



**TURKEY CHILDHOOD
(PRIMARY SCHOOL 2ND GRADE STUDENTS)
OBESITY SURVEILLANCE INITIATIVE
COSI-TUR 2016
BASIC FINDINGS**

ANKARA 2019



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Turkey Childhood (Primary School 2nd Grade Students) Obesity Surveillance Initiative COSI-TUR 2016 has been conducted by the Republic of Turkey, Ministry of Health in partnership with the Ministry of National Education. The survey has been undertaken in accordance with the WHO European COSI protocol prepared by the World Health Organization Regional Office for Europe in partnership with its member countries. Financial support for the project has been provided by Republic of Turkey, Ministry of Health.

1st Print Edition : March 2019 /50 Copies
ISBN : 978-975-590-714-7
Ministry of Health Publication No : 1126
Press : Artı6 Medya Reklam Matbaa Ltd. Şti.
Özveren Sokak No:13/A Kızılay / ANKARA • Tel: 0312 229 37 41 - 42

Interpreter: Mustafa AY
Cover Photograph: Kadir EKİNCİ
www.beslenmehareket.hsgm.gov.tr

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PREFACE

The fact that there were only 15 member countries have national data sets and 19 member countries have overweight and obesity surveillance policies for children aged 6-10 at the “WHO European Ministerial Conference on Counteracting Obesity” which took place in Istanbul between 15-17 November 2006 was the reason for the decision to create a standardized childhood surveillance – observation initiative within the WHO European Region.

The WHO European Childhood Obesity Surveillance Initiative – COSI was conducted for the first time in the school year of 2007-2008 in 13 countries from the WHO European Region (Belgium, Bulgaria, Cyprus, Czech Republic, Ireland, Italy, Lithuania, Malta, Latvia, Norway, Portugal, Slovenia and Sweden). The second round of the survey was conducted in 17 countries (new members; Greece, Hungary, Spain and Macedonia) in the school year of 2009-2010 and the third round was conducted in 21 countries (new members; Albania, Moldova, Romania and Turkey) in the 2012-2013 school year. This international effort aims to monitor and compare the growth and development of school-aged children in the European region, to develop a permanent surveillance system and to use the results in health policies for children.

The 2013 survey, which included Turkey in the third round, was carried out through the cooperation of the Ministry of Health, Ministry of National Education and Hacettepe University within the framework of the criteria and protocols set by WHO. According to COSI TUR 2013 results; the incidence of obesity in primary school second grade children was 8.3% and overweight was 14.2%. The results of this study have played a decisive role in the implementation of the Healthy Nutrition and Active Life Program.

The 4th Round of the survey was conducted within the school year of 2016-2017 in which a total of 38 countries from the WHO European Region took part in the COSI Survey. The COSI TUR 2016 survey results, which still constitute one of the studies carried out by WHO with the most comprehensive participation, will make important contributions towards the evidence based procedures of the healthy lifestyle programs as well as their development and our multi-sectoral work.

I kindly thank everyone who contributed to this study.

Fatih KARA, MD. Assoc. Prof.
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ACKNOWLEDGEMENTS

We would like to thank the World Health Organization Regional Office for Europe and the COSI working team for their intensive collaboration as a part of the COSI Survey, the Turkish Statistical Institute and Nilay EROL for their intensive efforts towards the preparation of the study samples,

Academic Staff of Hacettepe University Hilal ÖZCEBE MD. Prof., Tülay Bağcı BOSI Diet. Phd. for their voluntary consultancy services and their support in the training of the field teams as well as the review of the surveys, Dear Mahmut Saadi YARDIM MD. Assoc. Prof. for enabling the cleanliness of the data, its analysis as well as preparation of the relevant tables,

The Ministry of National Education for their intensive cooperation, the Sarar and Kurtuluş Primary Schools for their cooperation and support during the pilot work and field survey training conducted in Ankara,

And to the provincial field coordinators, all our colleagues who worked during the field data collection phase, all school administrators, teachers, families and children who took part in our survey.

**Republic of Turkey Ministry of Health
General Directorate of Public Health**

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ABBREVIATIONS

BAZ	: BMI-for-age Z-score (BMI Z-score by age)
BMI	: Body Mass Index
CDC	: Center for Disease Control (US Center for Disease Control and Prevention)
COSI	: Childhood Obesity Surveillance Initiative
WHO	: World Health Organization
CI	: Confidence Interval
HAZ	: Height-for-age z-score
NUTS	: Nomenclature of Territorial Units for Statistics
MoNE	: Ministry of National Education
NUTS	: Turkey Regional Classification (The Nomenclature of Territorial Units for Statistics)
OR	: Odds Ratio (Estimated Relative Risk)
MoH	: Ministry of Health
SE	: Standard Error
SD	: Standard Deviation
TOÇBİ	: Surveillance on Growth Monitoring in School Aged Children in Turkey
TSİ	: Turkish Statistics Institution
WAZ	: Weight-for-age Z-score

1. INTRODUCTION

Obesity in the childhood age groups is becoming an increasingly important public health problem. The number of overweight and obese children in the 0-4 age group in the world increased from 32 million in 1990 to 41 million in 2016. The majority of overweight and obese children live in the developing countries. If the current rate of increase in the incidence of obesity continues, the number of overweight and obese children all over the world is estimated to reach 70 million by 2025. The likelihood of overweight babies and children becoming obese during adolescence and adulthood will also increase. It is known that childhood obesity is related to many serious health problems, especially diabetes and heart diseases (WHO, 2017).

Obesity is also considered a major health problem in the European Region. It is reported that about 7% of the national health budgets of countries in the European Region are spent on diseases related to obesity. Intervention programs are being developed to prevent obesity, which has been identified as an important problem since childhood. Comprehensive measures are included in the "Action Plan for Childhood Obesity 2014-2020" prepared by the European Union and it is aimed to strengthen cooperation between countries. (EU Action Plan for Childhood Obesity 2014-2020)

Nutrition is defined as consumption of nutrients for the maintenance of life, protection and development of health. The leading one of the basic behaviors that affect health is "adequate and balanced nutrition". Healthy nutrition directly contributes to improving the health potential of the individual, the family and the community, and raising the level of well-being (WHO, 2012).

Growth is a very good indicator that reflects the general health status of children. Inadequate and false nutrition affects a child's growth and is among the first and most important indications proving that his/her general health condition is deteriorating. Assessment of individual nutritional status of children can be achieved by monitoring their growth. During the baby follow-ups made by family physicians in our country, the growth of children is also observed. A joint monitoring program is being carried out by the family physician and the school under the scope of school health starting from the school period. However, the results of survey conducted with the representative sample of the population to assess the growth status of children at country level are generally used to assess the situation (MoH, 2013a).

In Turkey, the Surveillance on Growth Monitoring in School Aged Children in Turkey (TOÇBİ) Project enabled the monitoring of indicators related to nutrition in 2009. In the TOÇBİ survey, among the target group of children aged 6-9, 14.3% was found to be overweight and 6.5% to be obese. The results of the TOÇBİ (2009) survey show that one in five children in Turkey is at risk of overweight-related illnesses (MoH, 2011).

COSI TUR 2013 Survey was conducted over 5100 students in 2nd grades in 216 schools (163 urban, 53 rural) in 67 provinces that represent Turkey. In the study, 14.2% was found to be overweight and 8.3% to be obese. Obese (including overweight): 22.5% (Urban: 24.2%, Rural: 14.2%). (COSI TUR 2013)

There are strategies, goals and actions with the aim of increasing the healthy nutrition behaviors and physical activities of the children and youth as well as the adults within the scope of "Turkey Healthy Nutrition and Active Life Program (2010-2014)" which was prepared by the Ministry of Health. Obesity is defined as an important health problem under the program in Turkey. By adding the subject of counteracting obesity to the educational curriculums of formal and informal education programs in schools within the scope of the program, it has been aimed to get the preschool and school-aged children, adolescents and youth adopt a habit of

adequate and balanced habits and regular physical activities, to contribute to the training of healthy and productive generations. The 2014-2017 program is being implemented through updates. (MoH, 2013b).

The member countries of the World Health Organization in the European Region repeat its Childhood Obesity Surveillance survey once every three years.

In order for a country to participate in the COSI Survey, an official competent organization-institution and Principal Investigator should be assigned for providing national coordination and management and then a cooperation agreement should be made between this organization and WHO Regional Office for Europe.

Nearly 40% of school-aged children are above normal weight and 15% of children are overweight in the World Health Organization European Region in 2010. Overweight and obesity in childhood causes problems such as cardiovascular diseases, diabetes, movement system problems, mental problems, school failures and low self-esteem (WHO, 2013).

This study was carried out in order to assess the status of obesity in childhood using the World Health Organization European Region Childhood Surveillance survey protocol. This protocol is implemented in order to be able to compare the frequency of childhood obesity in Turkey with that of the WHO European Region, as well as provide data support for the assessment of the Healthy Nutrition and Active Life Program of Turkey being undertaken in Turkey.

1.1 OBJECTIVES

In Turkey, it is aimed to;

- Define the nutritional behaviors and physical activity levels according to the statements of 2nd grade students (6-9 age group) and their families,
- Carry out the anthropometric measurements (height and body weight) of children and identify the growth indicators (underweight, normal weight, overweight and obesity, stunting)

Collect information about the schools' practices related to nutrition and physical activity.

Based on the results obtained, it is aimed to;

- assess the success of the programs for children's "healthy nutrition and growth"
- identify new strategies and enable the planning of interventions for children to acquire healthy lifestyle behaviors,
- monitor the growth of children by repeating the same study at country level every three years,
- make an international comparison of the results of this study using the survey methods and questionnaires determined by WHO.

2. BACKGROUND

This section will focus on three basic concepts related to survey. The first of these concepts is "healthy nutrition and its importance", the second is "obesity, its causes and problems it causes" and the third one is "anthropometric measures and methods of assessment".

2.1. Healthy Nutrition and Its Importance

The healthy lifestyle and economic development of the individual and the community depend on the health of the individuals who constitute the community. Health is based on an adequate and balanced nutrition. Adequate and balanced nutrition is also defined as healthy nutrition and optimal nutrition. Healthy nutrition is essential in all life stages from embryo to infancy, childhood, adolescence, adulthood and finally elderliness for surviving, growth and development, productivity, health and well-being.

It is known that growth and development are affected and health is impaired when any of the nutrients found in the nutrient structure are not taken or taken more or less than required. Choice of nutrition (food, nutrients) by the individuals is closely related to traditions, economic, cultural and environmental factors as well as age, gender, genetics and lifestyle.

In human life "Nutrition" is not just the consumption of food but also includes practices that are based on enjoyment while eating, socialization, practices made according to the traditions and customs. For healthy nutrition, all nutrients from various foods must be taken in an adequate and balanced manner. Some foods are rich in some nutrients, some are poor. In addition, various processes applied to foods, including cooking, causes the loss of some nutrients.

2.2. Definition, Frequency, Causes and Related Health Issues of Obesity

Overweight and obesity are defined as "abnormal or excessive fat accumulation that presents a risk to health".

Obesity in the world has tripled compared to 1975. In 2016, there are 1.9 billion overweight adults and 650 million obese adults in the world. In other words, 39% of the adults over the age of 18 are overweight and 13% are obese. Obesity is also increasing among children. Over the past 40 years, obesity has increased tenfold, in 2016, 41 million children at the ages of 0-4 and 340 million children at the age of 5-19 were either obese or overweight. If the numbers of overweight and obesity increase at this rate, it is expected to rise to 70 million in 2025. (WHO, 2017)

While there were 32 million overweight and obese children in the 0-5 age group worldwide in 1990, this number increased to 41 million in 2016. In this period, the number of overweight and obese children in the 0-5 age group in the African Region increased from 4 billion to 9 million. Increase rate of obesity and overweight is more than 30% in developing countries, a large majority of the overweight or obese children live in the developing countries. (WHO <http://www.who.int/topics/obesity/en/>)

Excessive and false nutrition are among the leading factors causing obesity as well as inadequate physical activity. Furthermore, genetic, environmental, neurological, physiological, biochemical, socio-cultural and psychological reasons are other factors. It is accepted that the genetic factors as well as the environmental factors play a significant role in the increase of frequency of obesity during childhood period all over the world.

