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HACETTEPE
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**TURKEY CHILDHOOD (AGES 7-8)
OBESITY SURVEILLANCE INITIATIVE
(COSI-TUR)
2013**

KEY FINDINGS

ANKARA 2014

Childhood Obesity Surveillance Initiative, 2013 (COSI-TR-2013), is conducted by Republic of Turkey Ministry of Health. The project which is collaborated with World Health Organization European Regional Office and member countries has been designed in accordance with WHO European COSI protocol. This project was at first initiated with the partnership of 13 member countries and WHO European Regional Office in 2006. Turkey joined the third phase of the research run by World Health Organization European Office in 21 countries. Support from Ministry of National Education and Hacettepe University has been obtained throughout the project. Financial support for the project has been provided by Republic of Turkey Ministry of Health.

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PREFACE

Obesity is an important public health problem at global level as it increases both in developed countries and developing countries. Innovations revealing with technology are presented for humanity, thus having people move less due to the opportunities provided. When certain negative conditions collide such as differences in nutrition type and physical inactivity, obesity prevalence frequency world around rises.

2.8 million of people in the world lost their lives due to overweight and obesity, while 3.2 millions of people lost their lives because of physical inactivity. In WHO European region, half of the whole adults and 1 out of five of the children are overweight. One out of three of these children are obese, while this figure is increasing rapidly. Being overweight and obesity contributes increase in non-communicable disease rates, contributes to phenomenon of life time shortening, while it affects life quality in negative way.

Main objective of national health policies is to reach for a healthy society, combined by healthy individuals. Within this scope “Healthy Nutrition and Active Life Program in Turkey”, initiated in 2010 encompasses issues on precautions for enabling sufficient and balanced nutrition for fighting against obesity as well as promoting regular physical activity in society.

While there is no national research on monitoring of child and adolescent grow up available, there are various studies at local and regional level. Dwelling on the studies conducted, it is observed that frequency for being overweight and obesity is increasing gradually. Our children are going through a swift growing up and improving period. In this period having them gain habits for sufficient balanced nutrition and regular physical activity contributes to their growing up and plays an important role in raising their school success. This year Turkey has joined “European Childhood Obesity Surveillance Initiative” affiliated to World Health Organization and implemented in 21 countries, is applied in collaboration with Republic of Turkey Ministry of National Education and Ministry of Health.

The target of this study is to participate in an international research and monitor growing of school age children in comparison with the other countries. In scope of this Project, information concerning gathered through surveys for student, parents and school environment the child is in. As the research is repeated in two years, it is aimed to monitor difference in school age children’s’ growing.

I would like to extend my gratitude for field workers having effort and our consultants, Ministry of National Education, Prof. Seçil ÖZKAN, MD, President of Turkish Public Health Institution, Prof. Hilal ÖZCEBE, MD and Ayşe Tülay BAĞCI BOSİ, PhD, Institute of Health, University of Hacettepe, Principal Investigator and Assoc. Prof. Nazan YARDIM, MD, Director of the Department Obesity, Diabetes and Metabolic Diseases, for their contribution to the research to Dr. Joao BREDÁ, WHO Programme Manager, Nutrition, Physical Activity and Obesity, to Trudy WIJNHOVEN, WHO European Region COSI International Coordinator, to Maria HASSAPIDOU, Greece COSI Principal Investigator and personnel working the department for planning, completing for and preparing the results of this research which sets up profile for malnutrition, being overweight and fat in school age children in our country and I wish this study would be a beneficial one for raising healthy generations.

Mehmet MÜEZZİNOĞLU, MD
Republic of Turkey, Minister of Health

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ABBREVIATIONS

- BMI : Body Mass Index
- CDC : Centre for Disease Control
- CI : Confidence Interval
- COSI : Childhood Obesity Surveillance Initiative
- NUTS : The Nomenclature of Territorial Units for Statistics
- SE : Standart Error
- SD : Standart Deviation
- TOÇBİ : Surveillance on Growth Monitoring in School Aged Children in Turkey
(Türkiye Okul Çağı Çocuklarında Büyümenin İzlenmesi Projesi)
- WHO : World Health Organization

1. INTRODUCTION

Nutrition is defined as consumption of food to sustain life and to preserve and improve health. “Adequate and balanced nutrition” is the first of the basic behavior affecting the state of health. Healthy nutrition directly provides an important support for improving the health potential of the individual, family and society, and their wellbeing (WHO, 2012).

Although many factors come into play in determining healthy nutrition behavior, socio-economic status is known to be the most significant ones. Social and economic indicators such as educational status, income level and occupation have effects on nutrition opportunities and behavior, thereby also on health status. Over-nutrition and malnutrition, and inadequate physical activity are listed at the top reasons for obesity; however, genetic, neurological, physiological, bio-chemical, psychological factors, as well as socio-cultural and environmental factors are also important factors for obesity (Peterson, Hughey, Lowe, et al, 2007).

Properties of the inhabited environment and individuals’ life styles are effective in forming noncommunicable diseases that are becoming more frequent in the world. Smoking, alcohol and substance consumption, malnutrition and inadequate nutrition, sedentary life style, living and working under adverse environmental conditions, problematic social surroundings are influential in forming such noncommunicable diseases (Lawrence G and Potvin L 2002) . Overweight and obesity that cause noncommunicable diseases are defined as “an increase in the amount of body fat to a degree that would comprise health risks”. Cardiovascular diseases, diabetes, hypertension, certain cancer types and muscular-skeletal system diseases are among the major problems caused by obesity. According to data from World Health Organization, nearly three million people worldwide die due to being overweight or obese. Overweight or obesity not only doubles the burden of disease every year, but it also leads to deaths caused by an illness due to obesity. Furthermore, obesity also decreases the quality of life (WHO, 2012).

The most important one of the childhood public health problems is obesity. Childhood obesity increases all around the world, including low and middle income countries (WHO, 2012). It is acknowledged that environmental factors, along with genetic factors, play a major role in the increase of the frequency of obesity occurrences, especially during childhood. The generally accepted view is that obesity epidemic is caused by an environment that encourages excessive food intake and inhibits physical activity. Growing wealth and social conditions such as the increase in the marketing of premade food called “fast food” which is consumed outside home and easy access to such foods, increasingly popular sedentary forms of recreation like watching television and videos or using computers are listed as factors that come into play in the increase of obesity (French, Story, and Robert, 2009).

