

Change in the Prevalence of Overweight and Obesity among School Children in Tebessa (Eastern Algeria) between 1995 and 2007

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Abstract

Background: The frequencies of the overweight and the obesity are in increase at the children in the world, what led the World Health Organization (WHO) to speak about real epidemic. The situation of Algeria is badly known until now. The main objective of the study was to esteem the distribution, in a population of children and teenagers schooled to Tébessa by the corpulence esteemed by the Body Mass Index (BMI).

Methods: All 4-13-year-old children attending public schools in the Commune of Tébessa were measured and weighed during a systematic health check at school from 1995 to 2007. BMI was calculated and plotted on standardized BMI for age tables, using the International Obesity Task Force (IOTF) references.

Result: The frequency of the overweight and obesity according to the references of the IOTF was estimated at 11.37 p hundred between 1995 and 2007. This prevalence passed from 17.39 % in 1995 /98 to 8.49 % in 2005 /2007. The older children from 10 to 13 years are the only ones which presented an evolution during this period. The girls are touched by obesity than the boys. Conversely the boys are touched slightly by the overweight than the girls. A significant decrease or in the prevalence of overweight and obesity was observed during this period in both boys and girls.

Conclusion: These observations from Tébessa, showing a reduction in obesity and overweight in among the girls and boy. However, follow-ups of the stoutness of the children are useful in order to prevent this epidemic.

Keywords: Overweight; Obesity; Children; Body Mass Index; Prevalence

Introduction

In recent decades the prevalence of obesity and overweight has increased steadily in both developed and developing countries [1-4]. Obesity in youth has serious medium- and long-term consequences including endocrine, cardiovascular, renal, pulmonary, orthopedic and gastroenterological diseases [5,6]. Overweight and obese youths may also face psychological challenges resulting in harm to their self-image.

For the above reasons obesity and overweight have become a public health priority [7], particularly in school settings where the children affected may suffer stigmatisation and be confronted with learning difficulties [8].

It is therefore of interest to have robust data on the prevalence of overweight and obesity in different parts Tébessa, to be able to monitor the effect of preventive interventions and/or regional variations.

Few longitudinal data collected in a systematic manner exist for school children in Algeria. Because of the potentially important role attributed to schools in the prevention of overweight and obesity [9], it is of interest to have data on its prevalence among children school. This may also allow better targeted prevention programs.

In order to estimate the prevalence and evolution of this outbreak, an epidemiological study was set up. The objective of this investigation is to determine the prevalence of overweight and obesity among school students in public schools of the City of Tebessa (Algeria) and to monitor overweight and obesity in the period 1995-2007.

Methodology

Tebessa in Algeria is located 20 kms from the border with Tunisia. There is a phosphate mine near to the city. The city has a population of around 161,440 people. The history of Tebessa dates back to the 7th

century BC when it was a Numidian town. The city was also a part of the Roam Empire as was known as Theveste in the ancient period. In 1851 it has been occupied by the French. Under the name of **Tebessa** it became the capital of a canton, then an arrondissement of the département of Constantine in Algeria, later, it became capital of an arrondissement in the department of Bône, now (1974) it is capital of a province of its own, bearing the same name.

This cross-sectional study, which took place in Tébessa, was carried out between February 2005 and May 2007. This study covered a representative sample of 4-13 years old Algerian children. 34 representative schools were selected reflecting the real distribution of the whole urban districts of the studied population.

All 4-13-year-old children (mean age 8.035 ± 2.37 yr.) educated in these schools in Tébessa were included in the study. A total of 21618 children (10691 girls and 10927 boys) were included over the 12-year period (1995-2007), thus making it possible to estimate the prevalence of overweight and obesity in Tébessa.

Interministerial Circular No. 01 of 04.06.1994 on the reorganization plan of school health has created Units Detection and Monitoring (UDS) dependent on both the Department of Health and Population,

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of Education and Interior and Local Government. This is to implement “a recovery plan based on improving the quality of services and level of health coverage in schools ... “. These units are located at schools and to include a medical office and medical staff (doctor, dentist) and paramedics.

All children and adolescent educated in public schools in Algeria underwent a health visit, during the first year of primary school, the first year of middle school and the first year of secondary education it is a government program. During this visit at the UDS the nurses questioned the child about health-related topics including vaccination, nutrition, exercise, wellbeing and integration.