It is assumed that the obesity epidemic is caused by an environment that promotes excessive food intake and inhibits physical activity. These conditions are mainly due to the changing family life dynamics directed by social conditions and affluence such as increasing marketing of ready-to-eat food called "fast food" and the increasing ease of access to these foods, the widespread use of sedentary forms of entertainment as watching television and video and dramatic increases in the number of working women (French SA, Story M, and Jeffrey RW, 2009).

2.3. Anthropometric Measurement Techniques and Methods of Assessment

It is rather difficult to assess overweight and obesity in childhood and adolescence. Due to the fact that children and adolescents are in the process of growth and development, body structures change rapidly. It is recommended that different indicators could be used depending on age (WHO 2007. 2013. WHO 2013).

For children and adolescents, there is no specific classification as is for adults; however, there are different approaches to definition of overweight and obesity. One of the most frequently used methods is the use of percentile and/or Z-score values at the individual and community level. Growth standards for children at the ages of 0-5 in 2006 and growth reference values for children and adolescents at the ages of 5-19 in 2007 have been defined by the World Health Organization. Thus, in today's children and adolescents, the classification of BMI Z-scores - Body weight Z-score values are used to classify as overweight-obesity, underweight and severe underweight while the Height Z-score is used to classify as stunting and severe stunting and excessive tallness. From the values obtained by the body weight measurements, the students' clothes are narrowed to obtain clear body weights and the body weight is corrected according to the clothes. Z-score assessment is performed with ANTRO Plus 2007 program and extreme values are excluded from the analysis according to WHO recommendations (WHO 2009. 2013).

3. METHODS

The fact that there were only 15 member countries have national data sets and 19 member countries have overweight and obesity surveillance policies for children aged 6-10 at the “WHO European Ministerial Conference on Counteracting Obesity” which took place in Istanbul between 15-17 November 2006 was the reason for the decision to create a standardized childhood surveillance – observation initiative within the WHO European Region. The WHO European Childhood Obesity Surveillance Initiative – COSI was conducted for the first time in the school year of 2007-2008 in 13 countries from the WHO European Region (Belgium, Bulgaria, Cyprus, Czech Republic, Ireland, Italy, Lithuania, Malta, Latvia, Norway, Portugal, Slovenia and Sweden). The COSI protocol was developed in cooperation with the Member States and finalized in 2012 by the WHO European Region (TM Wijnhoven et al, 2012).

The second round was implemented in the education year of 2009-2010 with 17 countries (new members: Greece, Hungary, Spain and Macedonia) and the Third Round was in the education year of 2012-2013 with 21 countries (new members: Albania, Moldova, Romania and Turkey).

Turkey was involved in the survey in the 3th round in 2012-2013. The results of the survey were released to the press and public in December 2013 with the participation of the Ministers of Health, National Education and Food, Agriculture and Livestock, along with the WHO European Region Administrators, representatives of relevant institutions and organizations. All outcome reports of the survey have been communicated to relevant stakeholders and shared with WHO; also shared on the website of the Ministry of Health (www.beslenme.gov.tr).

On behalf of Turkey, the COSI Survey is coordinated by the Ministry of Health, General Directorate of Public Health and is carried out in cooperation with the faculty members of Hacettepe University, Faculty of Medicine, Public Health Department. Turkey is a member of the World Health Organization COSI advisory group, and takes an active participation in the preparation of the World Health Organization protocols, guidelines and questionnaires, as well as is an active member of the COSI national and international publications committee. Turkey has participated in the WHO 8th COSI Meeting held in Croatia in 2015 and in the WHO 9th COSI Meeting held in Russia in 2016 and shared the COSI survey results with European Region member countries. 2017 is 10th Anniversary and 10th Year Meeting was held in Malta under the Term Presidency of EU. The fourth round of the survey was repeated in 2016 with the attendance of 32 Member States of the WHO European Region and number of the participant countries continues to increase every year.

The WHO European Childhood Obesity Surveillance Initiative (COSI) October 2015 Manual of Data Collection Procedures and Protocol have been used in this survey.

3.1. Survey Type

This study is a cross-sectional epidemiological study carried out in cooperation with the Republic of Turkey Ministry of Health, WHO European Region, Republic of Turkey Ministry of National Education and Hacettepe University.

3.2. Survey Variables

3.2.1. Independent Variables;

Primary School 2nd Grade Students (Ages 6-9);

- Gender
- Certain nutritional habits
- Doing physical activities
- Time spent watching TV and homework
- Time spent physical activity

Socio-demographic characteristics of their families

- Age
- Educational Status
- Occupational Status

Features of schools

- Geographic region
- Environmental conditions
- Opportunities and practices regarding nutrition and physical activity

3.2.2. Dependent Variables;

Primary School 2nd Grades Students (Ages 6-9);

- Underweight
- Overweight
- Obesity
- Stunting

3.3. Target Population/Sampling of Survey

The Turkish Statistical Institute provided the sampling of the survey which was conducted in accordance with the protocol signed between the Republic of Turkey Ministry of Health, the General Directorate for Public Health, Department of Healthy Nutrition and Active Life and the WHO European Region.

The COSI-TUR 2016 Survey was conducted in the first half of 2016-2017 school year with the cooperation of the Republic of Turkey Ministry of National Education.

The target group of the "WHO European Childhood Obesity Surveillance Initiative " was the second grade students of the primary schools affiliated to the Ministry of National Education. For this purpose, the Ministry of National Education (MoNE) provided a list of schools in which school, branch, student and gender based details are included for 2015-2016 school year. A total of 1,273,884 first grade students were identified in this list in totally 26,150 schools within the scope of this survey. The first grade students' information on the list of the year 2015-2016 from the MoNE served as the basis of the determination of the survey sample.

1. 271 schools closed by the Ministry of Education in the school year of 2016-2017 were removed from the lists.
2. In the WHO European Childhood Obesity Surveillance Initiative (COSI) protocol document, it is suggested that if less than 1% of the students under target population are enrolled in schools with specialized training (schools within the Special Education and Practice Center where mentally, visually and hearing impaired students are trained), then they can be removed from the sample. 366 Special Education and Practice Schools determined to be in line with this criterion were excluded from the scope of the study.
3. 506 schools without second grade branches and students were excluded from the scope of the study.

The sampling design of the survey was carried out in 25,019 schools, 57,306 branches and 1,260,721 students. Childhood Obesity Surveillance Initiative Survey has been planned to give an estimation based on gender and the Nomenclature of Territorial Units for Statistics Classification based on Level 1 (NUTS1) x gender. The stratification variables according to the estimation dimension are given below. The provinces in the NUTS1 Region Classification are stated in Table 3-1.

Table 3-1. NUTS Statistics Region Classification

TR1	ISTANBUL
TR2	WEST MARMARA (Balıkesir, Çanakkale, Edirne, Kırklareli, Tekirdağ)
TR3	AEGEAN (Afyon, Aydın, Denizli, İzmir, Kütahya, Manisa, Muğla, Uşak)
TR4	EAST MARMARA (Bilecik, Bolu, Bursa, Eskişehir, Kocaeli, Sakarya, Yalova, Düzce)
TR5	WEST ANATOLIA (Ankara, Konya, Karaman)
TR6	MEDITERRANEAN (Adana, Antalya, Burdur, Hatay, Isparta, Mersin, Kahramanmaraş, Osmaniye)
TR7	CENTRAL ANATOLIA (Kayseri, Kırşehir, Nevşehir, Niğde, Sivas, Yozgat, Aksaray, Kırıkkale)
TR8	WEST BLACK SEA (Amasya, Çankırı, Çorum, Kastamonu, Samsun, Sinop, Tokat, Zonguldak, Bartın, Karabük)
TR9	EAST BLACK SEA (Artvin, Giresun, Gümüşhane, Ordu, Rize, Trabzon)
TRA	NORTH ANATOLIA (Ağrı, Erzincan, Erzurum, Kars, Bayburt, Ardahan, Iğdır)
TRB	MIDDLE EAST ANATOLIA (Bingöl, Bitlis, Elazığ, Hakkari, Malatya, Muş, Tunceli, Van)
TRC	SOUTHEAST ANATOLIA (Adıyaman, Diyarbakır, Gaziantep, Mardin, Siirt, Sanliurfa, Batman, Sirnak, Kilis)

The sample volume for the survey has been calculated as 12,394 by taking into account the estimation levels and the 2013 COSI application loss rate.

The following formula is used in the calculation of sample volume.

$$n = \frac{t^2 pq}{d^2} * deff * h$$

n = total sample volume

t = 1.96 (value in student-t table at 0.95 significance level)

α = acceptable risk (probability of error = 0.05)

p = the ratio of units with a certain characteristic (prevalence frequency is 0.5)

q = 1 - p

d = amount of absolute precision (0.05)

Deff = 1.2 (design effect proposed in COSI document)

h = number of layers (taken as 12 regions*gender = 24.)

The calculated sample volume is distributed to the regions by means of compromised distribution. By this distribution, it is aimed to provide the optimum distribution that can produce the desired level of estimations. Layout distribution in the compromised distribution method is as follows:

$$nh = \tilde{n} [K^2 + (1- K^2) Mh^2]^{1/2}$$

\tilde{n} = average sample volume observed

$Mh = Nh / (N / H) = H.Wh$

K = Relative importance

$n_{min} = K.\tilde{n}$ smallest sample volume

h = Number of layers

After the distribution of the sample volume by region, it was planned to select a class from each school in the sample/paradigm, so the average number of students per branch was found in the region. The total number of schools (585 schools) to be chosen was reached by dividing the sample volume per region by the average number of students per class in the district. The choice of sample schools was made proportionally with probability proportional to size (PPS) in the region. The number of students in the relevant age group of the schools was taken as the size indicator.

Although the target sample size is 12394, in accordance with the average number of students in the school following the sample selection, it is estimated that 14655 students from 585 sample schools will be reached. In the post-questionnaire application, the relative weights were re-calculated through reflecting to the weights the unresponsiveness caused in certain cases by some students not being present at school etc., thus correcting the unresponsiveness. In this way, different weights were calculated for each school and the total number of estimations was reached by attaching the appropriate weight ratio to the information contained within the student response forms in the schools.

Table 3-2 shows the distribution of the sampling schools according to the NUTS1 Regions. One school each from Istanbul, Tokat, Konya, Van and Erzurum were excluded from the analysis due to the problems in the collection of school data or the lack of data. Analyzes were conducted over 580 schools with appropriate data. The percentages of responses of the questionnaires are shown in Table 3-3. Table 3-4 gives the numbers of boys and girls reached during the survey and their distribution according to the participation status.

Table 3-2. The Distribution of the Number of Schools Determined as Sample by NUTS Regions

		Number of Schools Determined by the Turkish Statistical Institute
TR1	Istanbul	51
TR2	West Marmara	37
TR3	Aegean	54
TR4	East Marmara	43
TR5	West Anatolia	44
TR6	Mediterranean	58
TR7	Central Anatolia	44
TR8	West Black Sea	48
TR9	East Black Sea	40
TRA	Northeast Anatolia	53
TRB	Middle East Anatolia	48
TRC	Southeast Anatolia	65
Total		585

3.4. Data Collection Stage - Data Collection Forms

3.4.1. Data Collection Forms

In the COSI survey conducted by the World Health Organization European Region, data collection forms have been standardized to allow international comparisons. Examiner, Family and School data collection forms prepared by WHO consist of two parts which are mandatory and voluntary. In the study of "Turkey Childhood Obesity Surveillance Initiative", mandatory and voluntary parts of the data collection forms were applied together by the Turkey working group. (WHO European Childhood Obesity Surveillance Initiative Manual of Data Collection Procedures, Version October 2015). Data collection forms have been translated into Turkish, preliminary tests have been made to bring them in compliance with the society, no changes have been made to question numbers and options to enable the international comparison of data sets. Questionnaires issued for Turkey were prepared in accordance with optical coding and data collection guidelines were prepared for each form. The three data collection forms below have been printed on the optical coding form.

