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WHO European Childhood Obesity Surveillance Initiative

COSI Turkmenistan 2016/2017 (Round Four)

report on data collection of childhood nutritional status | Ashgabat, Turkmenistan | 2020

ABSTRACT

Childhood obesity remains an important public health problem in the World Health Organization (WHO) European Region, where it is unequally distributed within and between European countries and population groups. Nutritional surveillance data are essential to effectively design, implement and evaluate policies and strategies aimed at counteracting obesity. Turkmenistan joined the WHO European Childhood Obesity Surveillance Initiative (COSI) study in 2016/2017 (fourth round) alongside 34 other countries. This population-based system involves a standardized, harmonized systematic process of monitoring prevalence of thinness, overweight and obesity (based on measured data) among primary schoolchildren.

COSI Turkmenistan was implemented in five velayats (regions): Ahal, Balkan, Dashoguz, Lebap, Mary and Ashgabat city. Data collection followed the WHO European COSI common protocol and the data collection procedures manual. A total of 3951 children were measured, corresponding to a participation rate of 97% from 159 primary schools.

According to 2007 WHO growth reference criteria, the prevalence of overweight (including obesity) in boys and girls aged 7 years was 11.5% and 11.4%, respectively. Ashgabat city showed the highest prevalence of overweight (19.1%) and obesity (3.2%).

Family data showed that most mothers (87.3%) breastfed their children for more than 7 months; of these, 50.5% breastfed from 13 to 24 months. Children from Turkmenistan reported a high food consumption of fresh fruit (70.1%), vegetables (68.1%), meat (68.3%), dairy products such as low-fat/semi-skimmed milk (75.7%), but more than 40% of children reported a consumption (> 4 days/week) of soft drinks (42.5%) and other sugary foods such as candy bars and chocolate (43.9%), and biscuits, cake, doughnuts and pies (48.3%). Regarding physical activity the majority of children reported walking or cycling to school (80.5%), and play outside for 1–2 hours per day during weekdays (65.3%) but sedentary habits such as watching TV or using electronic devices (1-2h/day) were reported by the majority (79.7%) of children.

In conclusion, COSI Turkmenistan allowed a better understanding of children´s nutritional and clearly showed that prevalence of childhood obesity (2.9%) coexists alongside thinness (4.3%). Addressing this important public health issue is therefore essential to ensure a healthy development of the children of Turkmenistan.

KEYWORDS

CHILDHOOD OBESITY | COSI TURKMENISTAN | OVERWEIGHT | CHILDREN

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Foreword

Childhood obesity is a major public health problem globally. In the short term, it can negatively influence a child's health, their educational attainment and their quality of life. In the longer term, childhood obesity – which often tracks into adulthood – can increase a person's risk of developing noncommunicable diseases (NCDs). NCDs are the leading cause of premature mortality in the World Health Organization (WHO) European Region.

Tackling childhood obesity is key for achieving the Sustainable Development Goals, especially Goal 3, which relates to ensuring healthy lives and promoting well-being for all people, at all ages. The WHO's Report of the Commission on Ending Childhood Obesity calls on Member States to ensure data collection on children's BMI-for-age (body mass index adjusted for age) and to set national targets for obesity – a priority that is echoed in the WHO European Food and Nutrition Action Plan and Health 2020, the European policy framework and strategy for the 21st century.

In 2008, the WHO Regional Office for Europe established the Childhood Obesity Surveillance Initiative (COSI). This unique system uses a standardized protocol to monitor childhood obesity and overweight among primary school-aged children (6–9 years). These data enable public health officials to monitor trends in obesity and overweight over time, to make comparisons between countries, and to track the effectiveness of childhood obesity policies. Over time, COSI has grown, and it now includes around 40 countries in the European Region.

We would like to commend Turkmenistan for its successful participation in the WHO European COSI study in 2016/2017, alongside 34 other countries of the European Region. This work has provided critical information on the prevalence of childhood obesity in the country, along with important insights related to early life factors and lifestyle behaviours.

Importantly, these findings provide a baseline understanding of the situation in Turkmenistan. Using the findings from this COSI study, the WHO Regional Office for Europe looks forward to working with the government in Turkmenistan to address the important public health issue of childhood obesity and to ensure the health and well-being of children, both in the immediate term and as they develop into adults.

Dr João Breda
Head of the WHO European Office for the Prevention and Control of Noncommunicable Diseases

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Executive summary

Childhood obesity remains an important public health problem in the World Health Organization (WHO) European Region, where it is unequally distributed within and between European countries and population groups.[1,2] It is associated with a wide range of serious health and social consequences in childhood, as well as a higher risk of premature death and disability in adulthood.[3,4]

Prevention is recognized as the only feasible option for curbing the obesity epidemic. Nutritional surveillance data are essential to effectively design, implement and evaluate policies and strategies aimed at counteracting obesity.[5]

In response to this critical need for standardized surveillance data, the WHO Regional Office for Europe established the WHO European Childhood Obesity Surveillance Initiative (COSI) in 2007.[6] This population-based system involves a standardized, harmonized systematic process of monitoring prevalence of thinness, overweight and obesity (based on measured data) among primary schoolchildren. The common COSI protocol establishes the main characteristics of study design and sampling strategy,[7] but – by including a combination of mandatory and voluntary components – it also affords participating countries some flexibility to adapt the system to their national context. This allows monitoring of trends in the epidemic as well as intercountry comparisons within the European Region. The study was initiated with 13 WHO European Member States in 2008, and three further rounds (2010, 2013 and 2016) followed.

Turkmenistan joined the WHO European COSI study in 2016/2017 (fourth round) alongside 34 other countries. COSI Turkmenistan was implemented in five velayats (regions): Ahal, Balkan, Dashoguz, Lebap, Mary and Ashgabat city (considered here as an additional region). Data collection followed the WHO European COSI common protocol and the data collection procedures manual.[7,8]

A total of 3951 children were measured, corresponding to a participation rate of 97% from 159 primary schools. Anthropometric measurements included weight and height and were collected by trained examiners (family doctors). A family form was applied and indicators of children's dietary intakes and physical/inactivity patterns were collected. The family rate response was of 95%.

