
	Eff	%	Eff	%	Eff	%	
Breakfast with Family	136	75.1	40	69	16	45.7	p < 0.01
Breakfast with comrades	6	3.3	5	8.6	6	17.1	
Breakfast, Alone	39	21.5	13	22.4	13	37.1	
Total	181	100	58	100	35	100	
Lunch with Family	184	74.5	58	69.9	41	71.9	p < 0.3
Lunch with Comarades	22	8.9	13	15.7	07	12.3	
Lunch, Alone	41	16.6	12	14.5	09	15.8	
Total	247	100	83	100	57	100	

The prevalence of students who take their breakfast with family was respectively; 45.7% of obese, 69% of overweight and 75.1% for normal weight. 37.1% of obese, 22.4% for overweight vs 21.5% among normal weight who eat their breakfast alone. We did not found a correlation, between, lunch with whom, and the corpulence of students; this may be due to the fact that the most (88% or more) of students eat their breakfast at home. Similarly, we did not found also a correlation, between, dinner-with whom and corpulence; This may be due to our eating habits for dinner ; Algerian families take in most cases their dinner with family as shown in the table above, over 90% of students take their dinner in house, with family.

1.7. Watch TV taking the meal.

	Breakfast		10 am Snack		Lunch		17 am Snack		Dinner	
	Eff	%	Eff	%	Eff	%	Eff	%	Eff	%
Yes	64	19.22	5	6.76	169	37.64	125	53.19	243	61.99
No	269	80.78	69	93.24	280	62.36	110	46.81	149	38.01
Total	333	100	74	100	449	100	235	100	392	100

Students did not watch TV during meals, except for evening snack and dinner.

1.1 TV related meal -corpulence

The number of students, who take their breakfast and lunch, on watching TV was reduced, in the respective order of 14% and 37%, that prevent us to define whether, there is a correlation between breakfast TV and corpulence, or not. The same way for snack and dinner-TV with corpulence, we could not demonstrate differences in these patterns among obese children, overweight and normal weight.

DISCUSSION

Prevalence of overweight and obesity

Many are epidemiological studies on overweight and obesity in children and adolescents worldwide. According to anthropometric data measured during the study, college students have a normal weight, which can't be described as satisfactory, which is according to WHO reference 2007 z-score of 54.7% only.

The high prevalence of overweight / obesity is not restricted to the adult population. In children and adolescents, it is increasing in all countries of the world and data on this population reflect the trend in adult –children obesity also presents a significant risk of persistence into adulthood; obese children become obese adults in proportions that vary across studies from 20 to 50% if obesity was present before puberty, and 50 to 70% after puberty[5]- In our study the prevalence of overweight including obesity was 31.4%. Most children are overweight 18.2%, 11.4% of children are obese, and 1.8% of children develop severe obesity. No significant differences were found between girls and boys at this age. These data are not the first to be published in Algeria. The first study was published in 2006. Although these results may not be representative of the entire country, they allow us to place the city of Constantine in 2012 at higher numbers in some regional studies in Algeria in 2006 and 2007[6]; In Algeria a few local studies on overweight were carried out:

• In the town of Ain Smara in 2007, a 14% prevalence of overweight-obesity was found in 8-10 years. [6]

• In Setif 2006/2007 the school screening reveals a rate of 13.5%[6].

• Another study in Sidi Bel Abbes in 2007, found a prevalence of overweight-obesity of 8.3% among 13-18 year olds. 2003. [6]

• In Algiers in 2008, the school screening reveals a rate of 20% overweight, and obesity of 5% in children aged 12 to 17 years, according to WHO reference 2007 z-score. [7]

According to WHO (2003) [8] the lack of consistency and inconsistency between different studies concerning the classification of obesity in children and adolescents mean that it is not yet possible to provide an overview of the global prevalence of obesity in these age classes.
By comparing our prevalence of obesity and overweight among adolescents in Constantine, Algeria, with the prevalence of some Arab countries we found that Algeria occupies the first position with prevalence of overweight 18.2% before Lebanon 18.8%, then Kuwait 33.3%, finally l'Egypt with 35.9%. About our obesity prevalence 11.4%, Algeria occupies the third position in 2012/2013 after Lebanon2.1%, then Egypt 11.2% and before the Kuwait 12.2% according to the reference of Cole et al. [9]

Our prevalence of obesity 13.2% are above of Tunisia, according to two studies[10]. In Morocco, overweight and obesity affect 37.1% of infants. [11]