School Registration Form: It is the form used to assess the opportunities and practices of nutrition and physical activity in schools. It has been filled by the examiner and/or together with the school official when the school was first visited for the interviews in accordance with the survey program or within the day when the anthropometric measurements were conducted.

Family Registration Form (Volunteer): It is filled by the students' families. The family registration forms have been delivered to the family in a closed envelope together with the survey filling instructions when the school was first visited for the interview. A consent form has been attached to the front side of the envelope for consent on the participation of their children in the survey. The forms were filled by the families and delivered to the students in envelopes and then they were picked up from the school when the anthropometric measurements of the students were taken.

Student Registration Form: It is the form used by field teams to perform anthropometric measurements of students at school and to process data. A separate form has been used for each student who has been given consent by their families. The trained provincial field survey team (doctors, dietitians, nurses, health officials and child development experts) filled in the information regarding the students in accordance with the data collection schedule and recorded the anthropometric measurements of the students.

3.4.2. Provincial Survey Teams

The examiners who will collect data on the field are composed of staff of the provincial directorates of health, sections of non-communicable diseases and community health centers. Each team consists of two people, one of whom is a responsible dietitian. A total of 115 field teams were formed within the scope of the survey.

"COSI-TUR 2016 Field Examiners Training" was given to the provincial field team leaders who took part in the survey in Ankara between November 29 and December 1, 2016 in order to provide national and international standardization training during data collection. Provincial field team leaders have identified and trained "assistant examiners" for themselves to assist during the data collection phase of the survey. During the study, anthropometric measurements were conducted by field team leaders trained by consultants. The assistant examiner has provided convenience in the work environment by performing tasks such as taking the students into the classroom and preparing them for the measurements.

3.4.3. Field Coordinators and Field Teams

The majority of the examiners who collect data from the field are dietitians are working in provincial directorates of health, sections of non-communicable diseases, community health centers, also include the nurses, midwives and child development experts. Each team consists of a responsible dietitian and a deputy. In accordance with the sample taken from TUIK (Turkish Statistics Institute), there are 115 Field Teams, each consisting of two persons (230 persons) according to the school numbers in the provinces (for example there are 8 field teams for Istanbul, 2 field teams for Kars).

3.5. Standardization

3.5.1. Training of Provincial Field Survey Teams and Data Collection Standardization

During the training meeting held in Ankara between November 29 and December 1, 2016, theoretical and practical training was given to ensure the standardization of the examiners that were determined from the provinces. The training of examiners was carried out by the consultants in the format determined by the World Health Organization, with the supervision and support of the consultants. The training was supported with guidelines and directions prepared to fill out the forms. The field survey teams were made to perform the data collection forms application and coding practices. The questionnaires that were filled out were checked by the consultants and the mistakes that were found to be made by the examiners were corrected through reapplication.

3.5.2. Ensuring Standardization among Observers

In order to ensure that the anthropometric measurement was performed to the maximum extent and accuracy by all examiner, height and weight measurement practices were conducted in schools where students in the survey age group were present. During the training, preliminary studies were done with adults to measure height and body weight, and training was conducted to make standardized measurements accurately and precisely. The preliminary application was made in two primary schools in Ankara (MEB Sarar and Kurtuluş Primary Schools) which are not survey schools. Each examiner, under the supervision of counselor and educator, repeated the measurements of three students from the second grade of primary school two times.

Following the theoretical anthropometric measurement training, the examiner undertook a practical anthropometric measurement. The same person's measurement was also taken by an expert and the examiner and the expert assessed the results of the anthropometric measurements together. In case of difference between two measurements, this application practice was continued until there was no difference.

During practical applications, 2 measurements were made and recorded for every adult and child by examiners. After completing all application practices, the measurements were assessed by the consultants and the correlation coefficient between the measurements was calculated. Correlation coefficient between the first and second measures of the examiners was determined to be 0.98.

3.5.3. Measuring Instruments and Calibration

In line with the view of WHO, the body weight scales with code SECA 813 and the portable height measurement instrument with code SECA 213 as well as the WHO COSI survey standard data collection forms were used by the Turkey project group in all survey groups.

During the course of the survey, the examiners were introduced to the anthropometric measurements, the calibration method was taught, and the application standardization of the measuring instruments and calibration materials to be used during the application was provided. Scales measuring body weight and instruments measuring height were checked and calibrated at every twenty five measurements, and the examiners were trained in calibrating techniques. All of the controls of the scales conducted by the examiners were recorded on the calibration form by writing the date of the calibration control, the process continued by marking that the calibration was implemented.

Calibration of the body weight scale; Not later than one minute after opening the body weight scale, the 0.0 value is read on the solar screen and the calibration form is marked. Calibration of the body weight scale was performed by the entire study group using 5 liters water-filled bottle of the same brand. The calibration was repeated on the morning of each measurement day and the calibration results were recorded.

Calibration of the height measurement device; The height measurement device was checked to see whether or not once the head and foot board pointed to the minimum value on the device when they were set to the minimum value. The tailor meter of which the height was known (100 cm) was positioned in a manner where it went from top to bottom and set up so that the head board made contact with the meter itself, the height value was then written on the calibration form.

3.5.4. Standardization of Application Conditions

The field work of this survey was completed between November 2016 and February 2017. Empty classrooms or private rooms in the schools were used in the measurements made during field data collection used. The measurements were taken between morning and noon whenever possible, however if the class which was chosen as a sample had appeared in a group which received training in the afternoon, then the measurements were taken following the first lesson.

Body weight was measured in kilograms and recorded with a sensitivity of 100 grams. The scale was placed horizontally on a flat, hard surface and all of the clothing which provided extra weight on the children (jacket, cardigan, coat etc.) as well as wallets, mobile phones, key-chains, belts or any other objects were removed, thus taking into consideration the sensitivities of the child, the process was explained to the child, the child was made to stand upright on the middle of the scale and the measurement was taken.

In order for the height measurement to be taken, the height measurement board was mounted at the location where a flat surface and vertical surface met (intersected) thus ensuring that the vertical angle presented a triangle shape and ensuring that the vertical surface was utilized. The vertical and horizontal pieces were connected in a manner which presented the correct angle, with the mobile piece being used as the head board and the recording of the height was done so in centimeters with a closeness ratio of 0.1 cm.

3.5.5. Number of Schools and Children Reached

The percentages of the respondents to the questionnaires are given in Table 3-3 and the numbers of the boys and girls reached in the survey as well as their participation status are given in Table 3-4.

Table 3-3. Number of Questionnaires Answered in the Field and Included in the Analysis

Question Forms	Number of Samples	Number of Questionnaires Answered		Number of Surveys Included in the Analysis	
		n	%	n	%
School	585	585	100.0	580	99.1
Family	14144	11876	84.0	11,669 *	82.5
Student	14144	11732	82.9	11,523	81.5

* There are 151 family questionnaires for which no school code is specified.

Table 3-4. Number of Boys and Girls Reached During the Survey and Participating in the Survey

	Girls		Boys		Total	
	n	*%	n	*%	n	*%
Participated **	5744	82.6	5988	83.2	11732	82.9
Not present	600	8.6	560	7.8	1160	8.2
Not permitted by his/her family	541	7.8	573	8.0	1114	7.9
Not want to participate	66	1.0	72	1.0	138	1.0
Total	6951	100.0	7193	100.0	14144	100.0

* Column percentage

** 8 students with unknown genders were distributed to girls and boys groups as 4 persons each, but they were excluded from the analysis.

COSI-TUR 2016 Survey has been carried out with the participation of 11732 students from 585 primary schools in 79 provinces (excluding Şırnak and Hakkari), in cooperation with the Republic of Turkey Ministry of National Education in the first half of the 2016-2017 school year, in accordance with sample size in Turkey, 12 NUTS Regions, based on male-female genders.

3.6. Data Processing and Analysis

After completion of the data collection phase at each school, all data collection forms were sent to the central team within 10 days following the data collection by the field teams. Data collection forms from the central team have been transferred to the electronic medium using optical character recognition technology for electronic coding of the optical coding forms. Electronically transferred data sets were transferred one by one to MS Excel files. Archiving of data collection forms was carried out by the Ministry of Health working group while the creation of variables, clearing of the data sets, implementation of the controls, configuration of the coding and backing up the data set were undertaken by the consultant who also acted as the data manager.

Table 3-5 shows the distribution of the schools in the sample by NUTS1 Regions. One each school from Istanbul, Tokat, Konya, Van and Erzurum provinces were excluded from the analysis due to the problems in the collection of school data or the lack of data. Analyzes were conducted over 580 schools with appropriate data.

Table 3-5. The Distribution of the Number of Schools Determined as Sample and Included in Analysis by Regions

Region	Number of Schools Included in the TUIK Sample	Number of Schools Included in the Analysis
Istanbul	51	50
West Marmara	37	37
Aegean	54	54
East Marmara	43	43
West Anatolia	44	43
Mediterranean	58	58
Central Anatolia	44	44
West Black Sea	48	47
East Black Sea	40	40
Northeast Anatolia	53	52
Middle East Anatolia	48	47
Southeast Anatolia	65	65
Total	585	580

The Ministry of Health Working Group has created databases and data cleanups for each Excel data set in SPSS 23. Assessments were made on the quality of the data, the examiner's carefully filling in the forms, and the correct and accurate coding of the supervisor's forms. Verification of validation intervals and consistency checks of the data were implemented. Checks for inconsistent and incomplete data as well as data cleaning, validation (such as extreme-outlier values, data input errors and out of range values) and backup of data were undertaken by the consultant who also acted as the data manager.

The unresponsiveness rate caused by the fact that some students were not present at the school during the data collection phase in the field was taken into account through re-calculating the weights based on this development and making the necessary adjustments before the analysis phase. In this way, different weights were calculated for each school, and the total number of estimations was reached by attaching the appropriate weight ratio to the information contained within the student response forms in the schools.

3.6.1. Calculation of Age Groups

Students who were reached during the study and whose age was below 72 months or higher than 120 months were not included in the analysis. Students whose age groups were suitable but according to the WHO criteria who had a Weight-for-age Z-score < -6 SD and/or $> +5$ SD, and with a Height-for-age Z-score < -6 SD and / or $> +6$ SD as well as a BMI Z-score of < -5 SD and / or $> +5$ SD were excluded from the analysis.

Variables were analyzed by the SPSS Complex Sample menu, taking into account the cluster effect of schools according to gender and NUTS1 regions. Thus, the confidence intervals for the calculated frequencies were obtained in a manner appropriate to the nature of the multistage cluster sample.

Prior to the analysis of the anthropometric measurements, the net weights were determined by deducting the tare weight of the clothes that the students wore during the measurement. In order to determine the tare weight of the clothes that the students wore during measurement, the clothes were coded by the examiners and the weight of these clothes were determined through measurement by the survey team with the average weight for underwear 120 gr., sports clothes (t-shirt worn under the track suit) 260 gr, thin clothes (apron) 275 gr. and thick clothes (jeans, sweater) 560 gr., thus allowing the analysis to be conducted based on these average weights.

Weight-for-age (WAZ), Height-for-age (HAZ) and the body mass index (BMI) for age Z-scores were calculated. WHO ANTRO Plus (WHO AntroPlus for Personal Computers manual: Software for assessing growth of the ehav's children and adolescents, Geneva: WHO, 2009. <http://www.who.int/growthref/tools/en/>, access date: 24 July) program was used for the calculation of the scores. The measured students were classified as underweight, normal weight, overweight and obese according to BMI-for-age Z-score (BAZ) values. The frequency levels of being classified as underweight according to the Weight-for-age Z-score (WAZ) as well as being classified as stunting according to the Height-for-age Z-score (HAZ) were calculated.