Abbreviations

BMI	body mass index
CI	confidence interval
COSI	Childhood Obesity Surveillance Initiative
MoHMI	Ministry of Health and Medical Industry of Turkmenistan
NCDs	noncommunicable diseases
PSU	primary sampling unit
SD	standard deviation
SSU	secondary sampling unit
WHO	World Health Organization

Main results

According to 2007 WHO growth reference criteria,[9] the prevalence of overweight (including obesity) in boys and girls aged 7 years was 11.5% and 11.4%, respectively. Obesity prevalence was slightly higher in boys than in girls (3.6% compared to 2.3%); for thinness prevalence, the reverse was true, where 4.4% of girls and 4.1% of boys presented this type of malnutrition. Ashgabat city showed the highest prevalence of overweight (19.1%) and obesity (3.2%).

Balkan showed the lowest prevalence of overweight (9.4%), while Mary presented the lowest prevalence of obesity (1.6%) and the highest prevalence of thinness (5.4%). The prevalence of childhood overweight and obesity was shown to be higher in urban areas (13.5% and 4.5%, respectively) than in rural areas (10.4% and 2.2%).

Data from COSI Turkmenistan 2016 showed that most mothers (87.3%) breastfed their children for more than 7 months; of these, 50.5% breastfed from 13 to 24 months.

Regarding eating habits, around 70% of children reported that they consumed fresh fruit (70.1%), vegetables (68.1%) and meat (68.3%) every day, while daily intake of fish was reported by only 3.9%. Dairy products such as low-fat/semi-skimmed milk (75.7%), whole-fat milk (52.6%), yoghurt and other dairy (65.6%) and cheese (70.9%) were consumed 3 days per week or less.

Fruit juice was consumed by a majority of children less than once a week (46.1%) or never (14.5%), while soft drinks containing sugar were reported to be consumed most days of the week (> 4 days) by 42.5%. Savoury snacks (20.4%), sugary food items such as candy bars and chocolate (43.9%), and biscuits, cake, doughnuts and pies (48.3%) were consumed 4 or more days per week.

Data on indicators of physical activity (going to school on foot or by bicycle, attending a sports or dance club, and time spent playing outside) were also collected.

Regarding the first indicator, in all regions the majority of children reported walking or cycling to school (80.5%), except In Ashgabat city, where 33.1% reported going to school by motorized vehicles and 9.7% by a combination of various means of transport.

Regular physical exercise measured by participation in sports/dance activities was reported by 26.5%. Ashgabat city was the region with the highest proportion of children (34.0%) that reported practising sport or dance activities.

The majority of children (65.3%) play outside for 1–2 hours per day during weekdays. The frequency of active play increases over weekends, as 38.3% of children play 2–3 hours per day and 40.3% more than 3 hours.

In COSI Turkmenistan 2016, sedentary habits were shown by time spent watching TV or using electronic devices. Data showed that during weekdays a majority (79.7%) of children spent 1–2 hours per day in such sedentary activities; but at weekends a larger majority (85.3%) increased their time watching TV and using electronic devices to more than 2 hours a day.

In conclusion, systematic data collection by COSI allows better understanding of the progression of childhood overweight and obesity in each country; it also permits comparability within the WHO European Region and provides information on related factors, such as eating habits and patterns of physical activity. Assessment of almost 4000 children in Turkmenistan, as part of the fourth round of data collection of the WHO European COSI study during the 2016/2017 school year, clearly showed that prevalence of childhood obesity (2.9%) coexists alongside thinness (4.3%).

To monitor trends over time, and as part of a routine surveillance system, COSI should be repeated every three years in the country.

1 Introduction

1.1 Childhood obesity – a priority public health issue

As one of the major contributors of noncommunicable diseases (NCDs), obesity remains an important public health issue in the World Health Organization (WHO) European Region, where it is unequally distributed within and between European countries and population groups.[1,2]

Obesity has the potential to negate many health benefits throughout the life-course, shortening life expectancy and adversely affecting quality of life.[2] Being overweight in childhood is associated with greater risk and earlier onset of chronic disorders such as type 2 diabetes, cardiovascular diseases and cancer.[3,4,10,11] Additionally, childhood obesity has adverse psychosocial consequences and lowers educational attainment [3,4,12,13]

Obesogenic environments have been identified as key drivers for unhealthy lifestyle behaviours, which are the primary causes of overweight and obesity. Unhealthy eating habits, high levels of sedentary behaviour, low levels of physical activity and inadequate levels of sleep all contribute to an energy imbalance between calorie intake and energy expenditure which leads to weight gain;[14] children within families from lower socioeconomic groups generally report worse outcomes.[2,14]

The north–south gradient observed in the WHO European Region, which shows a variation (in girls) from 18% to 50% in childhood overweight and from 5% to 21% in obesity,[15] has built up as a result of the changing social, economic, cultural and physical environment.[16] The European Region is highly diverse and the prevalence of childhood obesity may be plateauing in some settings;[17] in absolute numbers, however, more overweight and obesity are found in lower socioeconomic groups, and this contributes to a widening of health and other inequalities.[16,17] Moreover, many countries now face the burden of malnutrition in all its forms, with rising rates of childhood obesity as well as high rates of child undernutrition and stunting.[17]

Prevention is recognized as one of the most important and feasible options to tackle overweight and obesity in children. Nutritional surveillance data are essential to effectively design, implement and evaluate policies and strategies aimed at counteracting obesity.[5]