Behavioral subheadings such as pleasure from eating, response to offers to eat, duration of eating, desire to drink, and cognitive, involuntary and emotional eating habits are among those that are influential in the origination of obesity (Webber, Hill, Saxton et al, 2009; Cappelleri, Bushmakin, Gerber, et al, 2009). Duration of sleep is also stated to have an impact on the origination of obesity. As the duration of sleep increases, both the amount of calories burnt decrease and there isn’t enough time left for physical exercise. On the other hand, short durations of sleep is also a factor on origination of obesity (Must and Parisi, 2009).

Today, innovations that emerge with the rapid advances in technology are at humanity’s service. In daily life, mechanization is increasing and becoming wide spread, even short distances are covered

by cars and people move much less due to the facilities provided by the modern life styles. Advancing technology may also impact people's eating habits in a negative way. When lack of physical activity is added to changes in nutrition habits, they increase obesity further (WHO, 2012).

Growth is a very good indicator of children's general health conditions. Under-nutrition and malnutrition affect a child's growth and are among the first and most important indicators that a child's general health is deteriorating. Evaluation of children's individual nutritional status can be ensured by monitoring growth. In our country, children's growth within the children periodic examination are monitored by family physicians. From schooling on, a collaborated monitoring programme is run by the family physician and the school. However, in order to evaluate children's growth status nationwide, results from researches on a sampling representing the society are utilized to make a general assessment of the situation (MoH, 2013). Monitoring of the indicators concerning nutrition was made possible in our country with the Surveillance on Growth Monitoring in School Aged Children in Turkey (Türkiye Okul Çağı Çocuklarında Büyümenin İzlenmesi Projesi "TOÇBİ") in 2009. Among children at the age group of 6-9 which was TOÇBİ Study's target group, being overweight was assessed as 14.3% and obesity as 6.5%. The results of the TOÇBİ (2009) Study show that one out of every five children in our country is under risk regarding diseases associated with being overweight (MoH, 2011).

Upon the evaluation of the results from the status analysis conducted in our country, Ministry of Health has prepared "Healthy Nutrition and Active Life Program of Turkey (2014-2017)" in order to reach the goals set to prevent obesity by monitoring growth in adults, children and youth, to speed up the activities, to determine new goals and strategies according to needs, and to ensure the proceeding of activities within a given framework. Within the scope of this programme, obesity is defined as an important health problem in our country. By including the subject of campaigning against obesity in formal and common educational curricula at schools as a part of the struggle against obesity in the context of the programme, it is aimed to introduce the habit of balanced nutrition and regular physical activity to preschool and school aged children, adolescents and young people and to contribute to bringing up of healthy and productive generations (MoH, 2013).

World Health Organization European Region member countries run Childhood Obesity Surveillance Initiative to monitor school aged children's obesity status every two years. In 2010, 40% of school aged children had a body weight over normal standards and 15% was obese in the World Health Organization European Region. Being overweight and obese causes problems like cardiovascular diseases, diabetes, mobility problems, psychological problems, failure at school and lack of self-esteem (WHO, 2013). World Health Organization European Region Childhood Obesity Surveillance Initiative protocol was followed in this study which aims to assess childhood obesity status. As such, it is aimed to compare the frequency of obesity in childhood in our country with that of the WHO European Region countries, as well as to give data support to Turkey Healthy Nutrition and Active Life Programme conducted nationwide.

2. OBJECTIVES

Among second grade school students in Turkey (ages 7-8):

- To evaluate the anthropometric measurements (height and body weight) of their nutritional status and to determine their growth indicators (severe underweight, underweight, normal weight, overweight and obesity, severe stunting and stunting),
- To define children's eating habits and physical activity levels as declared by themselves and their families,
- To gather information concerning schools' nutrition and physical activity practices,

Based on the obtained results;

- To assess the success of programmes conducted for "healthy nutrition and growth" of children,
- To enable determining new strategies and planning interventions to ensure that children gain healthy living behavior,
- To follow up on children's growth by biannually repeating the same study nationwide,
- To obtain internationally comparable data by utilizing research methods and questionnaires prescribed by WHO.

3. METHODS

The WHO European Region Childhood Obesity Surveillance Initiative –COSI–, launched with the objective of determining and monitoring the occurrence of obesity during childhood in member countries has been implemented initially in 2007-2008 school year by World Health Organization European Region, with the participation of 13 countries (Belgium, Bulgaria, Cyprus, Czech Republic, Ireland, Italy, Lithuania, Malta, Latvia, Norway, Portugal, Slovenia and Sweden). Phase 2 of the surveillance was implemented in the 2009-2010 school year within 17 countries (new members Greece, Hungary, Spain and Macedonia (FYROM)) Phase 3 of the surveillance was implemented in the 2012-2013 school year within 21 countries (new members Albania, Moldova, Romania and Turkey).

In this study WHO European Region Childhood Obesity Surveillance protocol was employed. This study is conducted with the cooperation of Republic of Turkey Ministry of Health, Republic of Turkey Ministry of National Education and University of Hacettepe.

3.1. Sampling Size and Design

According to the protocol between Ministry of Health Turkish Public Health Institution Head of Department of Obesity and Metabolic Diseases and WHO European Region, it has been decided that the sampling selection method should be similar to that of other countries. Turkish Childhood Obesity Surveillance Initiative (COSI-TUR) has been conducted with a sampling representing the entire nation.

Population of the study are elementary school 2nd graders in entire Turkey. According to Republic of Turkey Ministry of National Education statistics, there were 1,229,965 students in 55,160 2nd grades in 29,730 elementary schools in the 2012-2013 school year. Schools with classes comprising less than 5 boys and 5 girls students have been left out of the population and 1,178,843 students in 45,082 2nd grades in 19,717 elementary schools have been established.

By evaluating the number of students at these schools, the number of elementary schools were re-established. 11,026 urban and 8,961 rural elementary schools were assessed within the population. There were a total of 955,250 second grade students from 33,923 second grade classes in urban regions and a total of 223,593 second grade students from 11,159 second grade classes in the population.