The weight for age, height and body mass index Z-scores classification and intersection points used in the assessment of the growth of children have been provided in Table 3-6.

Table 3-6. Z-score Classification of Anthropometric Measurements (WHO 2007)

Z-score	Height for Age ^a	Weight for Age ^b	Body Mass Index
> 2.00			Obese
1.01 - 2.00			Overweight
-2-1	Normal	Normal	Normal
<-2.00	Stunting	Underweight	Underweight

^a Tallness can be a problem in very rare circumstances. If there is a case of excessive tallness, the child should be assessed according to endocrine causes.

^b A child in this range has a growth problem, but it is more appropriate to assess it with BMI.

3.7. Ethical Issues

The approval of the Ministry of National Education and the approval of the Ethics Committee of Ministry of Health Keçiören Training and Survey Hospital have been taken for the survey to be carried out in the schools.

During the data collection phase of the study, the examiners;

- have obtained appointments from the school principals by conducting a preliminary meeting in which the objectives of the survey were explained and information was provided on the questionnaire to be applied.
- Received "Informed Written Consent Forms" from the parents.
- learned and recorded the reasons of the families, who have not consented their children to take part in the survey, why they did not allow their children to take part.
- Took care of confidentiality during the anthropometric measurements of the children, the measurements were made in a private room and alone. During the measurement, the field team leader and assistant examiner were present together.
- The anthropometric measurements of the students were made with the lightest clothes available on them.
- The names of the children have not been taken, the student's personal identification information have not been included in the form or in the electronic medium.

4. FINDINGS

Other than the tables about school characteristics, anthropometric measurements and percentages and averages in the tables related to the data obtained from family form are weighted analysis results, while the figures are given as unweighted.

4.1. THE DISTRIBUTIONS OF SCHOOL CHARACTERISTICS

School characteristics were mostly obtained from interviews with principals (92.4%). Information regarding eight schools was obtained from school officials other than principals and teachers (Table 4-1).

Table 4-1. The Duties of Individuals Responding the School Form in the Survey

School Official Interviewed	n	%
Manager	536	92.4
Teacher	36	6.2
Other	8	1.4
Total	580	100.0

99.0% of the schools have outdoor playground areas for students. 83.4% of the schools do not have an indoor gym.

In extreme weather conditions, the children are not allowed to play outside in 79.8% of the schools. 10.7% of schools do not allow to use outdoor playground areas outside of school hours. 83.4% of the schools do not have an indoor gym.

23.3% of the schools organize sports/physical activities apart from school hours at least once a week for all classes. Percentage of schools that do not organize any sports/physical activities outside school hours is 59.7%.

All children take shuttles to go to the schools in 23.3% of the schools. The percentage of schools where no school service is available is 34.3%. In other schools, there is a shuttle for some classes (10.9%), those who reside in rural area (5.5%) and far away (26.0%).

The safety score of routes for walking or riding a bicycle to and from school for children was calculated by the relevant official with whom an interview was made at the school. Safety score ranges between 1 - 10. The higher score means less safety, namely the lower the score, the higher the safety. The average safety score set by school administrators was found to be "5.8".

In 37.9% of the schools, the children have access to drinking water free of charge. In 46.9% of the schools, children have access to drinking water for a certain fee. 15.2% of the schools do not have drinking water.

In 17.6% of the schools, milk, yoghurt and ayran, in 3.4%, fresh fruits and in 2.6%, fresh vegetables are available free of charge. In 58.3% of the schools, milk, yoghurt and ayran, in 32.4% fresh fruits and in 7.6% fresh vegetables are available for a certain fee.

70.2% of the schools have a canteen and 10.0% have a buffet / cafeteria. During the survey, it was observed that three schools had automatic sales machines.

4.2. CHARACTERISTICS OF FAMILIES AND THEIR OPINIONS ON THEIR CHILDREN'S LIFESTYLE

For the questionnaires which contain the socio-demographic characteristics of the families and their opinions on their children's lifestyles, two third of such questionnaires (68.7%) were answered by mothers and approximately one third of the questionnaires (27.7%) were answered by fathers.

4.2.1. General Characteristics of the Family

The average household population is 5.1 people in Turkey. In the Northeast, Middle East and Southeast Anatolian Regions, the number of average individuals who are living in the household is statistically and significantly higher compared to other regions of the country. The average number of people under the age of 18 living in the household is 2.6. In the Middle East and Southeast Anatolia Regions, the number of people living under the age of 18 is statistically higher than the country average and other regions.

Table 4-2. The Distribution of Education Level of Mothers by Regions

NUTS	Education Level of Mothers	%	95% Confidence interval			Unweighted Number
			Standard Error	Lower Value	Upper Value	
Turkey	Illiterate	9.4	0.8	8.0	11.0	1008
	Literate	3.6	0.3	3.0	4.2	370
	Primary School	35.6	1.0	33.6	37.6	4059
	Secondary School	17.8	0.6	16.6	19.1	2056
	High School	20.7	0.7	19.3	22.1	2425
	Higher Education	12.9	0.9	11.3	14.8	1434
	Total	100.0	0.0	100.0	100.0	11352
Istanbul	Illiterate	4.7	1.0	3.1	7.0	58
	Literate	2.3	0.5	1.6	3.5	31
	Primary School	35.8	3.2	29.9	42.2	447
	Secondary School	18.6	1.6	15.6	22.1	226
	High School	23.6	2.0	19.9	27.8	256
	Higher Education	15.0	2.8	10.3	21.3	147
	Total	100.0	0.0	100.0	100.0	1165
West Marmara	Illiterate	5.6	1.4	3.3	9.1	30
	Literate	2.5	1.0	1.2	5.3	14
	Primary School	32.6	3.2	26.6	39.2	215
	Secondary School	17.7	1.9	14.2	21.8	123
	High School	24.1	2.7	19.2	29.8	170
	Higher Education	17.5	3.6	11.5	25.8	140
	Total	100.0	0.0	100.0	100.0	692
Aegean	Illiterate	5.6	1.8	2.9	10.5	54
	Literate	2.2	0.6	1.2	3.8	23
	Primary School	36.8	3.1	30.9	43.1	366
	Secondary School	17.3	2.5	12.9	22.7	173
	High School	22.9	2.5	18.4	28.0	250
	Higher Education	15.4	2.9	10.4	22.0	173
	Total	100.0	0.0	100.0	100.0	1039
East Marmara	Illiterate	4.8	1.3	2.7	8.2	41
	Literate	3.2	1.1	1.7	6.1	28
	Primary School	38.4	3.4	32.0	45.2	340
	Secondary School	16.7	1.6	13.7	20.2	148
	High School	23.3	2.3	19.1	28.0	222
	Higher Education	13.7	2.6	9.4	19.5	125
	Total	100.0	0.0	100.0	100.0	904
West Anatolia	Illiterate	3.6	0.9	2.2	6.0	26
	Literate	1.1	0.3	0.6	2.0	9
	Primary School	28.6	2.7	23.5	34.2	245
	Secondary School	18.3	1.7	15.1	22.0	166
	High School	30.7	2.7	25.7	36.2	285
	Higher Education	17.8	3.6	11.7	26.1	130
	Total	100.0	0.0	100.0	100.0	861
Mediterranean	Illiterate	7.3	1.8	4.5	11.6	84
	Literate	3.0	0.8	1.8	4.9	38
	Primary School	32.1	2.5	27.5	37.2	386
	Secondary School	20.9	2.1	17.0	25.3	242
	High School	22.2	2.0	18.5	26.5	279
	Higher Education	14.5	2.5	10.3	20.0	177
	Total	100.0	0.0	100.0	100.0	1206

Continuation of Table 4-2			95% Confidence Interval			
NUTS	Level of Education of Mother	%	Standard Error	Lower Value	Upper Value	Unweighted Number
Central Anatolia	Illiterate	2.5	1.1	1.1	6.0	24
	Literate	1.0	0.4	0.5	2.2	9
	Primary School	40.6	4.0	33.0	48.6	340
	Secondary / primary	24.6	2.6	19.9	30.0	218
	High School	22.8	3.2	17.1	29.6	213
	Higher Education	8.5	2.4	4.8	14.6	77
	Total	100.0	0.0	100.0	100.0	881
West Black Sea	Illiterate	2.2	0.9	1.0	5.0	21
	Literate	1.1	0.4	0.5	2.3	11
	Primary School	39.6	3.3	33.4	46.2	330
	Secondary / primary	19.6	2.3	15.5	24.5	171
	High School	22.3	2.0	18.6	26.6	207
	Higher Education	15.1	2.8	10.4	21.5	144
	Total	100.0	0.0	100.0	100.0	884
East Black Sea	Illiterate	1.8	0.6	1.0	3.4	12
	Literate	1.9	0.7	0.9	3.7	11
	Primary School	36.2	3.4	29.9	43.1	236
	Secondary / primary	22.6	2.1	18.8	27.1	150
	High School	24.3	2.6	19.4	29.8	172
	Higher Education	13.1	2.4	9.1	18.6	92
	Total	100.0	0.0	100.0	100.0	673
Northeast Anatolia	Illiterate	11.6	2.1	8.1	16.3	97
	Literate	3.6	0.9	2.2	6.0	31
	Primary School	43.5	2.1	39.4	47.7	363
	Secondary / primary	17.5	1.5	14.8	20.6	155
	High School	16.2	1.8	12.9	20.1	141
	Higher Education	7.6	1.7	4.9	11.7	72
	Total	100.0	0.0	100.0	100.0	859
Middle East Anatolia	Illiterate	21.9	3.1	16.4	28.7	211
	Literate	6.9	1.0	5.1	9.2	58
	Primary School	36.9	2.7	31.8	42.3	311
	Secondary / primary	13.0	1.4	10.4	16.1	105
	High School	13.3	2.4	9.3	18.7	123
	Higher Education	8.0	2.9	3.9	15.8	63
	Total	100.0	0.0	100.0	100.0	871
Southeast Anatolia	Illiterate	27.1	4.1	19.8	35.9	350
	Literate	9.2	1.5	6.6	12.6	107
	Primary School	35.4	3.1	29.5	41.7	480
	Secondary / primary	13.1	1.7	10.2	16.7	179
	High School	8.2	1.5	5.7	11.8	107
	Higher Education	7.0	2.3	3.7	13.0	94
	Total	100.0	0.0	100.0	100.0	1317

The percentage of illiterate mother was found as 9.4% in this study, this percentage was 11.5% in Northeast Anatolia Region, 21.9% in the Middle East Anatolia Region and 27% in Southeast Anatolia Region. The percentage of mothers who are only literate is 3.6%, while it increases to 6.9% in the Middle East Anatolia and to 9.2% in Southeast Anatolia Region. **(Table 4-2)**

Education levels of fathers are higher than mothers. Among fathers, the percentage of illiteracy is 2.0% and only literacy is 2.0%. However, these percentages are found as 4.6% and 2.4% in Middle East Anatolian Region and 5.9% and 5.7% in the Southeast Anatolian Region.

The opinions of the families about their economic situation were learned with the question " Including all your household earnings per month, please tick the box which best represents your household situation?". 25.5% of the families state that they easily pass the month with their earnings, 32.3% state that they pass the month without serious problems with their earnings, 29.3% state that they have trouble meeting the ends the month with their earnings, 12.8% state that they barely meet the ends in the month with their earnings.

82.0% of the mothers do not work in an income-generating business. The large majority of this group consists of housewives (78.7%). 3.3% of the mothers stated that they are unemployed.

12.8% of fathers are capable of working and unemployed, 2.4% of them are not capable of working and unemployed and 2.1% of them are retired. 17.3% of fathers are not employed and 82.7% still work in income generating jobs.

57.4% of the children live in apartment houses and 35.6% of them live in detached houses. 86.9% of the children live in apartment houses in Istanbul while this percentage is 81.0% in West Anatolian Region. In general, 35.6% of the children live in detached houses in Turkey, this percentage is 46.8% in Northern Anatolian Region, 48.4% in Middle East Region and 49.3% in Southeast Anatolian Region.