1.2 WHO European Childhood Obesity Surveillance Initiative (COSI)

At the WHO European Ministerial Conference on Counteracting Obesity (Istanbul, Turkey, 15–17 November 2006), it was recognized that widely standardized and harmonized surveillance systems were required as a basis for policy development. The European Charter on Counteracting Obesity,[18] which aimed to strengthen action against obesity throughout the Region, encouraged the development of internationally comparable core indicators for inclusion in national health surveillance systems, so that the resulting data could be used for advocacy, policy-making and monitoring purposes.[18]

In response to this need, in 2007 the WHO Regional Office for Europe and 13 Member States established the WHO European COSI – a systematic process of collection, analysis, interpretation and dissemination of descriptive information for use in monitoring excess bodyweight and in programme planning and evaluation.[6] The importance of such surveillance systems was reinforced in the Vienna Declaration on Nutrition and Noncommunicable Diseases in the Context of Health 2020 and in the Report of the Commission on Ending Childhood Obesity. [2,19]

A common COSI protocol establishes the main characteristics of study design and sampling strategy,[7] but – by including a combination of mandatory and voluntary components – it also affords participating countries some flexibility to adapt the system to their national context. Thus, within the WHO European COSI, each country has the potential to develop a childhood nutrition surveillance system, whose main goal is to create a systematic network to collect, analyse, interpret and share descriptive information about childhood nutritional status of primary school-age children; a system that produces data that are comparable between European countries and allows monitoring of childhood obesity every three years. The first round (2007/2008) included 13 countries; the second round (2010) 17 countries; and the third round (2013) 19 countries. In 2016/2017, 35 countries participated in the fourth WHO European COSI round.

1 Introduction

1.3 COSI Turkmenistan

Following the Turkmenistan strategy of strengthening its response to NCDs, improving its surveillance systems is crucial for planning targeted action, monitoring progress and outcomes related to counteracting NCDs, and informing and evaluating strategies and policies.[20]

Risk factor monitoring in Turkmenistan has been integrated into the general health information system in order to support linkages and sustainability and to allow longer-term measurement of the impact of NCD interventions, yet children's nutritional status data is still scarce or nonexistent.[20] The Nutrition Country Profile of Turkmenistan showed that, in 2011, 81% of deaths (all causes) appeared to be due to NCDs, while data from WHO (2015) showed that more than 55% of adults were overweight, with 17.1% of men and 23.1% of women obese.[21]

In 2016 Turkmenistan joined the WHO European COSI (fourth round). The inclusion of Turkmenistan in the COSI study was a significant step towards better understanding and tackling this important public health issue, as data on childhood obesity in the country will become available within a surveillance mechanism that allows standardized and comparable information about children's nutritional status among European countries to be collected.

As a result of Turkmenistan joining the WHO European COSI, data on primary schoolchildren collected in the country will not only allow continuous monitoring of the nutritional status of children; it will also contribute to greater understanding of children's lifestyle characteristics, particularly those related to nutrition and patterns of physical activity, raising awareness and prioritizing the issue in the political agenda.

This report presents data collected in COSI Turkmenistan 2016, within the fourth round of the WHO European COSI study. Among children (7 years old), it determined the prevalence of thinness, overweight and obesity and identified children's eating patterns, patterns of physical activity, and sedentary habits.

2 Methodology

The WHO European COSI fourth round was implemented in 2016; a standardized methodological protocol and data collection procedures were followed by all participating Member States.[7,8]

The study has a semi-longitudinal design with repeated cross-sectional samples targeting primary schoolchildren. This age range (6–10 years old) was chosen because it is used in predicting the condition in adulthood and precedes the confounding effects of puberty. At the age of around 6 years, a process known as adiposity rebound begins, during which there is a period of rapid increase in body fat.[22]

2.1 Organizational structure

COSI Turkmenistan was organized and coordinated by the Ministry of Health and Medical Industry of Turkmenistan (MoHMI).

The appointed COSI working group attended their first introductory workshop in Ashgabat on 19–20 May 2016; the workshop was led by the WHO Regional Office for Europe Programme of Nutrition, Physical Activity and Obesity.

The COSI study was explained in detail to all 45 participants, together with its protocol and data collection procedures.[7,8] The theoretical session was followed with a practical part, where the participants had an opportunity to practise waist measurement and calculations such as body mass index (BMI) and reference weight management. The expert instructors also introduced the data management online programme, OpenClinica – a practical tool already successfully tested in several European COSI-participating countries. The training concluded with all participants receiving a certificate of participation.

COSI Turkmenistan organizational structure and preparation for study implementation was carried out prior to the start of data collection in the school year 2016/2017. The Clinical Center for Mother and Child Health Care was appointed as a responsible institution, and Mrs Maya Tanrygulyyeva was appointed as COSI Turkmenistan principal investigator. A regional supervisor and a regional coordinator were appointed for each velayat (region), plus Ashgabat city, making a total of six study regions in all.

MoHMI appointed a total of 60 examiners to carry out the fieldwork, which involved anthropometric measurements of, and interviews with, children. All nominated examiners were family doctors. Thus, for each velayat, a group of 10 examiners was created, including the regional supervisor from the local health department and a regional coordinator from MoHMI. Each examiners team comprised two examiners, who were responsible for each school; and an identification code was assigned to each team.

All the examiners and members of the working group attended the training for COSI fieldwork implementation, which took place in November and December 2016 (see Section 2.4 for further details).

During preparation for the COSI study implementation, several meetings took place between members of the working group.

A local team of five specialist statisticians, from the State Statistical Committee of Turkmenistan, was responsible for entering the collected data. The COSI Turkmenistan data manager was a leading specialist in statistics, Ms Krijivitskaia Lidia.

2.1.1 Time and place

COSI Turkmenistan data collection took place within a three-week period in March and April 2017.