For the purpose of the study, school nurses, weighed and measured all children and plotted their data on a weight to height and BMI curve [10]. Children were measured on regularly calibrated SECA balances (kg) and measured on either wallmounted or balance-mounted height scales (cm). Children were in their underclothes to measure weight and during inspiration for height. Anthropometric measurements are recorded on the books of children’s health. To carry out our study, we collected data (weight and height) placed on the health records of each child. A total of 16 primary schools, 10 colleges’ means and 08 secondary’s school were involved in this study.

This age was chosen for practical reasons and physiological. Indeed, after 6 years, obesity has greater predictive value of the status of the adult fat [11]. In addition, this age could be a good time to prevention strategies and therefore deserves a special interest.

For the presentation of our results, we have grouped some years in one class, because the amount of data collected for different years were not the same (lack of data on several health records), from which the distribution Next: 1995-1996-1997-1998 (1995/1998), (1999/2000), (2001/2002), (2003/2004), 2005-2006-2007 (2005/2007).

Statistics

Body mass index (BMI) for each child was calculated as weight in kilograms divided by height in meters squared (kg/m^2) [2]. The proportions of overweight and obese children among the participants were determined according to the BMI by gender and age, regarding cut-off points, suggested by Col et al. [12], on the basis of the IOTF references [12]. These references are based on overweight outcome values (values equivalent to BMI over $25 \text{ kg}/\text{m}^2$) and (under $30 \text{ kg}/\text{m}^2$ of adults) and obesity (values equivalent to BMI, equal or over $30 \text{ kg}/\text{m}^2$ of adults). The comparison between percentages was calculated using the χ^2 test.

The software used for data entry and data processing are Excel 2000 and Minitab version 13. The χ^2 test was used for comparisons of frequencies. The significance level was set at 0.05

Results

Using the IOTF references, the prevalence of overweight (obesity included) obesity and overweight in all age groups was 11.37%, 3% and 8.34% respectively. There was no significant gender effect on the prevalence of overweight including obesity (11.55% vs. 11.14% $P = 0.333$). The boys had a higher prevalence of overweight than the girls (8.73% vs. 7.94%, $p = 0.034$). However, the girls had a higher prevalence of obesity (3.2% vs. 2.82% $p = 0.033$) (Figure1).

The prevalence of overweight, obesity and overweight including obesity tends to decreased significantly since 1995 (Figure 2). Between 1995-1998 and 2005-2007, there were a significant changes among

children in the prevalence of overweight including obesity (17.39 % vs 8.49 % $p = 0.0001$), obesity (4.84 % vs 1.8 % $p = 0.0001$) and overweight (12.55 % vs 6.38 % $p = 0.0001$).

The prevalence of obesity among girls decreased from 5.2% in 1995/98 to 1.78% in 2005/2007 ($p = 0.0001$). The peak prevalence of obesity is observed in 1995/98. Among boys the prevalence of obesity decreased from 4.5% in 1995/98 to 1.83% in 2005/2007 ($p = 0.0001$). The peak prevalence is observed from 1995 to 1998 (Figure 3).

The highest prevalence of overweight and obesity are observed in the age group of 4 to 5 years. The minimum prevalence of overweight was observed at the age of 7 years (7.03%) while the minimum prevalence of obesity alone (2.27%) and that of overweight including obesity (9.46%) are observed in the slice age 8-9 years (Figure 4).

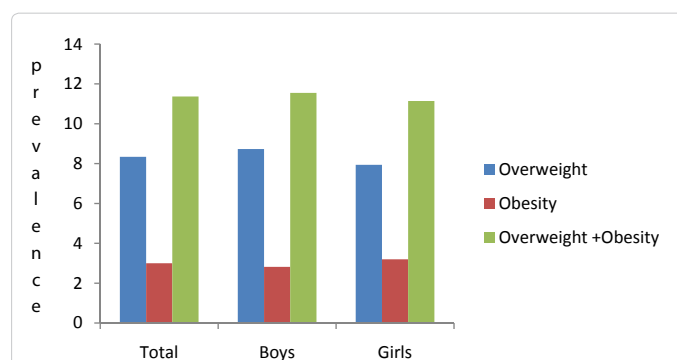


Figure 1: Overall prevalence of obesity, overweight and overweight including obesity.

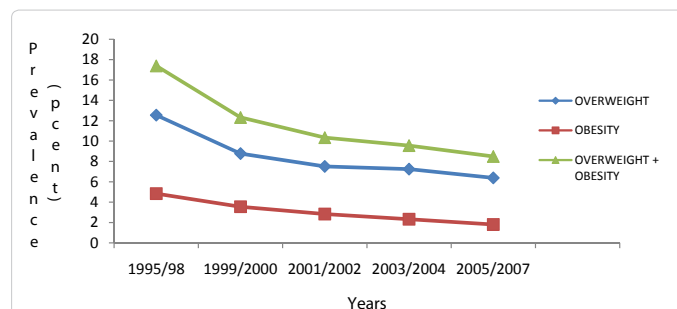


Figure 2: Decrease of the prevalence of overweight, obesity and overweight including obesity between 1995 and 2007.