This epidemic phenomenon is spreading in many parts of the world including Europe, North America and Australia. Moreover, the prevalence is particularly high in Britain and in the countries of southern Europe west. The prevalence of overweight and obesity in European children has increased at a rate that has accelerated until the late of 90s in Europe; the report showed that the IOTF childhood obesity increased steadily, with a higher prevalence in the countries of southern Europe. In Northern Europe, the prevalence of overweight is 10-20%, while in Southern Europe it is 20-35%. [7] In Canada, the prevalence of overweight and obesity among young Quebecers is high but appears to be leveling off, while in adults it tends to increase significantly, reflecting the global trend. [7] The United States has experienced significant development of overweight in children long before other countries; the rate of growth in France in the 1990s was similar to the kinetics observed at the same time in North America. In Australia, the prevalence has increased dramatically in the last 15 years to reach numbers in the range of 20-25%. Before this change, many countries have established over the past 10 years of national strategies to fight against obesity, especially among children.

This is the case particularly in the United States, Canada, Denmark, the UK, Sweden and Australia-New Zealand. [7] In the late 1990s, French health authorities are aware that overweight in children became a real public health problem. This has contributed to several national surveys including anthropometric measurements. These prevention efforts made in recent years, probably allowed a frequency stability of excess weight. This is probably why since 2000 a stabilization of childhood obesity. [12] In particular is observed in those who have implemented prevention programs such as the National Health and Nutrition Programme (NFHP) in France for example. [13]

A literature search on 52 studies in the Internet. [14] (from 1999 to July 2010) from 25 countries concluded in favor of stability of the epidemic among children and adolescents in Australia, Europe, Japan and the United States. In adults, the stability was found in the United States, while increases were also observed in some European and Asian countries. However, keep in mind that the phase stability has been observed in the past but they were then followed by further increases. Therefore, research into the causes, prevention and treatment of obesity should be a priority.

Eating Habits

Our study reveals differences in eating habits of obese adolescents and normal weight. Our results show that obese children are the least to consume their breakfast 58.3% vs 72.8% of normal weight ($P < 0.0001$). Our study confirms that taking breakfast is a protective factor against weight gain. Our results are consistent with several studies. [15, 16]

Obese students are less to eat their breakfast, and lunch, with family, and at home. These results allow us to conclude that meals outside present a risk factor for weight gain. Students, who take their breakfast, lunch; dinner with family therefore, will be more controlled than those who are, alone, or with their friends, which allow us to infer that taking meals away from the sight of the family can constitute a risk factor for weight gain, our results are consistent with several other studies. [17, 18, 19] We found that 83.2% of students do not take their morning snack. Difference not significant, $p < 0.6$. The reduced number of students who take their morning snack 16.8%; make it impossible to assess whether there is a relationship between the 10 am snack and corpulence children. The prevalence of normal weight, overweight, obese, taking their afternoon's snack on watching TV were respectively; 51.2%, 52.2%, and 62.2%. These results allow us to assume that the student body size increases with the increase of hours of eating on watching TV (Difference not significant, $p < 0.7$), these

results are consistent with several other studies. [20, 21, 22] Almost students have their dinner, 96.3%. The prevalence of normal weight students, overweight, obese, who takes their dinner, is respectively 98% vs 95.2% and 86.7%, our results show that with the increasing of their body size, teenagers start to not take their dinner. Significant difference, $P < 0.01$.

As is proven, taking breakfast like lunch, dinner and snack, does not have a weight gain, but it's still a major need for the proper functioning and performance of the health and even for good body, but weight gain thus influenced by the amount and type of food in our dishes. In addition for the content of our food, there are other factors affecting weight gain, which are from our results;

1. The removal of one or more, of the main meal in the day; breakfast, lunch, snack, dinner; because it will increase the feeling of hunger, and that will in turn caused the eating of any kind of food therefore their contain of sugar or fat, and thus will increase the influence of flavors taste fat. Not to mention as well as the great hunger leads the person to fill the mouth without properly chewed, and it will lead the person to eat more capacity, and this in turn will lead to expand the stomach and expand its capacity in order to make a sound contained food. The repetition of this cascade will lead after a while to stomach greater = contributions = weight gain = persistent obesity.

2. uncontrolled meals, taking students from their meals outside, is a risk factor weight gain, because our children want always in their meals print some fries, soft drinks, meat , senile, chips, pizza, ... etc., and that what they find out in fast food.

CONCLUSION

This study highlights the existence of a high prevalence of overweight and obesity, and Algeria is not immune to this epidemic phenomenon. It's a fact of life related to changes in lifestyle. While defining childhood obesity does not appear so simple, evolutionary trends appreciated by various definitions are consistent to conclude that the child is most affected by this epidemic. In Algeria, increasing the number of children affected is very fast, and posed in terms of public health, the problem of complications that may compromise the long-term health. In total, the results of this study show the need to develop effective tools for monitoring the level of the population in order to detect as early as possible determinants of obesity in order to provide prevention strategies appropriate and effective in our population of children and adolescents, future adults.