Turkmenistan is divided into five velayats (regions): Ahal, Balkan, Dashoguz, Lebap and Mary. For this study, Ashgabat city was considered as an additional region. Fieldwork was conducted in all five regions, plus Ashgabat city. During data entry, it was agreed with the COSI Turkmenistan data manager from the State Statistical Committee that some adjustments to locations should be made according to the national classification (1 – urban; 2 – semi-rural; 3 – rural).

2.2 Ethical considerations

The methodological protocol was devised in accordance with the International ethical guidelines for biomedical research involving human subjects.[7,23] All ethical concerns were discussed with responsible representatives from MoHMI and ethical approval was obtained.

Each school received a notification letter from MoHMI giving an overview of the study. Consent was required at two levels: parent and child. All study procedures were fully explained to parents in a letter and at a school information meeting, so that their informed consent for children's measurement and data processing could be obtained. Parents' informed consent was provided to all selected schools during the first visit of the examiners team. Teachers of selected second-grade classes were usually in charge of providing informed consent forms with parents and collecting them when completed.

The informed consent form was adapted to national context and translated into both Turkmen and Russian; the final version of the form was available in these languages. Consent was obtained prior to a child's enrolment in the system. Turkmenistan adopted active informed consent for the COSI Turkmenistan study. The results of anthropometric measurements were offered either to parents or to child only upon request.

2 Methodology

2.3 Study design and sampling

The COSI Turkmenistan study design and sampling followed the COSI protocol procedures for all countries involved.[7] The protocol defines limits within which each participating country can create a surveillance system that both matches its own national characteristics and allows comparisons with the other countries.

Following the COSI protocol, the main characteristics of the COSI Turkmenistan study design and sampling strategy were as follows:

- The surveillance system target population was primary school-age children; more specifically, Turkmenistan targeted 7-year-old children.
- Primary school was the setting for enrolment. As education is compulsory in the country, most children can be easily reached through the education system. Moreover, primary schools are of interest because they play an important role in influencing children's behaviour regarding nutrition and physical activity, and can be settings for the promotion of healthy lifestyles.[6]
- Only second-grade classes were included in the survey because most of the targeted children were enrolled in this grade when data collection took place.
- A sample of children was selected adopting a two-stage stratified cluster sampling design with primary schools as primary sampling units (PSUs) and second-grade classes as secondary sampling units (SSUs). More specifically, schools were stratified by region and were selected with a probability proportional to size. In each selected school, one class was randomly sampled and all children belonging to that class were invited to participate in the survey.
- An estimation procedure was carried out in order to estimate the characteristics of the target population from the surveyed children. The procedure included computation of a sampling design weight for each sampled child by calculating the inclusion probability of both PSUs and SSUs and the post-stratification of the sampling design weights to known population totals (i.e. children enrolled in second-grade classes of all primary schools in each region of the country).

The national representative sample included 159 schools, none of which refused to participate in the survey. The participation rate among children was high, as 3951 children were measured out of 4085 students enrolled in the selected classes when data collection took place (96.7%). More than nine in 10 families (95%) invited to take part in the surveillance filled in the family form.

Main characteristics of study design	
Country	Turkmenistan
Setting of enrolment	Primary schools
Targeted age group(s)	7 years
Inclusion of a sample/all children in targeted grades of primary school	Sample
Participation in previous COSI rounds of data collection	No
Sentinel approach	Not applicable

Main features of sampling design		
Country	Turkmenistan	
Sampling design	Two-stage cluster sampling	
Sampling unit definition	PSU	Primary school
	SSU	Second-grade class
Stratification		Yes, by region
Sampling units approached and participating proportion (%)	PSU	159 (100.0)
	SSU	159 (100.0)
Child form response rate	96.7%	
Family form response rate	95.3%	

2 Methodology

2.4 Equipment and training procedures

Prior to COSI Turkmenistan data collection, all examiners were trained in taking standardized measurements as accurately and precisely as possible, according to the technical measurement procedures and instructions given in the COSI protocol and data collection procedures.[7,8]

A total of 60 examiners attended training on COSI Turkmenistan implementation that took place in Ashgabat from 28 November to 2 December 2016, organized jointly by the WHO Regional Office for Europe, the WHO Country Office in Turkmenistan and MoHMI.

The theoretical part of the training included a review of the background and objectives of the surveillance system; it covered standardized use of forms, anthropometric measurements as described in the COSI data collection procedures manual,[8] interaction and interview techniques with children, calibration of measurement instruments, recording measurement procedures, and writing legibly to reduce mistakes during data entry. Strict adherence to the measurement techniques and recording procedures was emphasized. The practical part lasted two days at two designated schools in Ashgabat city, where the examiners were able to practise data collection procedures, including anthropometric measurements of children. A total of two training sessions were conducted in Turkmenistan.

All examiners (family doctors) were nominated by MoHMI to carry out the fieldwork for COSI Turkmenistan. To each team (consisting of two examiners), a participating school and class was designated, in a total of 10 examiners per region (plus Ashgabat city). Each group also had a supervisor and a responsible representative from MoHMI.

MoHMI provided 35 sets of standardized COSI equipment: SECA 220 measuring rod attached to the SECA 769 digital scale. The equipment used for measurement was the same in all selected schools in the country. All examiners were trained how to calibrate the weighing scales and height rod and were also instructed to check and calibrate the equipment on each day of measurements.

The anthropometric instruments were calibrated every day at the schools, just before measuring started. Transport was usually organized to move the instruments from one to another school.

2.5 Data collection forms and procedures

COSI Turkmenistan included all three questionnaires provided in the COSI data collection procedures manual (child form, school form and family form).[8] All questionnaires were translated and available in two languages (Turkmen and Russian) and used in paper format.