According to the standards determined by World Health Organization, in order to assess childhood obesity, at least 2,800 seven-year-old children's heights and body weights should be measured. With the consideration that there would be children unwilling for such measurements, as well as those whose data cannot be assessed during the study for varying reasons, inclusion of at least 4,000 7-year-old children needed to be ensured. However, it is forecasted that data from 70% of the children would be used in the study. In accordance with the lists from the Ministry of National Education, it was calculated that age ranges of 40% of the students may change at the date of the study, and therefore the size of the sampling was increased by 40% to 5,600 students.

The sampling was selected with rural-urban stratified random systematic method and the sampling interval was calculated by dividing the total of elementary schools in Turkey by the established number of elementary schools in the sampling. All elementary schools in Turkey were coded according to their provinces' license plate numbers and once the first elementary school was defined randomly and the other elementary schools were chosen systematically in accordance with the sampling interval.

Upon calculation of the number of schools, classes and students, a total of 216 elementary schools were included in the sampling, 163 of which being in urban and 53 in rural areas. In the 2nd grades that were included in the sampling in 216 elementary schools, weights and heights of 2nd grader students who were present in their classes on the measurement day and who consented to be included in the study were measured and questionnaires were filled out by children’s families and schools. According to the target group, 86.7% of family forms and 88.5% of surveyor forms were analyzed. (Table 1) 91.8% of answered surveyor forms and 97.1% of family forms were included in the analysis.

Table 1. Distribution of the Numbers of Forms of School, Family and Surveyor Responded and Analyzed in the Study, Turkey 2013

Questionnaires	Sampling Number	Respondeds		Analyzed	
		Number	Percentage	Number	Percentage
School	216	216	100.0	216	100.0
Family	5600	5017	89.6	4856	86.7
Surveyor	5600	5101	91.1	4958	88.5

3.2. Questionnaires, Data Collection and Analysis

It was decided that the mandatory and voluntary parts of the questionnaire to be implemented together in the “Turkey Childhood Obesity Surveillance Initiative”. Questionnaires were translated into “Turkish”, adapted to the society through preliminary testing, and the number of questions and options were left without modification to compare with international data sets. Questionnaires prepared for Turkey were designed in a compatible manner with optical encoding and data gathering directives were prescribed for each form.

Data regarding eating habits, physical activity behaviour and time spent sedentary which may be influential on growth and obesity, as well as certain basic socio-demographic characteristics of children and families were obtained from children and their families. Data regarding nutrition and physical activity facilities and policies were obtained from schools. Height and weight measurements of children were conducted with the purpose of assessing their growth and obesity statuses.

Formation of teams made up of physicians, dieticians, nutritionists, nurses and/or healthcare professional corresponding to the number of schools and classes included in the sampling of the relevant provinces was requested from central organization so as to form the project teams to work on the field. Teams consisting of healthcare personnel determined by provinces have participated in training programs for data gathering on April 28 – 30, 2013 in Ankara.

Field teams were trained by consultants both in theory and practice on techniques for measuring height and weight. During these trainings preliminary efforts were realized with adults and children regarding height and weight measurements and personnel were trained on standard adequate and precision measurement.

As per recommendation from WHO, WHO COSI research standard data gathering forms, SECA 813 weight scales and portable SECA 213 height boards were used in all research groups by the project group of Turkey.

When the number of healthcare professional determined for field work in provinces were insufficient, healthcare professional trained by consultants acted as “Assistant Surveyors” upon passing on the training they received to two healthcare professional suitable for their working environment and conditions. These assistant surveyors to work on the field provided the required support for taking the children from their classes for data gathering and preparing them for anthropometric measurements.

Data gathering on the field was completed between May 15th and June 11th, 2013 and measurements were taken in an empty classroom or a private room in the schools. As much as possible, measurements were taken between morning and noon, however if the class in the sample was the afternoon class, measurements were taken following the first class. Weights were measured in kilograms and recorded with a sensitivity interval of 100 grams. As for height measurements, a height board was mounted where a level ground and a vertical plane intersected forming a right triangle, utilizing the vertical plane. Vertical and horizontal parts were assembled in a right angle, the mobile part was used as head rod and heights were measured and recorded with a sensitivity interval of 0.1cm.

Upon completion of the data gathering process in each province, questionnaires were delivered to the central team in a secure manner. Within a period of 10 days from the completion of the survey, provinces delivered all the questionnaires to the central team. Controls, data clean up, confirmation (anomalous and extreme data, data entry errors and out of context data etc.) and backup for inconsistent and incomplete data has been conducted by the consultant who is the data administrator. Questions 28, 29 and 31 were excluded from the analysis due to many errors in questions and datasets.

Weight-for-age (WAZ), height-for-age (HAZ) and body mass index-for-age (BAZ) scores have been calculated, WHO ANTHRO Plus program (WHO 2007) was used to calculate the scores, and classification was done as severely underweight, underweight (thin), normal, overweight and obese. With regard to height, severe stunting, stunting, normal, tall and over tall were the determined groups. Classification and cut-of points of weight-for-age, height and body mass index Z-Scores in the evaluation of children’s growth is presented in Table 2.

Table 2. Z-Score Classification of Anthropometric Measurements (WHO 2007)

Z SCORE	WEIGHT	HEIGHT	BODY MASS INDEX
> + 3 SD		VERY TALL	} OBESITY
>+2 SD		TALL	
>+ 1 SD	} NORMAL	} NORMAL	OVERWEIGHT
MEDIAN			NORMAL
< - 1 SD			
< - 2 SD	UNDERWEIGHT	STUNTING	THINNESS
< - 3 SD	SEVERE UNDERWEIGHT	SEVERE STUNTING	SEVERE THINNESS

http://www.who.int/growthref/tools/who_anthroplus_manual.pdf

3.3. Ethical Issues

Approval from the Ministry of National Education was obtained to conduct the study in the schools. In addition, ethical approval was obtained from the Ethical Board of Zekai Tahir Gynaecology and Obstetrics Hospital.

During data gathering phase of the survey, surveyor has:

- Explained the goals of survey, briefed about the survey application,
- Learned and recorded the reasons of families who didn't allow their children to participate in the survey,
- Taken anthropometric measurements of children one by one, in a separated place,
- Included a two-person healthcare staff consisting of Surveyor and Assistant Surveyor in the room during measurements,
- Taken students' anthropometric measurements with the lightest possible clothing,
- Taken the names of children solely to gather children's forms, with no optical reading and no transfer to electronic environment,
- Obtained a form of consent from families.