59.6% of the families are landlords and 32.3% of them rent their houses. The percentage of landlords varies from 54.0% to 68.3% and the percentage of the families who rent their houses varies from 24.1% to 38.7%.

4.2.2. Children's Birth Stories and Their State of Receiving Breast milk

The birth weights of the children have been learned according to the statements of their families. The median birth weight of the children was calculated as 3,240 gr and the average value was calculated as 3,179.5 gr. The median birth weight was lowest in Northeast Anatolian Region (3,055 gr) and highest in East Marmara and East Black Sea Regions (3,300 gr).

80.9% of the parents stated that their children were born at the normal time, 12.5% of them did not born on time. Birth percentage of children on time varies from 74.8% to 86.0% per regions.

95.5% of the families stated that their children were breastfed. Among the children, the percentage of children not breastfed is 3.6%. The percentage of breastfeeding among the regions varies between 94.3% and 96.8%. The average duration of exclusively breastfeeding for children is 4.5 months. Breastfeeding duration for children, including supplementary food and other fluids, is found as an average of 15.6 months. The average duration of breastfeeding within the scope of Turkey is 15.6 months.

4.2.3. Children's Physical Activity Levels

According to the statements of families, 53.2% of the children go to schools at a distance not more than one kilometer away from their homes and 25.3% go to schools at a distance around 1-2 km away from their homes. According to the regions, the percentage of those who reside within maximum one kilometer distance to schools varies from 42.5% to 58.7%.

The percentage of children who travel on foot or by bicycle is 59.3%. 32.6% of the children go to the school by motorised vehicles. Going by motorised vehicles was the highest in the West Marmara Region (38.5%), and the lowest in Central Anatolia (26.3%).

The parents rated the level of safety of school route by walking or cycling on the basis of 10 points as "1 very safe" and "10 very unsafe". Average point across the country is 6.6.

Only 17.0% of the families in Turkey have declared that their children are a member of a dance or sports course. 6.6% of the member children do not participate in any activity on week days, 58.1% of them participate in this activity 1-2 hours a week. 35.4% of the children participate in such activities for 3 hours or more per week.

According to the statements of the parents, 9.5% of the children do not play any games on weekdays. 19.9% of children play less than one hour a day and 29.7% play an hour a day. 40.9% of children play 2 hours a day and more.

According to the statements of the families, 2.9% of the children do not play at the weekends. 8.8% of children play less than one hour a day and 12.1% play an hour a day. 76.2% of the children play 2 hours a day and more.

According to the statements of families, nearly half of the children (47.9%) are spending 2 hours or more a day on weekdays during the school period. This percentage is 52.6% on weekends.

According to the statements of the families, 21.3% of the children never spend time watching TV or using electronic devices on week days and this rate is 12.2% for weekends. 36.2% of the children spare more than 2 hours watching TV or using electronic devices on week days, however this percentage increases to 69.9% at the weekends.

According to the statements of the families, students sleep on average at 21:32 in the evening and wake up at 08:07 in the morning. The average sleep duration is 10.3 hours.

4.2.4. Nutritional Behaviors of Children According to Statements of Their Families

76.5% of children have breakfast every day, percentage of children who have breakfast 1-3 days a week is 12.1% and the percentage of those who have for 4-6 days is 7.7%.

According to the statements of the families, 50.4% of the children eat fruit, 13.0% fresh vegetables and 6.8% fresh squeezed fruit juice. It is stated that 18.9% of children consume meat less than once a week and 6.1% consume no meat at all. It is stated that 14.6% of the children do not consume any fish. 21.0 % of the children consume cheese less than once a week or never.

Table 4-3 Children's Consumption Frequency of Some Foods According to Statements of Their Families (%)

	Never	Less than once a week	Same Days (1-3 Days)	Most Days (4-6 days)	Everyday	Unweighted Number of Respondents
	%	%	%	%	%	n
Meat	6.1	18.9	41.8	26.3	7.0	10715
Fish	14.6	40.3	33.4	9.5	2.2	10637
Cheese	13.4	7.6	20.1	19.1	39.8	10649
Low-fat/ semi-fat milk	37.0	13.5	21.6	13.2	14.7	10434
Whole-fat milk	23.0	12.8	23.5	17.8	22.9	10367
Yoghurt, cacik, ayran	4.9	5.7	22.1	30.0	37.3	10636
Kefir	85.3	5.7	5.3	2.1	1.7	9952
Milk pudding/ ready-made milk	20.5	32.6	31.0	11.1	4.7	10560
Fresh Fruits	1.9	4.6	18.5	24.5	50.4	10355
Vegetables (except potatoes)	6.7	13.2	41.8	25.3	13.0	10355
Fresh-squeezed fruit juice	29.9	22.7	29.9	10.7	6.8	10319
100% fruit juice (ready)	21.1	20.7	29.6	14.1	14.4	10285
Pizza, lahmacun (pancake with spicy meat filling), hamburger, hot dog/ sausage sandwich	12.7	38.7	33.0	11.8	3.8	10785
Salty snacks (potato, chips, corn chips, appetizers)	14.5	34.6	29.6	13.7	7.6	10679
Biscuits, cakes, cookies	3.5	20.0	39.2	25.3	11.9	10425
Sugar bar, chocolate	6.1	24.9	36.3	20.2	12.5	10587
Flavored Milk	36.2	18.6	23.9	11.7	9.6	10413
Diet or light drinks (excluding milk)	88.6	4.6	4.2	1.4	1.2	10347
Sugar-containing beverage	25.2	28.2	28.2	10.7	7.7	10351

24.4% of the families think their children are underweight, 68.6% normal weight, 6.4% little overweight and 0.6% extremely overweight.

4.2.5. Characteristics Regarding Family Health

Respectively, hypertension, diabetes mellitus and elevated cholesterol levels were observed among the family members as determined by health personnel. It was declared in Turkey that there is a hypertensive patient in the family of 17.6% of the children who are at the 2nd grade and there is a diabetes patient in the family of 14.9% of the same age group children. The percentage of family members with high blood cholesterol is 16.6%.

The average length of the children's mothers is 162.4 cm and their average weight is 68.2 kg based on their declaration. According to the Body Mass Index (BMI) values calculated according to the statements, 35.2% of the mothers are categorized as overweight and 16.2% are categorized as obese. The average body weight of the fathers is 81.8 kg and height is 174.2 cm according to the statements. Based on declarations, the frequency of overweight of fathers is 48.9% and frequency of obesity is 18.4% by BMI.

4.3 ANTHROPOMETRIC MEASUREMENT RESULTS

Table 4-4. The Distribution by Gender of Students who were Anthropometrically Measured in the Regions

NUTS	Gender	%	Standard Error	95% Confidence interval		Unweighted Number
				Lower Value	Upper Value	
Turkey	Boys	50.7	0.5	49.6	51.7	5871
	Girls	49.3	0.5	48.3	50.4	5652
	Total	100.0	0.0	100.0	100.0	11523
Istanbul	Boys	50.2	1.4	47.5	53.0	556
	Girls	49.8	1.4	47.0	52.5	553
	Total	100.0	0.0	100.0	100.0	1109
West Marmara	Boys	48.9	1.9	45.1	52.7	345
	Girls	51.1	1.9	47.3	54.9	343
	Total	100.0	0.0	100.0	100.0	688
Aegean	Boys	53.5	1.7	50.2	56.7	528
	Girls	46.5	1.7	43.3	49.8	469
	Total	100.0	0.0	100.0	100.0	997
East Marmara	Boys	45.3	1.8	41.8	48.8	411
	Girls	54.7	1.8	51.2	58.2	463
	Total	100.0	0.0	100.0	100.0	874
West Anatolia	Boys	49.6	1.6	46.4	52.9	429
	Girls	50.4	1.6	47.1	53.6	427
	Total	100.0	0.0	100.0	100.0	856
Mediterranean	Boys	48.3	1.6	45.2	51.3	597
	Girls	51.7	1.6	48.7	54.8	616
	Total	100.0	0.0	100.0	100.0	1213
Central Anatolia	Boys	52.6	1.4	49.9	55.4	471
	Girls	47.4	1.4	44.6	50.1	427
	Total	100.0	0.0	100.0	100.0	898
West Black Sea	Boys	49.6	1.8	46.0	53.2	447
	Girls	50.4	1.8	46.8	54.0	432
	Total	100.0	0.0	100.0	100.0	879
East Black Sea	Boys	51.5	2.0	47.4	55.5	371
	Girls	48.5	2.0	44.5	52.6	347
	Total	100.0	0.0	100.0	100.0	718
Northeast Anatolia	Boys	50.2	1.9	46.4	53.9	454
	Girls	49.8	1.9	46.1	53.6	444
	Total	100.0	0.0	100.0	100.0	898
Middle East Anatolia	Boys	50.9	2.0	46.9	54.9	475
	Girls	49.1	2.0	45.1	53.1	434
	Total	100.0	0.0	100.0	100.0	909
Southeast Anatolia	Boys	54.7	1.5	51.8	57.5	787
	Girls	45.3	1.5	42.5	48.2	697
	Total	100.0	0.0	100.0	100.0	1484

50.7% of the total 11,523 students who are made valid anthropometrical measurements are boys. The percentage of boys regarding the anthropometric measurements is the lowest with 45.3% in the East Marmara Region and the highest in the Southeast Anatolia Region (54.7%). (Table 4-4)

Table 4-5. The Distribution by Age Group of Students who were Anthropometrically Measured in the Regions

NUTS	Age Groups	%	Standard Error	95% Confidence interval		Unweighted Number
				Lower Value	Upper Value	
Turkey	6 years-old	13.9	0.6	12.8	15.1	1517
	7 years-old	79.7	0.6	78.4	80.9	9275
	8 years-old	5.9	0.3	5.3	6.5	683
	9 years-old	0.5	0.1	0.4	0.7	48
	Total	100.0	0.0	100.0	100.0	11523
Istanbul	6 years-old	10.9	1.0	9.0	13.0	128
	7 years-old	83.9	1.1	81.7	85.9	926
	8 years-old	4.6	0.7	3.3	6.2	47
	9 years-old	0.7	0.2	0.3	1.4	8
	Total	100.0	0.0	100.0	100.0	1109
West Marmara	6 years-old	9.0	2.6	5.1	15.5	40
	7 years-old	83.5	2.7	77.6	88.2	595
	8 years-old	7.3	1.3	5.1	10.4	52
	9 years-old	0.1	0.1	0.0	0.8	1
	Total	100.0	0.0	100.0	100.0	688
Aegean	6 years-old	8.6	1.8	5.8	12.8	74
	7 years-old	82.4	2.4	77.2	86.6	840
	8 years-old	8.7	1.4	6.3	12.0	81
	9 years-old	0.2	0.2	0.1	1.1	2
	Total	100.0	0.0	100.0	100.0	997
East Marmara	6 years-old	11.7	1.6	8.9	15.2	97
	7 years-old	82.5	1.8	78.8	85.7	722
	8 years-old	5.6	0.9	4.1	7.6	53
	9 years-old	0.2	0.1	0.1	0.8	2
	Total	100.0	0.0	100.0	100.0	874
West Anatolia	6 years-old	9.2	1.4	6.8	12.4	72
	7 years-old	87.2	1.5	83.9	90.0	753
	8 years-old	3.3	0.7	2.2	4.9	29
	9 years-old	0.3	0.2	0.1	1.0	2
	Total	100.0	0.0	100.0	100.0	856
Mediterranean	6 years-old	11.2	2.0	7.8	15.8	115
	7 years-old	80.6	2.0	76.3	84.3	998
	8 years-old	7.8	1.0	6.0	10.1	95
	9 years-old	0.4	0.2	0.2	1.0	5
	Total	100.0	0.0	100.0	100.0	1213