Data collection in the field lasted three weeks in March and April 2017, during which each school received scheduled visits by a team of examiners. During the first visit, family informed consent letters and family forms were distributed and collected with assistance from the school. The school form was also handed over to be administered and filled in by the school administration; at the same time, it was requested that a special room should be prepared where measurements could be taken to ensure that the protocol was strictly followed.[7]

The child form was handled by the trained team of examiners, on the appointed date of the second visit, generally in the morning period. During this visit the mandatory anthropometric measurements, including body weight and height, were taken strictly following the data collection procedures manual.[8]

2.5.1 Standardization of conditions

Examiners ensured that principles of confidentiality and privacy were observed during measurements. Measurements were taken only if informed consent had been given by the children's parents. Children were also asked for their own consent every time before measurements were taken. The results of measurements were given only upon request of the child.

At the time of measurement, children were asked to remove their school uniform, shoes and socks, and any heavy or bulky items, such as mobile phones, key chains, watches, belts, and hair/head accessories, including the traditional takhia.

Children were only allowed to wear light underwear or light sports clothes (in the case of low room temperature, which happened in a few schools). The type of clothing the child was wearing at the time of measurement was indicated in the child form so that the child's weight could be adjusted accordingly.

2 Methodology

2.5.2 Anthropometric techniques

Anthropometric measurements included height, weight, and waist and hip circumference, measured strictly according to the data collection procedures manual.[8]

The scale and height rod were placed on a hard surface and calibrated every day just before measurement. Weight was measured in kilograms (kg) and recorded to the nearest 100 g (0.1 kg). Height, waist and hip circumferences were measured in centimetres (cm) and recorded to the nearest millimetre (0.1 cm).

2.6 Data analysis

All completed paper forms were returned to the WHO Country Office in Turkmenistan at the end of data collection. A team of five data clerks entered the data from the paper forms to a Microsoft Access file, which was created in collaboration with the WHO Regional Office for Europe and Trial Data Solutions.

During data entry, some minor changes were made; for instance, the categories "school location" and "state" were adjusted according to the state classification: 1– urban (city); 2– semi-rural (small town); 3 – rural (village).

Data were checked for inconsistencies and completeness in collaboration with the WHO Regional Office for Europe and following standard procedures. All critical data were double-checked by local teams. The final dataset followed the COSI 2016 Codebook and was shared with WHO Regional Office for Europe as per COSI protocol.[7]

For purposes of analysis, body weight was adjusted for weight of clothes worn. Researchers in the country calculated the mean weight of commonly worn clothing items and provided these weights to WHO. When it was time to calculate the body weight of children, WHO subtracted the weight of the clothing (indicated on the child form) from the measured body weight provided on the child form. The 2007 WHO-recommended cut-offs for school-age children and adolescents were used to compute BMI for age (BMI/A) Z-scores and to interpret anthropometric indicators.[5] These cut-offs define:

- **thinness**: as the proportion of children with a BMI/A value below –2 Z-score;
- **overweight**: as the proportion of children with a BMI/A value above +1 Z-score;
- **obesity**: as the proportion of children with a BMI/A value above +2 Z-score.

According to the WHO definitions, the prevalence estimates for overweight children include those who are obese.

Children with biologically implausible (or extreme) weight, height and BMI values were excluded from the analysis: weight-for-age value below –6 or above + 5 Z-score; height-for-age value below –6 and above +6 Z-score; and BMI/A values below –5 or above +5 Z-score relative to the 2007 WHO growth reference median.

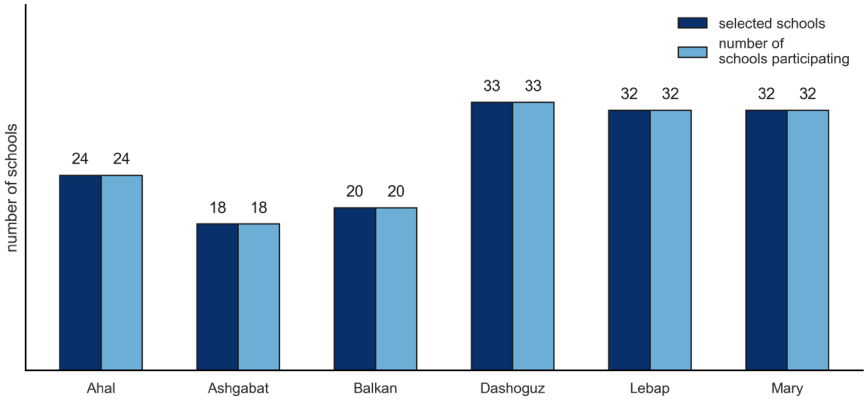
Weighted data analyses were carried out in order to infer results from the surveyed children to the population and to produce unbiased estimates. The main findings of these analyses are shown in the tables and figures included in the report below. For completeness, the number (n) of sampled children used to produce each finding was also reported. The confidence intervals (CIs) for proportions are constructed using a logit transform so that their endpoints always lie between 0 and 1. Data analyses have been carried out using Stata Statistical Software: Release 15.

3 Overweight and obesity among children

3.1 Participation rate

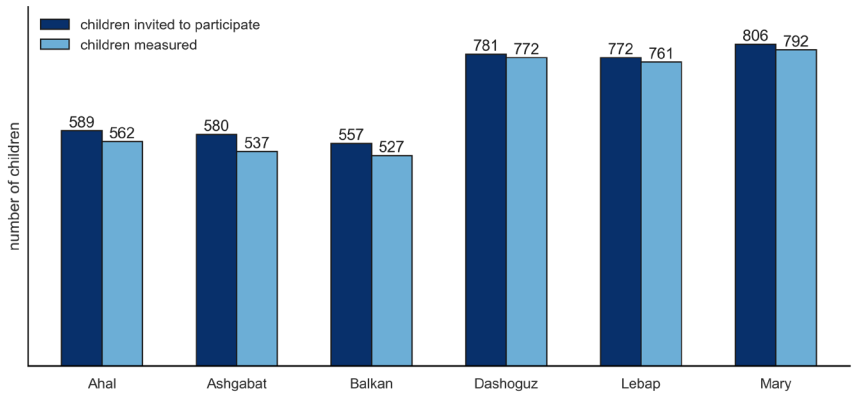
COSI Turkmenistan 2016 was conducted in 159 randomly selected schools with a participation rate of 100% (Figure 1).