4. RESULTS

4.1. Results on Schools

This study has been conducted in 216 schools, 163 (75.5%) of which are in urban and 53 (24.5%) in rural areas. 2,541 female and 2,560 male students were reached during the study.

Table 3. Distribution of Numbers of Boys and Girls Reached and Participated in the Study, Turkey 2013

Number of Students	Girls		Boys	
	Number	Percentage	Number	Percentage
Students participated in the study	2541	88.8	2.560	88.9
Students, absent in the school	239	8.3	233	8.1
Students with no permission from parents	82	2.8	78	2.7
Students unwilling to participate	3	0.1	7	0.3
Total	2862	100.0	2878	100.0

4.1.1. Nutritional Policies and Nutritional Facilities of Schools

Table 4. Distribution of Nutritional Facilities at Schools by Residence (%), Turkey 2013

	Urban	Rural	Total	
			Number	Percentage
Vending machine	1.2	-	2	0.9
Canteen	92.0	26.4	164	78.5
Cafeteria	17.8	26.4	43	20.6
Total (n)	163	53	216	100.0

It is stated that 78.5% of schools has a canteen and 20.6% has a cafeteria. Percentage of schools with canteens are higher in urban areas than in rural areas. During the survey, it is found that there are vending machines in two schools.

In 9.7% of the schools fresh fruit and in 8.3% fresh vegetables are distributed to all students. In 61.4% of the schools, free milk is distributed to all students.

Table 5. Distribution of Nutritional Education at Schools and Prohibition of Sales and Advertising of High Calorie/Low Nutritional Value Food and Beverages by Residence (%), Turkey 2013

	Urban	Rural	Total	
			Number	Percentage
Nutritional Education at School				
Yes, all students	81.4	69.8	168	78.5
Yes, some classes	12.4	17.0	29	13.6
No, not at all	6.2	13.2	17	7.9
Total* (n)	161	53	214	100.0
Inhibition of Sales and Advertising				
Yes	80.4	67.9	167	77.3
No	19.6	32.1	49	22.7
Total (n)	163	53	216	100.0

*The question related to nutritional education at school are not answered by in two schools.

Nutritional education are provided in 78.5% of the schools. 81.4% of the schools in urban areas give all students education on nutrition, while this figure is 69.8% in rural schools. It has been stated that there were no restrictions on sales and advertising of food and beverages in 22.7% of the schools.(Table 5)

4.1.2. Physical Activity Opportunities and Applications

Table 6. Distribution Having of Playground Facility, Practice of Physical Education Classes, Perform of Healthy Life Style Activities and Sportive Activities by Residence (%), Turkey 2013

	Urban	Rural	Total	
			Number	Percentage
Playground Facility				
Yes	96.9	94.3	208	96.3
No	3.1	5.7	8	3.7
Physical Education Class				
Yes, for all students	96.9	98.1	210	97.2
For some classes	2.5	-	4	1.9
No, there is not	0.6	1.9	2	0.9
Sportive Activities				
Yes, for all students	68.7	47.2	137	63.4
For some classes	13.5	17.0	31	14.4
No, there is not	17.8	35.8	48	22.2
Healthy Life Style Activities				
Yes	71.2	50.9	143	66.2
No	28.8	49.1	73	33.8
Total (Number)	163	53	216	100.0

66.2% of the schools perform healthy living activities and in 63.4% there are sports activities for all students. In almost all schools (97.2%), all students take physical education classes and 96.3% have playgrounds facilities at schools. The percentage of healthy living activities and sports activities organized for all students are much higher in urban residential areas compared to rural. (Table 6)

4.2. Children’s Life Styles

During the study, questionnaires have been filled out by 4,002 families in urban areas and 854 in rural areas, with a total of 4,856 families. 82.4% of families live in urban areas and 17.6% live in rural areas. Data were received from the mothers of 68.1% of children and from the fathers of 26.4%, and data were received from relatives of 5.4% of children.

4.2.1. Children’s Eating Habits

95.9% of families stated that their children were breastfed, while 4.1% stated that they did not. Average breastfeeding period was 7.15 ± 1.70 months.

Table 7. Distribution of Children Having Breakfast According to Families’ Answers by Residence (%), Turkey 2013

Frequency of Having a Breakfast	Urban	Rural	Total	
			Number	Percentage
Every Day	85.1	82.2	4053	84.6
4-6 Days a Week	5.3	6.8	266	5.6
1-3 Days a Week	7.6	9.2	379	7.9
No Breakfast	2.0	1.8	95	1.9
Total (n)	3953	841	4794*	100.0

**This question was not answered by 62 families.*

84.6% of families stated that their children have breakfast every day and 13.5% stated that they have breakfast 1-6 times a week. 1.9% stated that their children never have breakfast.

Table 8. Distribution of Children’s Food and Beverage Consumption Frequencies According to Families’ Answers (%), Turkey 2013

Food and Beverages	Everyday	4-6 Days a Week	1-3 Days a Week	None	Total*
Fresh Fruit	42.8	23.3	32.5	1.4	4610
Vegetables	18.3	26.3	47.2	8.3	4453
100% Processed Fruit Juice	14.2	13.9	50.2	21.7	4429
Fresh Squeezed Fruit Juice	5.8	11.5	47.0	35.6	4433
Sodas with Sugar	4.2	8.5	50.3	37.0	4505
Diet Sodas	1.7	2.2	10.7	85.4	4414
Semi-Skimmed Milk	23.6	15.4	29.0	32.0	4490
Whole Fat Milk	27.9	18.1	30.9	23.1	4494
Flavored Milk	8.3	8.8	35.6	47.3	4439
Cheese	51.0	16.5	22.1	10.5	4640
Ayran	28.7	25.7	41.2	4.3	4620
Yogurt	36.9	26.9	31.0	5.2	4587
Milk Pudding	5.9	11.6	59.2	23.3	4489
Red Meat, Chicken, Turkey	9.8	30.1	55.0	5.1	4616
Fish	4.1	9.2	67.0	19.7	4555
Eggs	42.4	28.1	25.4	4.1	4602
Legumes	8.8	28.6	56.4	6.2	4614
Dried Nuts	13.8	23.7	56.6	6.1	4590
Cereals, Bread	43.1	30.4	25.3	1.2	4571
Chips, Pop Corn	8.7	13.4	59.6	18.3	4583
Candy Bars and Chocolate	14.4	22.0	55.8	7.8	4581
Biscuits, Muffins, Cookies, Cakes Etc.	16.5	26.2	53.6	3.7	4605
Pizza, Turkish Pizza, Pancake With Spicy Meat Filling, French-fries, Hamburgers Etc.	4.2	12.6	66.1	17.2	4650

*Data were obtained from a total of 4,856 families. Families that did not answer these questions are not included in this total.