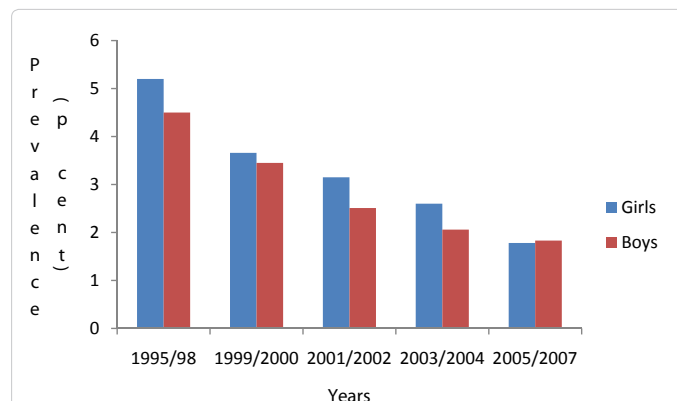


Figure 3: The change of prevalence of obesity by sex from 1995 to 2007.

The prevalence of obesity is higher among boys in age groups 4-5 years and 10-13 years, but the difference is significant only for age group 4-5 years ($p = 0.028$). Among girls the prevalence of obesity is higher than for boys age 6 years ($p = 0.0001$) and 8-9 years ($p = 0.037$). For the age group 7 years the prevalence of obesity was similar between the two groups (Figure 5).

Discussion

It has been shown that the BMI is the most valid indirect indicator of adiposity in children, adolescent and adults. [13,14]. The accepted BMI of 25 for overweight and 30 for obesity in adults is used to provide cut-off points at younger ages. However, the BMI is now generally accepted to be used to define obesity in children and adolescents clinically. Many specific BMI values for age and gender have been published [15].

Despite worrying international trends in childhood overweight and obesity [7,16], our study showed no further rise in the prevalence of overweight and obesity between 1995 and 2007 in 4-13 year-old children living in the commune of Tébéssa (according Cole's references). On the contrary, a significant decrease in overweight and obesity was observed after 1995.

Few studies have reported on the prevalence of obesity amongst children in developing countries in which it has reached epidemic proportions [17]. In Algeria, representative nationwide studies on the prevalence of overweight and obese children are not available yet. The reported prevalence was 4.89% for overweight and 1.42% for obesity in Tébéssa (Algeria) [18]. On the other hand, the prevalence of overweight and obesity in Khroub (Algeria) was 10.9% and 4.0%, respectively [19]. To the west of Algeria (Sidi-bel-Abbès), one study has been achieved during 2007 in 13 to 18 year old adolescents. It

showed that the prevalence of overweight including obesity was 8.3% according to the IOTF references [20]. Another study showed that the overall prevalence of overweight and obesity was 7.94% and 3.73%, respectively according to the IOTF references.

Compared to some other studies from southern Europe, our data tend to show relatively lower levels of overweight and obesity [21]. However, when comparing our data with the data collected on whole population samples of similar-age children in the country of Great Britain [22], and Northern Europe where the prevalence of overweight is 10-20% [23]. The trend and the values are close and seem to confirm the trend in large Algeria. It must be borne in mind that the prevalence of overweight and obesity may vary between different geographical areas and between urban and rural areas. Our results seem lower than those observed in Tunisia [24] and Morocco [25]. In a similar study carried out in Switzerland obesity levels in both boys and girls were relatively similar to those found in our 4-13-year-old children (boys: 3.5 vs. 3.8%, girls: 3.8 vs. 2.8%) but the prevalence of overweight was considerably higher in their group of 5-6-year-old children (boys: 8.6 vs. 20.5%, girls: 12 vs. 19.2%) [26]. This could be due to the increasing prevalence of obesity and overweight among preschool children.