Figure 1. Participation of schools in COSI Turkmenistan 2016, by region



Regarding children participation, 4085 children from Turkmenistan primary schools were invited to participate in the study; of these, 3951 children (49.9% girls) were assessed, corresponding to a participation rate of 97% (Figure 2).

Figure 2. Participation of children in COSI Turkmenistan 2016, by region



Of 4085 family forms distributed, a total of 3891 were filled in by parents/guardians, corresponding to a response rate of 95%.

3.2 Anthropometric indicators

Anthropometric measurements of height, weight and BMI, by region, are shown in Table 1. Mean values of height, weight and BMI were slighter higher for boys (123.9 cm, 24.1 kg, 15.7 kg/m^2, respectively) than for girls (122.6 cm, 23.3 kg, 15.4 kg/m^2). The tallest children were found in the Balkan region (mean value 125.1 cm); the children with the highest weight (25.0 kg) and BMI (16.1 kg/m^2) in Ashgabat city.

Table 1. Mean values of height (cm), weight (kg) and BMI (kg/m2) of children participating in COSI Turkmenistan 2016, by sex and region

Anthropometric indicators	Sex	Ahal			Ashgabat			Balkan			Dashoguz			Lebap			Mary			Turkmenistan		
		n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
Height (cm)	Boys	270	124.03	5.40	285	125.09	6.12	257	125.56	4.88	398	123.42	5.10	375	123.38	5.57	390	123.30	5.79	1975	123.87	5.56
	Girls	292	122.88	5.74	252	123.53	6.09	270	124.68	5.02	374	121.84	5.39	386	122.29	5.13	402	121.99	5.75	1976	122.59	5.58
	Total	562	123.43	5.61	537	124.34	6.16	527	125.11	4.97	772	122.66	5.30	761	122.83	5.38	792	122.64	5.80	3951	123.23	5.61
Weight (kg)	Boys	267	24.05	3.40	285	25.38	4.64	257	24.45	4.21	398	23.83	3.57	365	24.10	3.98	382	23.56	3.35	1954	24.11	3.84
	Girls	289	23.57	4.19	252	24.56	5.03	270	23.97	3.67	374	22.68	3.74	378	23.25	3.56	393	22.60	3.69	1956	23.25	3.97
	Total	556	23.80	3.84	537	24.98	4.85	527	24.21	3.95	772	23.27	3.70	743	23.67	3.80	775	23.07	3.56	3910	23.68	3.93
BMI (kg/m2)	Boys	267	15.63	1.77	285	16.15	2.23	257	15.44	1.95	398	15.59	1.73	365	15.78	1.83	382	15.46	1.59	1954	15.66	1.83
	Girls	289	15.56	2.08	252	16.01	2.53	270	15.36	1.71	374	15.21	1.74	378	15.51	1.78	392	15.17	2.04	1955	15.42	1.98
	Total	556	15.59	1.94	537	16.08	2.38	527	15.40	1.83	772	15.41	1.74	743	15.64	1.81	774	15.31	1.84	3909	15.54	1.91

Average waist and hip circumference data are presented in Table 2. Average waist circumference among girls was 54.0 cm, hip circumference 62.4 cm. Higher values were found in boys, whose average waist circumference was 55.3 cm and hip circumference was 62.6 cm.

Table 2. Waist and hip circumferences of children participating in COSI Turkmenistan 2016, by sex and region

Anthropometric indicators	Sex	Ahal			Ashgabat			Balkan			Dashoguz			Lebap			Mary			Turkmenistan		
		n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
Waist circumference	Boys	270	55.31	4.58	285	55.12	4.63	257	56.51	5.07	398	55.81	4.48	375	55.04	4.23	390	54.43	4.25	1975	55.26	4.51
	Girls	292	54.01	4.94	252	53.75	5.40	270	55.53	5.57	374	54.57	4.53	386	53.76	4.27	402	53.35	4.56	1976	54.04	4.80
	Total	562	54.63	4.82	537	54.46	5.07	527	56.01	5.36	772	55.22	4.55	761	54.39	4.30	792	53.88	4.45	3951	54.65	4.70
Hip circumference	Boys	270	62.19	4.47	285	64.96	5.18	257	64.72	5.11	398	61.67	4.45	375	62.55	4.89	389	61.42	4.59	1974	62.56	4.91
	Girls	291	61.98	4.98	252	65.25	5.71	270	64.90	5.05	374	61.42	4.65	386	62.44	4.60	402	61.11	4.67	1975	62.43	5.08
	Total	561	62.08	4.75	537	65.10	5.44	527	64.81	5.08	772	61.55	4.55	761	62.49	4.75	791	61.26	4.64	3949	62.49	5.00

3 Overweight and obesity among children

3.3 Prevalence of thinness, overweight and obesity

Overall, COSI Turkmenistan 2016 data showed that, among primary schoolchildren (7 years old), the prevalence of thinness was 4.3%, overweight 11.5%, and obesity 2.9%. The highest prevalence of obesity was found among boys (3.6%), while girls showed the highest prevalence of thinness (4.4%). Overweight prevalence was similar in boys and girls (11.5% and 11.4%, respectively) (Table 3, Figure 3).