Continuation of Table 4-5			95% Confidence Interval			
NUTS	Age Groups	%	Standard Error	Lower Value	Upper Value	Unweighted Number
Central Anatolia	6 years-old	12.1	2.2	8.4	17.2	95
	7 years-old	81.7	2.1	77.3	85.4	745
	8 years-old	6.0	0.8	4.6	7.9	57
	9 years-old	0.1	0.1	0.0	1.0	1
	Total	100.0	0.0	100.0	100.0	898
West Black Sea	6 years-old	10.6	1.9	7.4	14.9	89
	7 years-old	84.3	2.0	79.8	87.9	745
	8 years-old	4.9	0.8	3.5	6.8	42
	9 years-old	0.3	0.2	0.1	0.8	3
	Total	100.0	0.0	100.0	100.0	879
East Black Sea	6 years-old	13.0	3.0	8.1	20.2	78
	7 years-old	82.6	2.9	76.1	87.7	603
	8 years-old	4.1	0.8	2.9	6.0	35
	9 years-old	0.3	0.3	0.0	1.9	2
	Total	100.0	0.0	100.0	100.0	718
Northeast Anatolia	6 years-old	20.4	2.4	16.1	25.5	180
	7 years-old	73.2	2.4	68.3	77.7	666
	8 years-old	5.9	1.1	4.1	8.4	50
	9 years-old	0.5	0.4	0.1	2.4	2
	Total	100.0	0.0	100.0	100.0	898
Middle East Anatolia	6 years-old	24.1	2.2	20.0	28.8	209
	7 years-old	70.2	2.2	65.8	74.3	641
	8 years-old	5.4	0.9	3.8	7.5	56
	9 years-old	0.3	0.1	0.1	0.8	3
	Total	100.0	0.0	100.0	100.0	909
Southeast Anatolia	6 years-old	23.4	2.0	19.7	27.6	340
	7 years-old	69.6	2.2	65.2	73.7	1041
	8 years-old	5.7	0.8	4.3	7.6	86
	9 years-old	1.2	0.3	0.7	2.0	17
	Total	100.0	0.0	100.0	100.0	1484

Children aged 7 constitute 79.7% of total children, while the 6-years-old group constitutes 13.9% and the 8-years-old group constitutes 5.9%. (Table 4 - 5)

Table 4-6. The Distribution by BMI Z-Score Groups of Students who were Anthropometrically Measured in the Regions

NUTS	BMI Z Score Groups	%	Standard Error	95% Confidence interval		Unweighted Number
				Lower Value	Upper Value	
Turkey	Underweight	1.5	0.1	1.2	1.8	170
	Normal	74.0	0.6	72.7	75.2	8445
	Overweight	14.6	0.4	13.8	15.5	1751
	Obese	9.9	0.4	9.2	10.7	1157
	Total	100.0	0.0	100.0	100.0	11523
Istanbul	Underweight	1.7	0.5	1.0	3.1	18
	Normal	67.9	1.8	64.2	71.4	761
	Overweight	17.0	1.4	14.4	19.9	190
	Obese	13.4	1.1	11.3	15.8	140
	Total	100.0	0.0	100.0	100.0	1109
West Marmara	Underweight	1.2	0.4	0.6	2.4	10
	Normal	73.0	2.3	68.4	77.2	489
	Overweight	13.0	1.6	10.2	16.5	105
	Obese	12.8	1.8	9.7	16.6	84
	Total	100.0	0.0	100.0	100.0	688
Aegean	Underweight	1.4	0.4	0.8	2.3	14
	Normal	69.6	2.1	65.3	73.6	684
	Overweight	13.2	1.1	11.2	15.4	137
	Obese	15.9	1.6	12.9	19.4	162
	Total	100.0	0.0	100.0	100.0	997
East Marmara	Underweight	1.4	0.4	0.8	2.4	13
	Normal	69.9	2.0	66.0	73.6	621
	Overweight	19.4	1.7	16.2	23.1	156
	Obese	9.2	1.2	7.1	11.8	84
	Total	100.0	0.0	100.0	100.0	874
West Anatolia	Underweight	1.5	0.4	0.9	2.7	16
	Normal	71.3	1.8	67.7	74.6	603
	Overweight	16.8	1.2	14.6	19.2	143
	Obese	10.5	1.1	8.4	12.9	94
	Total	100.0	0.0	100.0	100.0	856
Mediterranean	Underweight	1.8	0.4	1.1	2.9	21
	Normal	74.2	1.9	70.2	77.8	883
	Overweight	14.9	1.3	12.4	17.7	195
	Obese	9.2	0.8	7.6	11.0	114
	Total	100.0	0.0	100.0	100.0	1213

Continuation of Table 4-6			95% Confidence Interval			
NUTS	BMI Z Score Groups	%	Standard Error	Lower Value	Upper Value	Unweighted Number
Central Anatolia	Underweigh	1.2	0.4	0.7	2.1	11
	Normal	73.3	2.0	69.2	77.1	643
	Overweight	15.6	1.5	13.0	18.7	149
	Obese	9.9	1.2	7.7	12.6	95
	Total	100.0	0.0	100.0	100.0	898
West Black Sea	Underweigh	0.8	0.3	0.4	1.8	7
	Normal	70.4	2.2	65.9	74.4	607
	Overweight	16.0	1.3	13.7	18.6	149
	Obese	12.8	1.4	10.3	15.8	116
	Total	100.0	0.0	100.0	100.0	879
East Black Sea	Underweigh	1.0	0.4	0.5	2.1	7
	Normal	66.9	2.2	62.5	71.0	474
	Overweight	20.2	1.8	16.9	23.8	146
	Obese	12.0	1.8	8.8	16.0	91
	Total	100.0	0.0	100.0	100.0	718
Northeast Anatolia	Underweigh	1.8	0.4	1.1	2.8	16
	Normal	79.2	1.7	75.8	82.3	700
	Overweight	13.5	1.2	11.3	16.1	127
	Obese	5.5	1.0	3.9	7.7	55
	Total	100.0	0.0	100.0	100.0	898
Middle East Anatolia	Underweigh	1.4	0.4	0.7	2.5	14
	Normal	83.8	1.7	80.2	86.9	754
	Overweight	9.4	1.1	7.5	11.7	90
	Obese	5.4	0.9	3.8	7.5	51
	Total	100.0	0.0	100.0	100.0	909
Southeast Anatolia	Underweigh	1.6	0.4	1.0	2.6	23
	Normal	83.5	1.5	80.2	86.2	1226
	Overweight	10.5	0.9	8.9	12.4	164
	Obese	4.5	0.8	3.2	6.3	71
	Total	100.0	0.0	100.0	100.0	1484

For the children of 2nd grade in Turkey, 1.5% of these are thinner than normal, 14.6% of them are overweight and 9.9% of them are obese (Table 4-6).

Table 4-7. The Distribution by BMI Z-Score Groups of Boys who were Anthropometrically Measured in the Regions

NUTS	BMI Z Score Groups	%	Standard Error	95% Confidence interval		Unweighted Number
				Lower Value	Upper Value	
Turkey	Underweight	1.7	0.2	1.3	2.1	93
	Normal	73.5	0.8	71.9	75.0	4239
	Overweight	13.6	0.5	12.6	14.6	860
	Obese	11.3	0.5	10.3	12.4	679
	Total	100.0	0.0	100.0	100.0	5871
Istanbul	Underweight	2.1	0.6	1.2	3.9	11
	Normal	69.1	2.2	64.6	73.3	380
	Overweight	13.7	1.7	10.6	17.5	83
	Obese	15.0	1.7	12.0	18.6	82
	Total	100.0	0.0	100.0	100.0	556
West Marmara	Underweight	0.9	0.4	0.3	2.2	4
	Normal	69.6	3.3	62.8	75.6	235
	Overweight	14.5	2.3	10.5	19.6	58
	Obese	15.1	2.6	10.6	20.9	48
	Total	100.0	0.0	100.0	100.0	345
Aegean	Underweight	1.7	0.6	0.9	3.3	9
	Normal	70.7	2.8	65.0	75.9	365
	Overweight	11.0	1.4	8.5	14.1	61
	Obese	16.6	2.1	12.9	21.1	93
	Total	100.0	0.0	100.0	100.0	528
East Marmara	Underweight	1.5	0.6	0.7	3.2	6
	Normal	70.8	2.9	64.8	76.2	295
	Overweight	15.7	1.9	12.3	19.9	63
	Obese	12.0	2.0	8.6	16.5	47
	Total	100.0	0.0	100.0	100.0	411
West Anatolia	Underweight	1.9	0.6	1.0	3.5	10
	Normal	70.8	2.7	65.2	75.8	298
	Overweight	15.6	1.5	12.9	18.8	68
	Obese	11.7	1.9	8.5	15.8	53
	Total	100.0	0.0	100.0	100.0	429
Mediterranean	Underweight	2.2	0.6	1.3	3.9	12
	Normal	72.3	2.3	67.5	76.6	426
	Overweight	15.0	1.7	12.1	18.6	96
	Obese	10.5	1.3	8.2	13.3	63
	Total	100.0	0.0	100.0	100.0	597

Continuation of Table 4-7				95% Confidence Interval		
NUTS	BMI Z Score Groups	%	Standard Error	Lower Value	Upper Value	Unweighted Number
Central Anatolia	Underweight	1.0	0.4	0.4	2.4	5
	Normal	71.9	2.3	67.2	76.1	331
	Overweight	15.3	1.5	12.6	18.5	76
	Obese	11.8	1.8	8.8	15.8	59
	Total	100.0	0.0	100.0	100.0	471
West Black Sea	Underweight	0.8	0.4	0.3	2.2	4
	Normal	67.7	2.7	62.2	72.8	299
	Overweight	16.0	1.6	13.0	19.5	75
	Obese	15.5	2.2	11.6	20.4	69
	Total	100.0	0.0	100.0	100.0	447
East Black Sea	Underweight	1.1	0.5	0.4	2.8	4
	Normal	67.5	3.4	60.5	73.9	245
	Overweight	18.1	2.7	13.4	24.1	71
	Obese	13.3	2.3	9.4	18.4	51
	Total	100.0	0.0	100.0	100.0	371
Northeast Anatolia	Underweight	1.4	0.6	0.7	3.1	7
	Normal	76.3	2.2	71.7	80.3	341
	Overweight	14.9	1.7	11.8	18.7	69
	Obese	7.4	1.5	5.0	10.9	37
	Total	100.0	0.0	100.0	100.0	454
Middle East Anatolia	Underweight	1.5	0.6	0.7	3.5	9
	Normal	81.5	2.4	76.2	85.8	383
	Overweight	10.0	1.8	7.0	14.0	47
	Obese	7.0	1.4	4.8	10.2	36
	Total	100.0	0.0	100.0	100.0	475
Southeast Anatolia	Underweight	1.5	0.4	0.9	2.6	12
	Normal	82.5	1.9	78.4	86.0	641
	Overweight	11.1	1.2	9.0	13.6	93
	Obese	4.9	1.1	3.2	7.5	41
	Total	100.0	0.0	100.0	100.0	787

11.3% of boys are obese and 13.6% are overweight. Overweight and obesity are assessed according to WHO criteria; accordingly, 24.9% of the boys who are at the 2nd grade in Turkey are overweight and obese. (Table 4-7)

Table 4-8. The Distribution by BMI Z-Score Groups of Boys who were Anthropometrically Measured in the Regions