Our data also corroborate results found in Tébéssa 5-8-year-old children from the eastern area, where a similar decrease in the prevalence of overweight and obesity was shown between 1998-2005 [10]. In Algeria in a study to Tebessa, with 3396 children aged 5 to 8 years, the decrease in the prevalence of overweight and obesity was lower than that of this work. The prevalence of obesity decreased from 1.06% in 1998 to 0.72% in 2005, the prevalence of overweight decreased from 6.38% in 1998 to 5.08% in 2005 [27]. However according to a study in Constantine (eastern Algeria) in children aged 5 to 18 years, the prevalence of overweight including obesity increased from 8.27% in 1996/98 to 10.12% in 2004, the prevalence of obesity increased from 1.26% to 1.88 p. percent [28]. This can be explained by the fact that the city of Constantine is a large city more urbanized than Tébéssa. These variations in the prevalence rates found in different countries worldwide and in different ethnic groups may certainly be due to environmental factors such as diet, physical activity, etc., which are the major contributors to increased overweight and obesity prevalence in children and adults [29].

Some reports from Turkey and Taiwan showed higher rates in boys than girls in the urban setting [30,31]. On the other hand, results from Saudi Arabia and Kuwait showed the opposite trend [32,33]. In the West of Algeria a study found, in this urban studied population, higher rates of overweight among girls. Conversely, obesity was increased in boys using the IOTF. We found in this urban study population higher rates of obesity among girls. Conversely, overweight was higher in boys using the IOTF.

Since the country is facing the difficult socio-economic and political structures in place of school health should allow regular analysis of surveillance data growth performed routinely in all schools in Algeria and therefore measures anthropometric must be systematically identified. Epidemiological data of childhood obesity in our country are not well known until today, but their existence in many parts of the country requires early detection for better care and a policy of prevention from childhood to reduce the burden of disease in adulthood. The prevalence of childhood overweight and obesity is increasing in the developing countries and Algeria doesn't escape from this scourge.

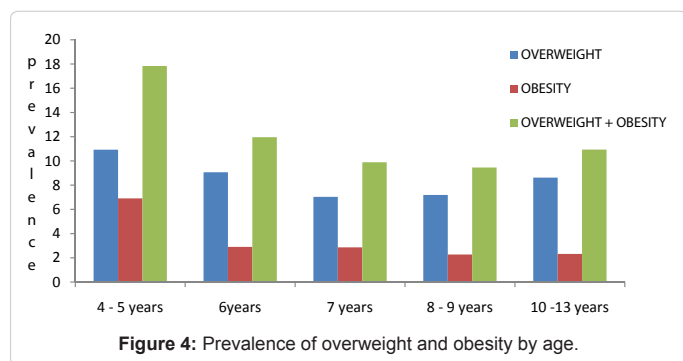


Figure 4: Prevalence of overweight and obesity by age.

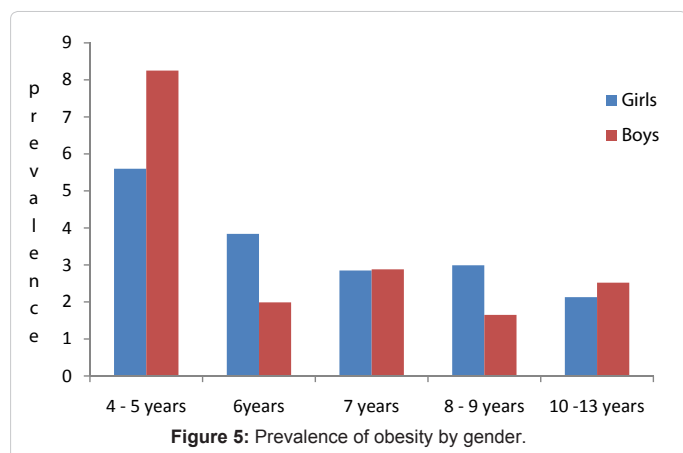


Figure 5: Prevalence of obesity by gender.

Conclusion

In conclusion, the data collected between 1995 and 2007 among 21618,4–13 year old children in Tébessa (Eastern Algeria) show a significant decrease in the prevalence of obesity and overweight Coles's [12]. This finding do not corroborates findings in other cities in Algeria; Tébessa may be among the first signs of a changing trend in obesity and overweight. The relatively high level of obesity and overweight at 4 years of age, however, merits special attention to early childhood, in that 17.84% of children already fall into the O and OW groups. Even if no clear conclusions can be drawn as to the reasons for this change, it is probable that both environmental and individual factors contribute to influencing people's behavior. An intriguing finding was the concomitant drop in obesity and overweight in Tébessa between 1995 and 2007.

We recall that obesity is directly responsible for the appearance of a long series of medical and psychological complications that justify a policy of active prevention, targeted early. And annual monitoring of changes in body mass index compared with the BMI curve of the health record, and especially before 6 years to identify the onset of adiposity rebound, is an urgent task to implement.

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