It is recommended to eat fresh fruit and vegetables daily. With reference to the families that have been interviewed, 42.8% state that their children consume fresh fruit and 18.3% state that they consume fresh vegetables daily. As declared by families, 35.6% of children do not consume fresh-squeezed fruit juice, while 21.7% do not consume processed fruit juice at all. 37.0% of children do not consume sodas with sugar and 85.4% do not consume diet sodas at all. (Table 8)

Families have stated that their children consume cheese, ayran and yogurt frequently. It has been stated consumption of cheese everyday as 51.0%, ayran as 28.7% and yogurt as 36.9%. (Table 8)

Consumption of meat products is less than that of dairy products. 9.8% of the families interviewed stated that their children eat red meat, chicken or turkey everyday. 5.1% of the children do not consume red or white meat at all, while 19.7% do not eat fish at all. Among children, consumption of eggs is much more compared to other food of animal origin. Frequency of children consuming eggs everyday is 42.4%. (Table 8)

Frequency of consuming legumes which are a plant source of proteins 1-3 times a week has been stated as 56.4%. 6.2% of the children has stated that they do not consume legumes at all. (Table 8)

43.1% of the families interviewed for this study stated that their children consume cereal and bread every day. (Table 8)

Greatest frequency of chips and popcorn consumption is 1-3 times a week (59.6%). Families stated that approximately one fifth of children do not consume such food products at all (18.3%). Frequency of consuming candy bars and chocolate every day is 14.4% and 4-6 times a week is 22.0%. 7.8% of families indicated that their children do not consume such food products at all. Consumption of food products containing high levels of fat and carbohydrates such as biscuits, cakes and cookies is quite high. 42.7% of families stated that their children consume these food products at least 4 times a week. 66.1% of children stated that they consume food products such as pita, Turkish pizza, French-fries and popcorn 1-3 times a week. (Table 8)

4.2.2. Sleep, Physical Activity and Sedentary Life Style Habits

Table 9. Distribution of Average Daily Sleeping Time (hours) According to Families' Answers by Residence, Turkey 2013

Residential Area	n	X ± SE (hours)
Urban	3115	9.29 ± 0.021
Rural	573	9.32 ± 0.047
Total* (n)	4573	9.30 ± 0.019

* This question has not been answered by 283 families.

Average sleeping durations of children is 9.30 ± 0.019; 9.29 (± 0.021) hours in urban areas and 9.32 (± 0.047) hours in rural areas. (Table 9)

Table 10. Distribution of Attendance of Children at Sport or Dance Club According to Families' Answers by Residence (attendance/week); Turkey 2013

Sportive Activity/ Week	Urban	Rural	Total	
			Number	Percentage
None	71.2	91.9	1587	74.2
Once	11.5	2.9	219	10.2
Twice	12.2	2.9	233	10.9
3 - 6 times	4.6	0.9	86	4.0
Everyday	0.6	1.3	15	0.7
Total (n)	1833	308	2141*	100.0

*This question has not been answered by 2,715 people.

74.2% of the families have stated that their children do not attend any sports or dance club at all, while 25.8% stated attendance once or more times a week. Meanwhile, attendance 3 times or more a week is 4.7%. In urban areas, 28.8% of children attend sportive or dancing activities regularly, but this percentage is only 8.0% in rural areas, as declared by families. (Table 10)

Families were asked to provide information as to the period of time children play games during the week and over the weekend.

- It has been declared that 2.6% of children do not play games at all during the week days. It has been stated that 12.1% of children play less than 1 hour a day, 26.5% 1 hour a day, 38.8% 2 hours a day and 19.6% 3 hours a day or more. 95% of the families did not answer this question.
- It has been declared that 0.7% of children do not play games at all over the weekend. 4.0% of children play less than one hour a day, 7.7% play 1 hour, 24.8% play 2 hours and 62.8% 3 hours or more. 153 families did not answer this question.

It is significant for children to go to school by walking in terms of daily physical activity. 71.4% of children in Turkey go to school by walking and 72.5% come back by walking. Approximately one out of every four children do not walk to and from school.

Table 11. Distribution of Time Children Spend Playing Computer Games According to Families' Answers (%), Turkey 2013

Time Spent Playing Computer Games	Week days*	Weekend*
None	56.6	43.2
Less than 1 Hour Every Day	22.4	19.7
1 Hour Every Day	12.0	15.6
2 Hours Every Day	6.4	13.6
3 Hours or More Every Day	2.5	7.9
Total (n)	4655	4617

*201 families did not answer the question related to time spent playing on computer during the week and 239 families the one related to that over the weekend.

According to families' statements, 20.9% of children play computer games at least one hour during the week days and 37.1% over the weekend. It has been stated that 2.5% of children play computer games 3 hours or longer everyday during the week days, and 7.9% over the weekend. These results indicate that playing computer games is among daily activities of one out of every two children. (Table 11)

Table 12. Distribution of Time Children Spend Watching Television According to Families' Answers (%), Turkey 2013

Watching TV	Week days*	Weekend*
None	3.2	2.3
Less than 1 Hour Every Day	22.3	10.7
1 Hour Every Day	28.0	14.4
2 Hours Every Day	33.3	35.4
3 Hours or More Every Day	13.2	37.2
Total (n)	4776	4731

*80 families did not answer the question related to time spent watching television during the week and 125 families the one related to that over the weekend.