Table 3. Nutritional status of children participating in COSI Turkmenistan 2016, by sex (WHO criteria)

	Thinness			Overweight			Obesity		
Sex	n	%	95% CI	n	%	95% CI	n	%	95% CI
Boys (n=1569)	65	4.1	3.0–5.7	191	11.5	9.4–14.1	63	3.6	2.7–4.9
Girls (n=1565)	68	4.4	3.3–5.9	183	11.4	9.5–13.5	38	2.3	1.6–3.2
Total (n=3124)	133	4.3	3.4–5.4	374	11.5	9.8–13.3	101	2.9	2.3–3.8

Figure 3. Nutritional status of girls and boys in COSI Turkmenistan 2016

The prevalence of childhood overweight observed at the national level was 11.8%. The only region that showed a higher prevalence of overweight than this was Ashgabat city (19.1%); the lowest prevalence was found in Balkan (9.4%). Regarding obesity, Ashgabat city again showed the highest prevalence (7.8%); only Mary (1.6%), Dashoguz (2.5%) and Balkan (2.8%) showed a lower prevalence than that observed at national level (3.2%). Mary was also the region that presented the highest prevalence of thinness (5.4%) (Table 4).

Table 4. Nutritional status of children participating in COSI Turkmenistan 2016, by region (WHO criteria)

Region		Thinness			Overweight			Obesity		
		n	%	95% CI	n	%	95% CI	n	%	95% CI
Ahal	(n=556)	24	4.3	2.9–6.3	67	11.5	7.6–20.0	20	3.4	1.9–5.7
Ashgabat	(n=537)	21	4.1	2.6–6.6	110	19.1	14.2–25.2	44	7.8	5.2–11.5
Balkan	(n=527)	23	4.3	3.1–5.9	53	9.4	6.7–13.1	17	2.8	1.4–5.6
Dashoguz	(n=772)	34	4.2	2.6–6.7	81	10.6	8.4–13.2	19	2.5	1.6–3.6
Lebap	(n=743)	27	3.8	2.3–6.3	93	11.8	9.2–15.1	25	3.2	2.1–4.7
Mary	(n=774)	42	5.4	3.3–8.7	79	10.2	7.1–14.5	13	1.6	0.9–3.0
Turkmenistan	(n=3909)	171	4.4	3.6–5.4	483	11.8	10.4–13.4	138	3.2	2.6–3.9

3 Overweight and obesity among children

The results for prevalence of thinness, overweight and obesity by residence area are shown in Table 5. The distribution of children living in rural and urban areas was similar (50.2% and 49.8%, respectively). The prevalence of childhood overweight and obesity was shown to be higher in urban areas (13.5% and 4.5%, respectively) than in rural areas (10.4% and 2.2%).

Table 5. Nutritional status of children participating in COSI Turkmenistan 2016, by residence area (WHO criteria)

	Thinness			Overweight			Obesity		
Residence area	n	%	95% CI	n	%	95% CI	n	%	95% CI
Urban (n=1948)	91	4.7	3.8–5.9	275	13.5	11.3–16.2	93	4.5	3.5–5.9
Rural (n=1961)	80	4.1	2.9–5.8	208	10.4	8.7–12.4	45	2.2	1.6–3.0
Turkmenistan (n=3909)	171	4.4	3.6–5.4	483	11.8	10.4–13.4	138	3.2	2.6-3.9

4 Health risk behaviours in children's eating habits and nutrition

4.1. Breastfeeding

According to WHO recommendations, the minimum time a child should be exclusively breastfed – that is, the period during which an infant receives only breast milk, without any additional food or drink – is 6 months.[24] Thereafter the infant should receive complementary foods with continued breastfeeding up to 2 years of age or beyond.

Data from COSI Turkmenistan 2016 showed that most mothers (87.3%) breastfed their children for more than 7 months; of these, 50.5% breastfed from 13 to 24 months (Figure 4).

Breastfeeding duration by region is shown in Table 6. Ahal was the region with the highest proportion of mothers who did not breastfeed their children (8.6%). The breastfeeding rate (more than 7 months) varied from 71.5% in Ashgabat to 96.7% in Lebap.

Figure 4. Duration of breastfeeding of children participating in COSI Turkmenistan 2016

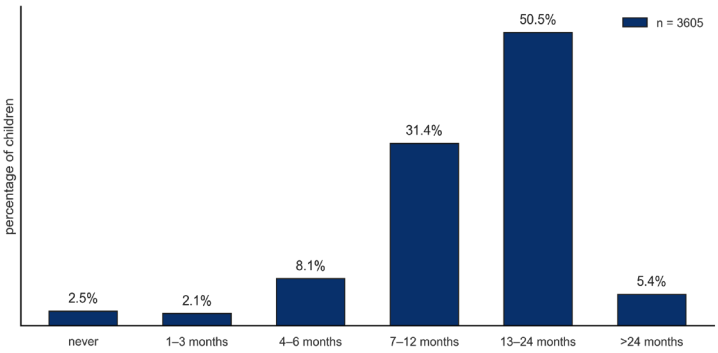


Table 6. Duration of breastfeeding of children participating in COSI Turkmenistan 2016, by region

	Never		1–3 months		4–6 months		7–12 months		13–24 months		more than 24 months		Total	
Region	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Ahal	48	8.6	2	0.4	73	12.8	176	32.7	226	45.4	1	0.2	526	100.0
Ashgabat	8	1.8	38	7.9	86	18.7	116	25.8	160	36.9	37	8.8	445	100.0
Balkan	9	1.8	17	3.3	25	5.0	101	18.8	333	66.2	24	4.7	509	100.0
Dashoguz	7	1.0	6	0.9	39	4.9	147	19.4	454	63.0	81	10.7	734	100.0
Lebap	3	0.5	6	0.9	13	1.9	290	42.6	316	48.2	44	5.9	672	100.0
Mary	21	3.1	17	2.3	75	10.4	292	40.3	303	42.5	11	1.4	719	100.0
TURKMENISTAN	96	2.5	86	2.1	311	8.1	1122	31.4	1792	50.5	198	5.4	3605	100.0

4 Health risk behaviours in children's eating habits and nutrition

4.2. Eating habits

Eating habits are considered to be one of the most important risk factors and determinants of obesity.[14] Data collection on these variables was carried out through family statements of daily or weekly food frequency consumption of several items.