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REFERENCE

1. Rolland-Cachera MF. Current definitions of childhood obesity. Mini-review Sang ThrombVaiss, 2004; 16:187—92.
2. Burniat W, Cole T, Lissau I and al, editors. Child and Adolescent Obesity: Causes and Consequences, Prevention and Management. Cambridge : Cambridge University Press, 2002; 282-306.
3. Andrieu E, Caillavet F, Food consumption and weight status in France. Working Paper No. 5—6 INRA Economics and Social Sciences, 2004.
4. Opinion on the prevention of childhood obesity, 2005.
5. Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH. Predicting obesity in young adulthood from childhood and parental obesity N Engl J Med, 1997; 337: 869-873.
6. Oulamara H, Agli AN, Frelut ML. Diet, physical activity and overweight among children in Eastern Algeria. Cah Nutr Diet, 2006; 41: 46—54.
7. Dr Ouchfoun Abdelkrim, study of overweight, obesity and factors associated with overweight among junior students enrolled in public colleges EPSP, Bouzareah, 2011.
8. World Health Organisation. Obesity prevention and management of the global epidemic. Technical Report Series No. 894; WHO Geneva 2003.
9. Jackson RT, Rashed M, Al-Hamad N, Hwalla N, Al-Somaie M. Comparison of BMI-for-age in adolescent girls in 3 countries of the Eastern Mediterranean Region. East Mediterr Health J, 2007; 13(2): 430-40.
10. Blouza S. Epidemiological and clinical profile of obesity in Tunisia. National Institute of Nutrition - Tunis Tunis X Maghreb Congress 2006 [Available online]. http://www.stmi.org.tn.
11. Ouzennou, N Baali A, Amor H, Roville-Sausse F. Eating behavior and obesity in infants of the city of Marrakech (Morocco). Biometrics and human anthropology. SBH edition 2003.Tome 21, numbers 1-2.
12. Salanave B, Peneau S, Rolland-Cachera M. F., Hercberg S., Castetbon K. Stabilization of overweight prevalence in French children between 2000 and 2007. International Journal of Pediatric Obesity, 2009; 4(2):66-72

13. Institut de Veille Sanitaire (INVS). National Health and Nutrition study ENNS, 2006 Nutritional status in France in 2006 according to objective indicators and benchmarks of the National Nutrition Health Program (NFHP). First results. Symposium National Health and Nutrition Programme (NFHP), December 12 (INVS), 2007 ; 77. available on; http://www.invs.sante.fr/publications/2007/nutrition_enns/RAPP_INST_ENNS_Web.pdf
14. Rokholm B, Baker JL, Sørensen TI. The levelling off of the obesity epidemic since the year 1999. A review of evidence and perspectives. Obes.Rev, 2010; 11: 835-46.
15. Jonas J Thompson-McCormick BM1, Jennifer J Thomas PhD, Asenaca BainivualikuBA, A Nisha Khan, Anne E Becker MD, Breakfast skipping as a risk correlate of overweight and obesity in school-going ethnic Fijian adolescent girls, Asia Pac J Clin Nutr, 2010; 19 (3):372-382.
16. Solution for public health (SPH), national obesity observatory, does skipping breakfast help with weight loss, England, October 2011.
17. Fulkerson J, Kubik M, Story M, Lytle L, & Arcan, C. Are there nutritional and other benefits associated with family meals among at-risk youth? Journal of Adolescent Health, 2009; 45: 389 – 395.
18. Fiese, B. & Hammons, A. Is frequency of shared family meals related to the nutritional health of children and adolescents? Journal of the American Academy of Pediatrics, 2011; 127: 1565-1574.
19. Neumark-Sztainer D, Hannan P, Story M, Croll J, & Perry C. Family meal patterns: Associations with sociodemographic characteristics and improved dietary intake among adolescents. Journal of the American Dietetic Association, 2003; 103: 317 – 322.
20. Dennison BA, et.al. Television Viewing and Television in Bedroom Associated With Overweight Risk Among Low-Income Preschool Children. Pediatrics. June 2002; 109: 6.
21. American Academy of Child & Adolescent Psychiatry. Obesity in Children and Teens. AACAP Fact Sheet #79.
22. American Obesity Association. Obesity in Youth. AOA Fact Sheets. http://www.obestiy.org/subs/fastfacts/obesity_youth.shtml.