The habit of watching the television is widespread among children. It has been stated that 28.0% of children watch television one hour every day and 33.3% two hours every day during the week. Meanwhile, over the weekend, 35.4% watch television 2 hours every day and 37.2% 3 hours and longer. (Table 12)

4.3. Assessment of Children's Anthropometric Measurements

Table 13. Distribution of Anthropometric Measurements of Children by Residence, Gender and Ages, Turkey 2013

	Urban		Rural		Total		p
	n	%	n	%	n	%	
Gender							0.95
Girls	2028	49.4	447	52.3	2475	49.9	OR= 1.124 CI= 0.97-1.30
Boys	2076	50.6	407	47.7	2483	50.1	
Age							0.11
7 Years	2184	53.2	429	50.2	2613	52.7	OR= 0.12 CI= 0.97-1.30
8 Years	1920	46.8	425	49.8	2345	47.3	
Total	4104	82.7	854	17.3	4958	100.0	

Anthropometric measurements of 4,958 children have been performed at schools in total, with 49.9% girls and 50.1% boys students. In urban areas, percentage of girls whose anthropometric measurements have been performed was 49.4% and in rural areas it was 52.3% (p=0.95) (Table 13).

52.7% of the children whose anthropometric measurements were performed at schools were 7 years old and 47.3% were 8 years old. In urban areas, 53.2%, and in rural areas, 50.2% of the children whose anthropometric measurements were performed were seven years old (p=0.11) (Table 13).

Average ages of children whose anthropometric measurements were performed in urban and rural areas it was same and it was 7.94 ± 0.34 years. (Table 13)

There were no differences in terms of distribution by gender, age and residential areas between children whose anthropometric measurements were performed.

Table 14. Distribution of Weight, Height and BMI Index Z-Scores of Children by Gender (%); Turkey 2013

	Boys	Girls	Total	
			n	%
Weight Z-Score				
Severe underweight	0.2	0.2	8	0.2
Underweight	2.1	2.1	104	2.1
Normal	88.6	91.9	4470	90.2
Overweight	6.5	4.9	282	5.7
Obese	2.6	1.0	89	1.8
Total (n)	2479	2474	4953	
Height Z-Score				
Severely Stunting	0.1	0.2	7	0.1
Stunting	2.1	2.4	113	2.3
Normal	94.8	95.8	4724	95.3
Tall	2.7	1.4	101	2.0
Over Tall	0.3	0.2	12	0.2
Total (n)	2483	2474	4957	
BMI Z-Score				
Severely Thin	0.3	0.2	13	0.3
Thinness	1.9	1.7	88	1.8
Normal	74.5	76.5	3739	75.5
Overweight	13.3	15.0	702	14.2
Obese	10.0	6.6	410	8.3
Total (n)	2479	2473	4952	

In terms of children's weight Z-Score values, nine out of every 10 children are within normal limits, while 0.2% are severe underweight and 2.1% are underweight. Percentage of underweight and severe underweight is the same for boys and girls and it is 2.3%. (Table 14)

In terms of children's height Z-Score values, 95.3% of children are within normal height limits; the percentage for boys is 94.8% and for girls it is 95.8%. Among boys, the percentage of being over tall is 0.3% and among girls it is 0.2%. (Table 14)

In terms of children's BMI Z-Score values, approximately 7-8 out of every 10 children are within normal limits. The percentage of being overweight and obese is 23,3% among boys and 21,6% among girls. The percentage of being severe thin and thinness is 2.2% among boys and 1.9% among girls. (Table 14)

Table 15. Distribution of Weight, Height and BMI Index Z-Scores of Boys by Residence (%), Turkey 2013

Boys	Urban	Rural	Total	
			n	%
Weight Z-Score				
Severe underweight	0.0	1.0	4	0.2
Underweight	1.8	3.2	51	2.1
Normal	87,8	92,9	2197	88,6
Overweight	7,5	1,5	162	6,5
Obese	2.8	1.5	65	2.6
Total (n)	2072	407	2479	
Height Z-Score				
Severely Stunting	0.1	0.2	3	0.1
Stunting	1.5	5.4	53	2.1
Normal	95.0	93.9	2354	94.8
Tall	3.1	0.5	66	2.7
Over Tall	0.3	0.0	7	0.3
Total (n)	2076	407	2483	
BMI Z-Score				
Severely Thin	0.3	0.2	8	0.3
Thinness	1.8	2.2	47	1.9
Normal	72.9	82.8	1847	74.5
Overweight	13.7	11.1	330	13.3
Obese	11.2	3.7	247	10.0
Total (n)	2073	406	2479	

In terms of children's weight Z-Score values, 87.8% of boys are within normal limits in urban areas and 92.9% in rural areas. The percentage of being severe underweight and underweight is 1.8% in urban areas and 4.2% in rural areas. (Table 15)

As for residential areas, the percentage of being within normal limits among boys in terms of height Z-Score values. The percentage of being tall and over tall is 3.4% in urban areas and 0.5% in rural areas. (Table 15)

Boys' BMI Z-Score distributions display differences by residential areas, as well. In urban areas, the percentage of boys being overweight and obese is 24.9%, while in rural areas it is 14.8%. The BMI Z-Score values' being within normal limits is higher in rural areas compared to urban areas, while the percentage for being obese is lower in rural areas compared to urban areas. (Table 15)

Table 16. Distribution of Weight, Height and BMI Index Z-Scores of Girls by Residence (%), Turkey 2013

Girls	Urban	Rural	Total	
			n	%
Weight Z-Score				
Severe underweight	0.1	0.2	4	0.2
Underweight	1.9	3.1	53	2.1
Normal	91,5	93,7	2273	91,9
Overweight	5,4	2,5	120	4,9
Obese	1.1	0.4	24	1.0
Total (n)	2027	447	2474	
Height Z-Score				
Severely Stunting	0.1	0.4	4	0.2
Stunting	1.7	5.6	60	2.4
Normal	96.3	93.7	2370	95.8
Tall	1.7	0.2	35	1.4
Over Tall	0.2	0.0	5	0.2
Total (n)	2027	447	2474	
BMI Z-Score				
Severely Thin	0.2	0.0	5	0.2
Thinness	1.7	1.3	41	1.7
Normal	74.6	85.0	1892	76.5
Overweight	16.0	10.5	372	15.0
Obese	7.4	3.1	163	6.6
Total (n)	2026	447	2473	

In terms of the distribution of weight Z-Score values of girls, 91.5% of girls in urban areas and 93.7% of girls in rural areas are within normal limits. The percentage of girls in urban areas being severe underweight and underweight is lower compared to rural areas (2.0% and 3.3%). (Table 16)