NUTS-1	BMI Z Score Groups	%	Standard Error	95% Confidence interval		Unweighted Number
				Lower Value	Upper Value	
Turkey	Underweight	1.3	0.2	1.0	1.8	77
	Normal	74.5	0.8	72.8	76.0	4206
	Overweight	15.7	0.6	14.6	16.9	891
	Obese	8.5	0.5	7.6	9.4	478
	Total	100.0	0.0	100.0	100.0	5652
Istanbul	Underweight	1.3	0.6	0.5	3.3	7
	Normal	66.7	3.1	60.3	72.5	381
	Overweight	20.2	2.1	16.4	24.7	107
	Obese	11.8	1.7	8.9	15.5	58
	Total	100.0	0.0	100.0	100.0	553
West Marmara	Underweight	1.5	0.6	0.6	3.5	6
	Normal	76.4	2.7	70.7	81.2	254
	Overweight	11.6	2.1	8.0	16.5	47
	Obese	10.6	1.8	7.6	14.6	36
	Total	100.0	0.0	100.0	100.0	343
Aegean	Underweight	1.0	0.5	0.4	2.7	5
	Normal	68.3	2.7	62.8	73.3	319
	Overweight	15.7	1.7	12.7	19.2	76
	Obese	15.0	2.0	11.5	19.5	69
	Total	100.0	0.0	100.0	100.0	469
East Marmara	Underweight	1.4	0.5	0.7	2.8	7
	Normal	69.2	2.5	64.1	73.9	326
	Overweight	22.5	2.5	18.0	27.8	93
	Obese	6.9	1.4	4.6	10.1	37
	Total	100.0	0.0	100.0	100.0	463
West Anatolia	Underweight	1.1	0.4	0.5	2.4	6
	Normal	71.7	2.1	67.4	75.7	305
	Overweight	17.9	1.6	14.9	21.4	75
	Obese	9.3	1.4	6.9	12.3	41
	Total	100.0	0.0	100.0	100.0	427
Mediterranean	Underweight	1.4	0.5	0.7	2.7	9
	Normal	76.0	2.3	71.3	80.2	457
	Overweight	14.7	1.6	11.8	18.2	99
	Obese	7.9	1.1	6.0	10.3	51
	Total	100.0	0.0	100.0	100.0	616

Continuation of Table 4-8			95% Confidence Interval			
NUTS-1	BMI Z Score Groups	%	Standard Error	Lower Value	Upper Value	Unweighted Number
Central Anatolia	Underweight	1.4	0.5	0.7	3.0	6
	Normal	74.9	2.4	69.9	79.2	312
	Overweight	16.0	2.2	12.2	20.7	73
	Obese	7.7	1.5	5.2	11.2	36
	Total	100.0	0.0	100.0	100.0	427
West Black Sea	Underweight	0.8	0.5	0.2	2.9	3
	Normal	73.0	2.5	67.9	77.5	308
	Overweight	16.0	1.8	12.8	19.9	74
	Obese	10.2	1.6	7.5	13.7	47
	Total	100.0	0.0	100.0	100.0	432
East Black Sea	Underweight	0.9	0.6	0.3	3.0	3
	Normal	66.2	2.7	60.8	71.2	229
	Overweight	22.3	2.6	17.6	27.8	75
	Obese	10.6	2.1	7.2	15.3	40
	Total	100.0	0.0	100.0	100.0	347
Northeast Anatolia	Underweight	2.1	0.7	1.1	3.9	9
	Normal	82.2	2.2	77.5	86.1	359
	Overweight	12.1	1.7	9.1	15.9	58
	Obese	3.6	0.8	2.3	5.7	18
	Total	100.0	0.0	100.0	100.0	444
Middle East Anatolia	Underweight	1.2	0.5	0.5	2.8	5
	Normal	86.3	1.9	82.2	89.6	371
	Overweight	8.8	1.3	6.5	11.8	43
	Obese	3.7	1.2	1.9	7.0	15
	Total	100.0	0.0	100.0	100.0	434
Southeast Anatolia	Underweight	1.7	0.7	0.8	3.7	11
	Normal	84.6	1.7	80.9	87.7	585
	Overweight	9.8	1.2	7.7	12.3	71
	Obese	3.9	0.8	2.6	5.8	30
	Total	100.0	0.0	100.0	100.0	697

8.5% of girls are obese and 15.7% are overweight. Overweight and obesity are assessed together according to WHO criteria; accordingly, 24.2% of the girls who are at 2nd grade in Turkey are overweight and obese. (Table 4-8)

Table 4-9. The Distribution by Age Group of BMI Z-Score Groups of Students who were Anthropometrically Measured in the Regions

NUTS	BMI Z Score Groups	%	Standard Error	95% Confidence interval		Unweighted Number
				Lower Value	Upper Value	
Turkey	Underweight	1.5	0.1	1.2	1.8	170
	Normal	74.0	0.6	72.7	75.2	8445
	Overweight	14.6	0.4	13.8	15.5	1751
	Obese	9.9	0.4	9.2	10.7	1157
	Total	100.0	0.0	100.0	100.0	11523
6 years old	Underweight	0.7	0.2	0.3	1.3	12
	Normal	79.3	1.2	76.8	81.5	1178
	Overweight	12.3	0.9	10.6	14.2	206
	Obese	7.8	0.8	6.4	9.5	121
	Total	100.0	0.0	100.0	100.0	1517
7 years old	Underweight	1.6	0.2	1.3	2.0	147
	Normal	72.8	0.7	71.5	74.1	6720
	Overweight	15.2	0.5	14.3	16.1	1444
	Obese	10.4	0.4	9.6	11.2	964
	Total	100.0	0.0	100.0	100.0	9275
8 years old	Underweight	1.6	0.6	0.8	3.3	11
	Normal	75.9	2.0	71.7	79.7	508
	Overweight	13.5	1.5	10.8	16.8	96
	Obese	8.9	1.3	6.7	11.8	68
	Total	100.0	0.0	100.0	100.0	683
9 years old	Underweight	-	-	-	-	-
	Normal	86.3	4.7	74.2	93.3	39
	Overweight	7.0	3.3	2.7	16.9	5
	Obese	6.7	3.5	2.3	17.7	4
	Total	100.0	0.0	100.0	100.0	48

14.9% of school-aged children in the 6-9 age group in Turkey are overweight, 9.9% obese and 24.8% of children aged 6-9 are overweight-obese than normal weight. (Table 4-9)

Table 4-10. The Distribution by Height for Age Indicator Z-Score (HAZ) of Stunting Frequency of Students who were Anthropometrically Measured in the Regions

NUTS	Percentage of Stunting HAZ <-2	95% Confidence interval			Unweighted Number
	%	Standard Error	Lower Value	Upper Value	
Turkey (n=11.523)	2.3	0.2	2.0	2.8	257
Istanbul	1.3	0.4	0.7	2.4	15
West Marmara	1.6	0.5	0.9	2.9	12
Aegean	1.1	0.4	0.6	2.1	12
East Marmara	1.5	0.4	0.9	2.3	14
West Anatolia	1.5	0.4	0.9	2.6	12
Mediterranean	1.6	0.4	1.0	2.5	20
Central Anatolia	2.2	0.5	1.4	3.4	18
West Black Sea	2.3	0.5	1.5	3.5	18
East Black Sea	0.3	0.2	0.1	1.0	3
Northeast Anatolia	3.5	0.9	2.1	5.7	26
Middle East Anatolia	3.5	0.6	2.4	5.0	35
Southeast Anatolia	5.4	0.9	3.8	7.5	72

The frequency of stunting in children was found to be 2.3%. Frequency of Stunting in North, Central and South East Anatolia Regions is higher in comparison to other regions (3.5%, 3.5% and 5.4% respectively). (Table 4-10)

Table 4-11. The Distribution by Height for Age Indicator Z-Score (HAZ) of Stunting Frequency of Boys who were Anthropometrically Measured in the Regions

NUTS	Percentage of Stunting HAZ -2	Standard Error	95% Confidence interval		Unweighted Number
	%		Lower Value	Upper Value	
Turkey (N = 5871)	2.3	0.3	1.8	2.9	131
Istanbul	0.6	0.3	0.2	1.5	4
West Marmara	1.5	0.6	0.6	3.3	6
Aegean	0.9	0.5	0.3	2.6	5
East Marmara	1.3	0.6	0.5	3.0	6
West Anatolia	0.8	0.4	0.3	2.2	4
Mediterranean	2.0	0.5	1.1	3.4	13
Central Anatolia	2.2	0.6	1.2	3.9	10
West Black Sea	2.9	0.8	1.7	4.9	12
East Black Sea	0.4	0.3	0.1	1.7	2
Northeast Anatolia	2.1	0.9	1.0	4.7	9
Middle East Anatolia	3.9	0.9	2.4	6.2	21
Southeast Anatolia	5.8	1.3	3.7	8.9	39

The frequency of stunting in boys was found to be 2.3%. Frequency of Stunting was found to be higher than Northern, Middle and South East Anatolia compared to other regions (2.9%, 3.9% and 5.8% respectively). (Table 4-11)

Table 4-12. The Distribution by Height for Age Indicator Z-Score (HAZ) of Stunting Frequency of Girls who were Anthropometrically Measured in the Regions

NUTS	Percentage of Stunting HAZ -2	Standard Error	95% Confidence interval		Unweighted Number
	%		Lower Value	Upper Value	
Turkey (N = 5871)	2.4	0.3	1.9	3.0	126
Istanbul	2.1	0.8	1.0	4.3	11
West Marmara	1.7	0.8	0.7	4.3	6
Aegean	1.4	0.6	0.6	3.0	7
East Marmara	1.6	0.5	0.8	3.1	8
West Anatolia	2.2	0.7	1.1	4.3	8
Mediterranean	1.2	0.6	0.5	2.9	7
Central Anatolia	2.1	0.9	0.9	5.0	8
West Black Sea	1.7	0.7	0.7	3.7	6
East Black Sea	0.2	0.2	0.0	1.6	1
Northeast Anatolia	4.8	1.4	2.6	8.6	17
Middle East Anatolia	3.0	1.0	1.6	5.6	14
Southeast Anatolia	5.0	1.2	3.1	7.9	33

The frequency of stunting in girls was found to be 2.4%. Frequency of Stunting was found to be higher than Northern, Middle and South East Anatolia compared to other regions (4.8%, 3.0% and 5.0% respectively). (Table 4-12)

Table 4-13. Anthropometric Criteria Summary Table (COSI TUR 2016 - Primary School 2nd Grade Students)

Anthropometric Criteria	Boys		Girls		Total	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Obesity (BAZ > 2)	11.3	(10.3 - 12.4)	8.5	(7.6 - 9.4)	9.9	(9.2 - 10.7)
Overweight (2≥BAZ>1)	13.6	(12.6 - 14.6)	15.7	(14.6 - 16.9)	14.6	(13.8 - 15.5)
Underweight (BAZ <-2)	1.7	(1.3-2. 1)	1.3	(1.0 1.8)	1.5	(1.2 - 1.8)
Severe Underweight (WAZ <-2)	2.0	(1.5 - 2.5)	1.9	1.6 - 2.4)	2.0	(1.6 - 2.3)
Stunting (HAZ-2)	2.3	(1.8-2.9)	2.4	(1.9 - 3.0)	2.3	(2.0-2.8)

BAZ: Body Mass Index Z-Score; WAZ: Weight by Age Z-Score; HAZ: Height by Age Z-Score; 95% GA: 95% Confidence Interval