In terms of girls' height Z-Score values, the percentage of being within normal limits is 96.3% for urban areas and 93.7% for rural areas. The percentage for girls being tall and over tall is 1.9% in urban areas and 0.2% in rural areas. (Table 16)

There is a percentage difference between the distributions of BMI Z-Score values among girls by residential areas. In urban areas, the percentage for girls being overweight and obese is higher (23.4%) compared to rural areas (13.6%). On the other hand, the percentage for being thin is lower in rural areas compared to urban areas. The percentage for being within normal limits is higher in rural areas compared to urban areas. (Table 16)

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Table 17. Distribution of Weight, Height and Body Mass Index Z-Scores of Boys by Ages (%), Turkey 2013

Boys	7 Year-olds	8 Year-olds	Total	
			n	%
Weight Z-Score				
Severe underweight	0.1	0.2	4	0.2
Underweight	1.7	2.4	51	2.1
Normal	88.3	88.9	2197	88.6
Overweight	6.5	6.6	162	6.5
Obese	3.4	1.8	65	2.6
Total (n)	1268	1211	2479	
Height Z-Score				
Severely Stunting	0.1	0.2	3	0.1
Stunting	1.9	2.4	53	2.1
Normal	95.0	94.6	2354	94.8
Tall	2.8	2.6	66	2.7
Over Tall	0.2	0.3	7	0.3
Total (n)	1270	1213	2483	
BMI Z-Score				
Severely Thin	0.2	0.5	8	0.3
Thinness	2.1	1.7	47	1.9
Normal	74.0	75.0	1847	74.5
Overweight	12.4	14.3	330	13.3
Obese	11.3	8.6	247	10.0
Total (n)	1267	1212	2479	

The weight Z-Score values of 88.3% of the seven-year-old boys and 88.9% of eight-year-old ones are within normal limits. The percentage for being severe underweight and underweight is 1.8% for seven-year-olds and 2.6% for eight-year-olds. (Table 17)

In terms of height Z-Score values of boys, the percentage for being within normal limits is 94.8% for in total and 95% for seven-year-olds and 94.6% for eight-year-olds. (Table 17)

In terms of BMI Z-Score the percentage for being within normal limits for seven-year-olds is 74.0%, and 75% for eight year-olds. The percentage for being overweight and obese is 23.7% for seven-year-olds and 22.9% is eight-year-olds. (Table 17)

Table 18. Distribution of Weight, Height and Body Mass Index Z-Scores of Girls by Ages (%), Turkey 2013

Girls	7 Year-olds	8 Year-olds	Total	
			n	%
Weight Z-Score				
Severe underweight	0.2	0.1	4	0.2
Underweight	2.0	2.3	53	2.1
Normal	92.1	91.6	2273	91.9
Overweight	4.9	4.8	120	4.9
Obese	0.7	1.2	24	1.0
Total (n)	1342	1132	2474	
Height Z-Score				
Severely Stunting	0.1	0.3	4	0.2
Stunting	2.4	2.5	60	2.4
Normal	95.7	95.9	2370	95.8
Tall	1.7	1.1	35	1.4
Over Tall	0.2	0.3	5	0.2
Total (n)	1342	1132	2474	
BMI Z-Score				
Severely Thin	0.1	0.3	5	0.2
Thinness	1.5	1.9	41	1.7
Normal	76.0	77.1	1892	76.5
Overweight	16.4	13.4	372	15.0
Obese	6.0	7.3	163	6.6
Total (n)	1341	1132	2473	

In terms of weight Z-Score values, 92.1% of seven-year-old girls and 91.6% of eight-year-old ones are within normal limits. The percentages for being severe underweight and underweight is 2.2% for seven-year-olds and 2.4% for eight-year-olds. (Table 18)

In terms of height Z-Score values, 95.7% of seven-year-olds and 95.9% of eight-year-olds are within normal limits. (Table 18)

In terms of BMI Z-Score values, 76.0% of seven-year-olds and 77.1% of eight-year-olds are within normal limits. The percentages of being overweight and obese is 22.4% for seven-year-olds and 20.7% for eight-year-olds. (Table 18)

Table 19. Distribution of Weight and BMI Z-Score by NUTS Regions (%), Turkey 2013

NUTS Regions	Severe under-weight	Under-weight	Normal	Over-weight	Obese	Total* (n)
Weight Z-Score						
İstanbul	0.1	1.6	86.6	9.5	2.2	813
Western Marmara	0.0	1.1	90.4	5.3	3.2	187
Eastern Marmara	0.0	2.9	90.0	5.0	2.0	441
Aegean	0.0	1.3	88.6	8.2	1.9	536
Mediterranean	0.1	1.3	90.7	5.4	2.5	709
Western Anatolia	0.0	1.9	89.9	6.8	1.4	427
Central Anatolia	0.0	0.8	92.2	4.9	2.1	243
Western Black Sea	0.5	3.4	91.3	3.8	1.0	208
Eastern Black Sea	0.0	0.8	81.7	9.5	7.9	126
Northeastern Anatolia	0.0	1.8	96.0	1.8	0.4	223
Eastern Anatolia	1.0	4.5	92.3	1.9	0.3	311
Southeastern Anatolia	0.3	3.3	93.3	2.7	0.4	729
Total	0.2	2.1	90.2	5.7	1.8	4953
BMI Z-Score						
İstanbul	0.2	2.0	69.5	15.9	12.4	812
Western Marmara	0.0	1.6	77.5	12.8	8.0	187
Eastern Marmara	1.1	2.9	73.9	13.6	8.4	441
Aegean	0.6	1.3	71.8	15.5	10.8	535
Mediterranean	0.1	2.4	72.5	16.1	8.9	709
Western Anatolia	0.0	1.2	76.2	14.5	8.2	428
Central Anatolia	0.0	0.8	77.8	13.6	7.8	243
Western Black Sea	0.0	0.5	79.3	14.4	5.8	208
Eastern Black Sea	0.0	0.0	58.7	23.0	18.3	126
Northeastern Anatolia	0.0	1.8	83.4	11.2	3.6	223
Eastern Anatolia	0.0	1.3	86.2	8.4	4.2	311
Southeastern Anatolia	0.3	2.2	82.0	11.9	3.6	729
Total	0.3	1.8	75.5	14.2	8.3	4952

* Weight Z-Score was not calculated for 5 children and BMI Z-Score for 6 children.

* Anthropometric measurements of all 4958 children are not included in this table.

In Turkey, it is observed that the percentages for being thin are similar by NUTS regions. It has been observed that in certain regions the percentages for being severe underweight and underweight are a little higher. In terms of weight Z-Score, the regions with highest level of severe underweight and underweight are Eastern Anatolia (5.5%), Western Black Sea (3.9%), Southeastern Anatolia (3.6%) and Eastern Marmara (2.9%), respectively. (Table 19)

The distribution of percentages for being obese also differ by NUTS regions. The regions with highest level of obese values are Eastern Black Sea (18.3%; and 41.3% including overweight), İstanbul (12.4%; and 28.3% including overweight), Aegean (10.8%; and 26.3% including overweight) and Mediterranean (8.9% overweight; and 25% including overweight). (Table 19)

Table 20. Distribution of Height Z-Score by NUTS Regions (%), Turkey 2013

NUTS Regions	Severe Stunting	Stunting	Normal	Tall	Over Tall	Total (n)
İstanbul	0.0	1.4	96.1	2.2	0.4	814
Western Marmara	0.0	0.5	97.9	1.1	0.5	187
Eastern Marmara	0.5	1.4	94.3	3.4	0.5	442
Aegean	0.4	1.9	94.4	2.8	0.6	536
Mediterranean	0.1	2.3	95.2	2.3	0.1	710
Western Anatolia	0.0	1.6	96.0	2.1	0.2	428
Central Anatolia	0.0	2.5	95.1	2.5	0.0	243
Western Black Sea	0.5	3.9	95.7	0.0	0.0	207
Eastern Black Sea	0.0	2.4	94.4	2.4	0.8	126
Northeastern Anatolia	0.0	2.2	96.4	1.3	0.0	223
Eastern Anatolia	0.3	4.5	94.2	1.0	0.0	312
Southeastern Anatolia	0.0	3.6	94.9	1.5	0.0	729
Total	0.1	2.3	95.3	2.0	0.2	4957

* Height Z-Score was not calculated for one child.

* Anthropometric measurements of all 4958 children are not included in this table.

In Turkey, it has been observed that there is a difference in percentages of being stunting by NUTS regions. The regions with highest level of being stunting and severely stunting are Eastern Anatolia (4.8%), Western Black Sea (4.4%), Southeastern Anatolia (3.6%) and Central Anatolia (2.5%). (Table 20)

The percentages for being tall by NUTS regions also differ. The regions with highest levels of being tall and over tall are Eastern Marmara (3.9%), Aegean (3.4%), Eastern Black Sea (3.2%), İstanbul (2.6%) and Mediterranean (2.4%), respectively. (Table 20)

5. CONCLUSIONS AND RECOMMENDATIONS

One of the major basic behavior that influence being healthy is “adequate and balanced nutrition”. Starting from early childhood, “healthy eating” is among the most important factors that ensure being healthy. Healthy eating is highly influential on the improvement of individual’s, family’s and society’s health potential and level of well-being.

5.1. Schools

This study has been conducted in 216 schools, 163 of which were located in urban (75.5%) and 53 in rural (24.5%) areas. During the study, 2541 girls and 2560 boys students have been reached.

- It has been stated that there were canteens in 78.5% of schools and cafeterias in 20.6%. The percentage of canteens in urban schools is higher compared to that in rural schools.
- Fresh fruit is offered to all students in 9.7% of schools and fresh vegetables are offered in 8.3%. The percentage for provision of free milk to all students is 61.4%.
- Nutrition education is provided to all students in 78.5% of the schools.
- There is no restriction on sales and advertising in 22.7% of the schools.

The schools need to be supported in terms of facilities, sources and practices relevant to nutrition and physical activity.

5.2. Children’s Life Styles by Families’ Statements

During the study, a total of 4856 questionnaires were filled out by families -- 4002 in urban and 854 in rural areas. 82.4% of families live in urban areas and 17.6% in rural areas. 68.1% of interviewed individuals were mothers, 26.4% were fathers, and only 5.4% were relatives other than mothers and fathers.

- Five out of every six children (84.6%) eat breakfast every day.
- It has been understood that the target of eating fruits, vegetables and food containing protein every day is not reached and that food with low nutritional value and high calories are consumed.
- Children’s sleeping durations are at the desired level.
- Three out of every four children (74.2%) are not engaged in sports activities at all.
- There is a group of children who don’t play games at all (around 2%)
- Three out of every four children walk to and from school.
- 22.4% of children play computer games at least one hour a day during the week days and 19.7% during the weekend. Playing computer games is among the daily activities of 43.4% of the children during the week days and 55.8% during the weekend.
- Watching television is a significant activity for children. 96.8% of children watch television during the week days and 97.7% during the weekend.

Much as children need to change their habits towards healthy and balanced eating, they also need to increase their physical activity. As such, the family must improve its point of view and the possibilities in the environment of residence should be made use of and improved.

5.3. Assessment of Children's Anthropometric Measurements

Anthropometric measurements of a total of 4958 children have been made at schools. Distribution by residential area, gender and age of children whose anthropometric measurements have been made were similar and a sampling was obtained to evaluate the results by residential area, gender and age.

- According to the evaluation of weight Z-Score values, nine out of every 10 children are within normal limits. The percentage of underweight (thin) is 2.1% and severely underweight 0.2% overall.
- According to the evaluation of height Z-Score values, 95 out of every 100 children are within normal limits and two are extremely stunting. The percentage of severely stunted is 0.1%, stunted is 2.3%, and tall and over tall are 2.2% overall.
- According to evaluation of BMI Z-Scores, 7-8 out of every 10 children are within normal limits. The percentage of thinness (underweight) is 2.2% for boys and 1.9% for girls. The percentage of obesity overall is 8.3% and overweight is 14.2% overall. The total percentage of thinness (underweight) and severe thinness (severe underweight) is 2.1%.
- The percentage of being tall and obese in urban areas is higher than the percentage of being stunting and thin (underweight) in rural areas.
- The percentages of thinness (underweight) and obesity differ by regions.

In Turkey, the problem of being underweight and overweight exists among children by residential area, type of settlement and gender. The policies related to children's healthy nutrition and physical activity must be strengthened and relevant practices must be prioritized urgently.

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