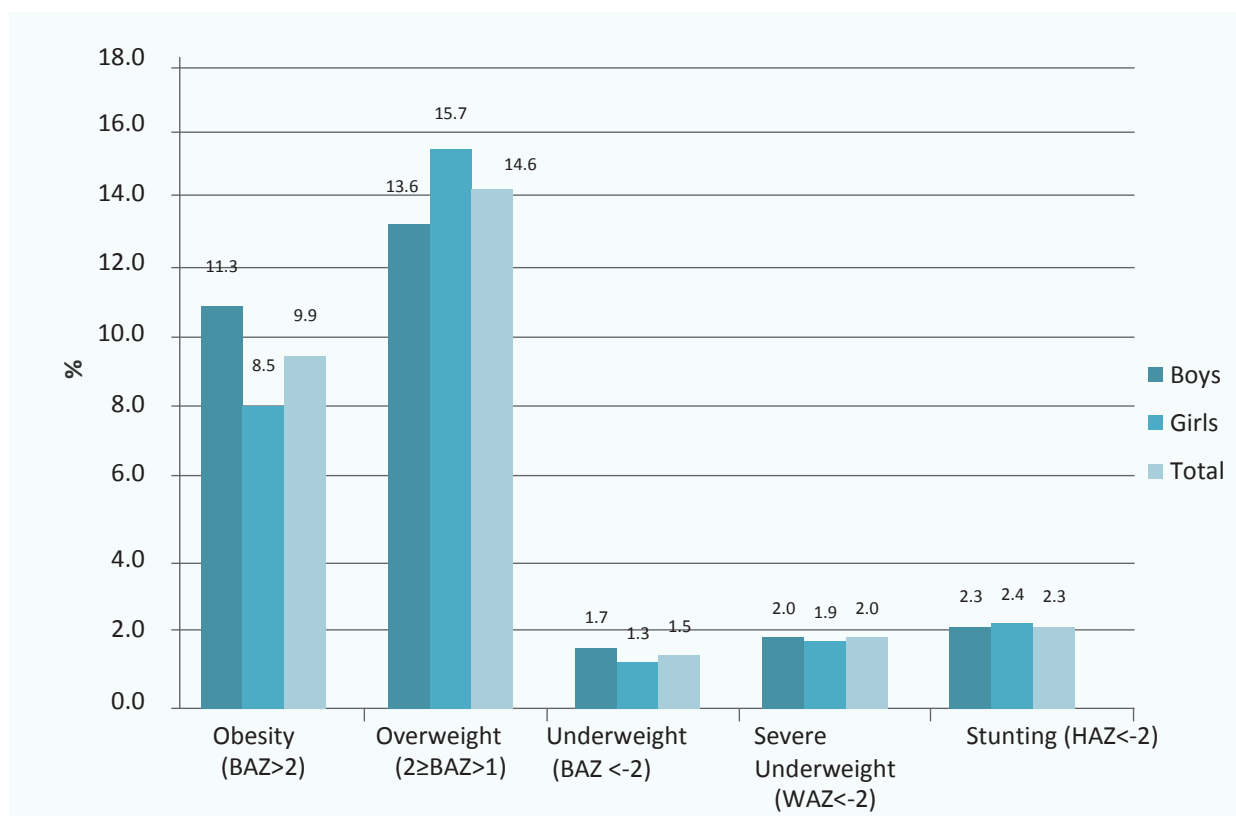


Diagram 4-1 Anthropometric Criteria According to Gender

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions Concerning Schools

- 99% of schools have open outdoor playground areas for students. In 79.8% of the schools, it is seen that students are not allowed to play outside in extreme weather conditions. 10.7% of schools do not allow to use outdoor playground areas outside of school hours.
- 83.4% of the schools do not have an indoor gym.
- To the question; whether the schools organize a sports/physical activity outside of school hours at least once a week; 59.7% of them said no.
- 34.3% of the schools do not have a shuttle and 23.3% of all students come to the school by shuttles.
- The safety score of routes for walking or riding a bicycle to and from school for children was calculated by the relevant official with whom an interview was made at the school. Safety score ranges between 1 and 10. The higher score means less safety, while the lower the score, the higher the safety. The average safety score set by school administrators was found to be "5.8".
- In 37.9% of the schools, the children have access to drinking water free of charge.
- 17.6% of the schools have milk, yoghurt and ayran, in 3.4% fresh fruits and 2.6% fresh vegetables are available free of charge.
- 70.2% of the schools have a canteen and 10.0% have a buffet / cafeteria.

5.2. Conclusions Concerning the Characteristics of Families and Their Attitudes Regarding Their Children's Lifestyles

- The average household population is 5.1 individuals and the average number of the individuals who are smaller than age of 18 is 2.6.
- 9.4% of the mothers are illiterate; 3.6% of the mothers are literate. 21.9% of the mothers in the East Anatolia Region and 27.1% in the Southeast Anatolia Region are not literate. 82.0% of the mothers do not work in an income-generating business.
- Education levels of fathers are higher than mothers. Among fathers, the percentage of illiteracy is 2.0% and only literacy is 2.0%. 82.7% of fathers still work in income-generating jobs.
- 25.5% of the families state that they easily pass the month with their earnings, 32.3% state that they pass the month without serious problems with their earnings, 29.3% state that they have trouble meeting the ends the month with their earnings, 12.8% state that they barely meet the ends in the month with their earnings.

5.3. Children's Birth Stories and Breastfeeding

- Birth weight average of the students is 3,179.5 gr.
- The percentage of the children breastfeeding is 95.5%, the average duration of mother's breastfeeding is 15.6 months, average duration of the children who are exclusively breastfed is 4.5 months.

5.4. Children's Physical Activity Levels

- According to the statements of families, 53.2% of the children go to schools at a distance not more than one kilometer away from their homes and 25.3% go to schools at a distance around 1-2 km away from their homes.
- The percentage of children who travel on foot or by bicycle is 59.3%.
- The parents rated the level of safety of school route by walking or cycling on the basis of 10 points as "1 very safe" and "10 very unsafe". The nationwide average score is 6.6.
- Only 17.0% of the families in Turkey have declared that their children are a member of a dance or sports course.
- According to the statements of the families, 2.9% of the children do not play at the weekend and 9.5% on week days.
- According to the statements of families, nearly half of the children (47.9%) are spending 2 hours or more a day on weekdays during the school period. This percentage is 52.6% on weekends.
- 36.2% of the children spend more than 2 hours a day watching TV/using electronic devices on weekdays. This percentage is 69.9% at the weekend.

5.5. Nutritional Behavior of Children as Declared By Their Families

- 3.7% of the children never have breakfast; 12.1% some days, and 76.5% have breakfast every day
- 77.0% of the children consume meat every day, 26.3% consume 4-6 days a week, 41.8% consume 1-3 days a week and 18.9% consume less than once a week. 6.1% of children do not consume any meat.
- 2.2% of children consume fish every day, 9.5% consume 4-6 days a week, 33.4% 1-3 days a week and 40.3% less than once a week. 14.6% of the children do not consume any fish.
- 39.8% of the children consume cheese every day, 19.1% 4-6 days a week; 20.1% some days (1-3 days) 13.4% of children do not consume any cheese.
- Low-fat/semi-fat milk consumption of children: 14.7% every day and 13.2% 4-6 times a week; 21.6% some days (1-3 days a week) 13.5% less than once a week and 37% never consume.
- Consumption of whole-fat milk of children: 23% every day and 17.8% 4-6 a week, some days (1-3 times a week) rate is 23.5%, less than 12.8% per week and 23% never. The percentages are specified respectively.
- Yoghurt, cacik, ayran consumption frequency among children: 37.3%, 30% most days (4-6 days per week), 22.1% some days (22 days, 1-3 days per week), 5.7% less than once a week 4.9% do not consume at all.
- 85.5% of children do not consume kefir at all. 1.7% consumes every day.
- 50.4% of the children consume fresh fruit, 24.5% (4-6 days a week), 18.5% some days (1-3 days a week) and 4.6% a week consumes less than once a week. 1.9% of children do not consume any fruit.

- 13.4% of children consume vegetables (excluding potatoes) every day, 25.3% consume 4-6 days a week, 41.8% consume 1-3 days a week and 13.2% a week. 6.7% of children do not consume any fruit.
- Freshly squeezed juice 6.8% everyday; 10.7% most days (4-6 days a week), 29.9% some days (1-3 days a week), 27.7% less than once a week and 29.9% never consumed.
- 100% fresh fruit juice (ready) consumption: 14.4% of the children every day and 14% most days (4-6 times a week).
- 33% of the children rarely consume pizza, lahmacun, fried potatoes, hamburger, hot dogs and sausages at a rate of 38.7% a week (1-3 days a week). 3.8% consumes every day, 11.8% consume (4-6 days a week).
- 7.6% of children consume salty snacks (potato chips, corn chips, cookies), 13.7% of them consume frequently (4-6 times a week), 29.6% of them consume some days (1-3 days a week) and 34.6% of them consume less than once a week. 14.5% of the children don't consume at all.
- 7.7% of children consume beverages containing sugar every day and 10.7% consume beverages containing sugar for 4-6 days a week.
- 12.5% of the children consume sugar bars and chocolate, 20.2% consume frequently (4-6 days a week), 36.3% consume some days (1-3 days a week) and 24.9% less than once a week. 6.1% of the children do not consume at all.
- 11.9% of the children consume biscuits, cakes and cookies every day and 25.3% of them consume 4-6 days a week.
- 88.6% of the children never consume diet and light beverages.

5.6. Characteristics Concerning Family Health

- According to the opinions of their parents, when the weight status of children is examined; 68.6% of the families thought that their child is normal weight; 24.4% of the families thought that their child is underweight, 0.6% of the families thought that their child is obese; 6.4% see the child as overweight.
- For the families, 17.6% of them are diagnosed with 14.9% with diabetes, 16.6% are diagnosed with high cholesterol.
- The average height of the mothers is 162.4 cm and the weight average is 68.2 kg. According to the Body Mass Index (BMI) classification, 16.2% of them are obese and 35.2% are overweight.
- The average height of the fathers is 174.2 cm, average weight is 81.8 kg. According to the BMI classification, 18.4% of the fathers are obese and 48.9% of them are overweight.

5.7. Anthropometric Measurement Results

- According to the BMI-Z score of primary school 2nd grade students; 9.9% were obese, 14.6% were overweight, 74% were normal and 1.5% is underweight. In the COSI 2013 survey, obesity was found as 8.3% and overweight as 14.2%.
- According to the BMI-Z score of primary school 2nd grade students; 11.3% were obese, 13.6% were overweight, 73.5% were normal and 1.7% were underweight.
- For the 2nd grade girls, 8.5% of them were obese, 15.7% were overweight, 74.5% were normal and 1.3% were underweight.
- The frequency of obesity was found as 2.3% for the children. This percentage was 2.3% for boys and 2.4% for girls. The frequency of obesity was higher in Northern, Middle and Southeast Anatolia Regions compared to other regions. (3.5%, 3.5% and 5.4% respectively)

Suggestions

- When a comparison is made with the COSI 2013 survey, we can see an increase in the rate of obesity and overweight. Healthy Nutrition and Active Life Program which is being implemented should be implemented continuously in the future.
- In addition, stunting status which was considered depending on the height indication by age is assessed and it was found that it is 2.3% for Turkey, 3.5% for Northern Anatolia Region; 3.5% for Middle East Anatolia Region and 5.4% for Southeast Anatolia Region. The School Meal Program must be initiated, with priority for the relevant regions.
- Children's consumption frequency of fresh fruit, vegetable, milk-yoghurt-cheese and meat-chicken-fish-egg is found to be lower than the portions recommended in the Turkey Dietary Guidelines. There is a need for interventions to increase the frequency of consumption of these foods. Community educations should be done, awareness should be increased, programs should be organized in the media, and correct information should be provided to the society.
- Total portion amount recommended for meat-chicken-fish-egg is 1.5 servings daily in Turkey Dietary Guidelines. While 6.1% of the children do not consume meat at all, 18.9% consume meat less than once a week. When the frequency of fish consumption is examined, it was stated that 14.6% of them don't consume fish at all, 40.3% consume less than once a week and it was understood that meat and fish consumption habits should be increased.
- Consumption frequency of the sugar bars, chocolates, biscuits, cakes and cookies are at the desired level of consumption. Interventions to reduce the consumption of such foods need to be strengthened. The interventions to reduce the consumption of HFSS (YYST) foods that are not in a classification of a healthy nutrient need to be strengthened.
- The level of education of the mothers were considered to be quite low in some regions. In healthy societies, literacy has an important place among the determinants of health for women. Increasing female literacy is important in gaining healthy nutrition behaviors.
- Improving the income situation, which is an important determinant of health, is important for the prevention of unhealthy eating and related diseases.

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Republic of Turkey Ministry of Health

General Directorate of Public Health

Adnan Saygun Caddesi No:55

Sihhiye, Çankaya ANKARA / TÜRKİYE

Ministry of Health Publication No:1126

ISBN: 978-975-590-714-7