Regarding breakfast, 89.6% of parents reported that their children had this first meal every day (Figure 5).

Children's food and beverage consumption, according to their family reports, is presented in Figure 6.

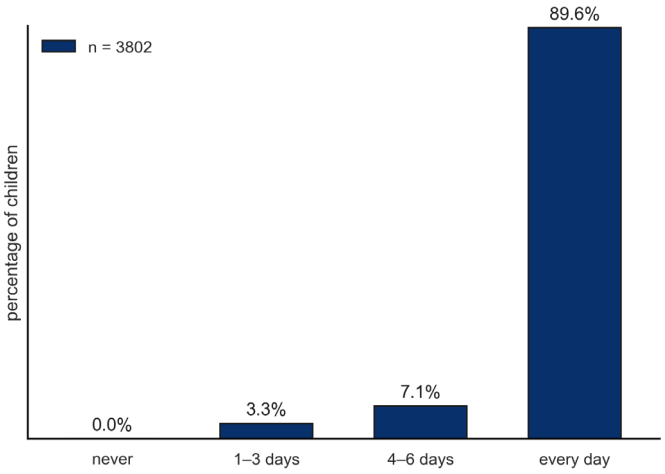
It was reported that fresh fruit (70.1%) and vegetables (68.1%) were consumed every day. Daily intake of fish (3.9%) was low compared to that of meat (68.3%).

Freshly squeezed fruit juice was consumed by a majority of children less than once a week (46.1%) or never (14.5%), while soft drinks containing sugar were reported to be consumed by 23.3% of children 1–3 days a week and by 42.5% most days of the week (> 4 days).

Consumption of dairy products was generally low. Low-fat/semi-skimmed milk (75.7%), whole-fat milk (52.6%), yoghurt and other dairy (65.6%), and cheese (70.9%) were consumed 3 days a week or less.

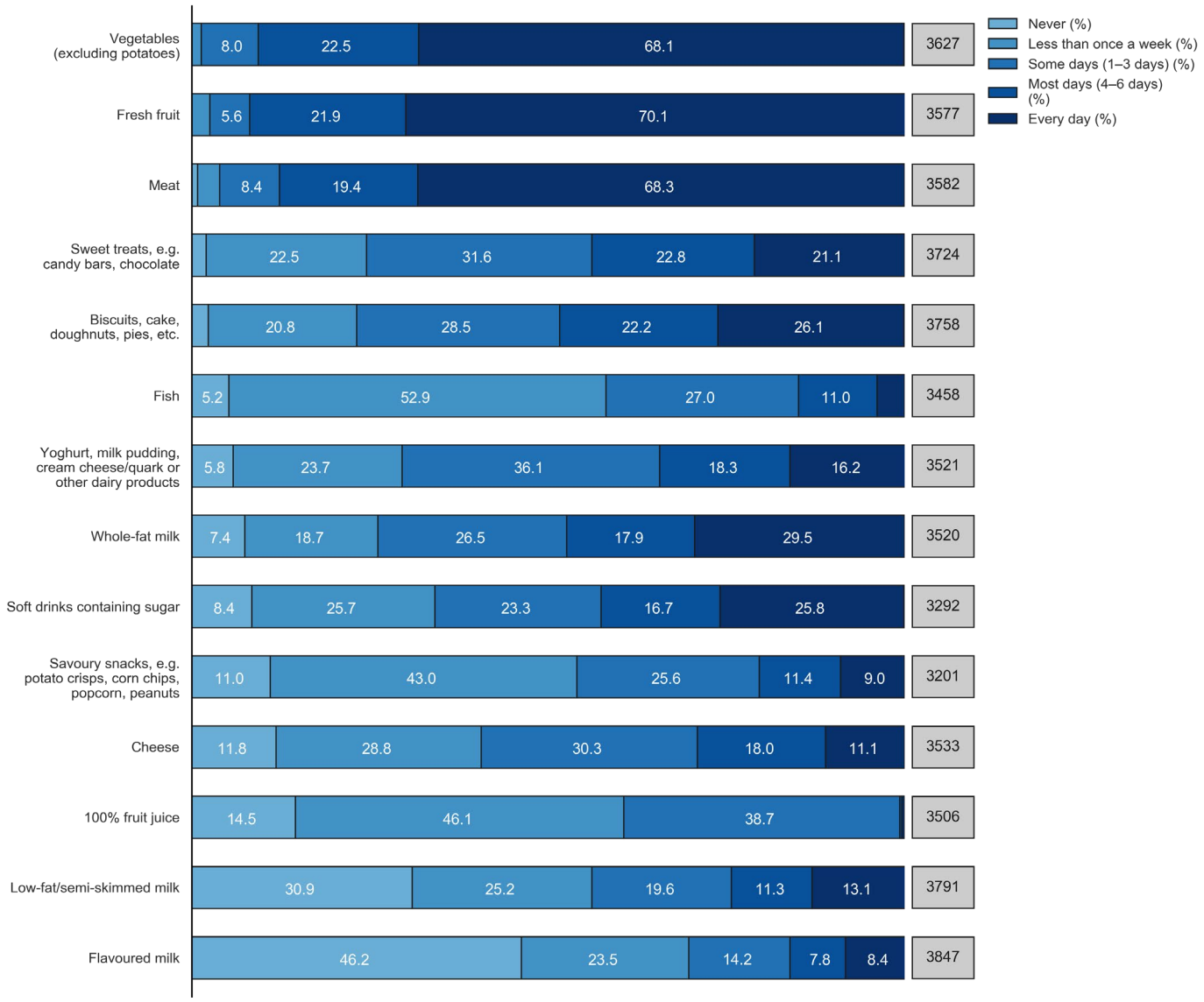
Savoury snacks such as potato crisps, corn chips, popcorn and peanuts (20.4%), sugary food items such as candy bars and chocolate (43.9%), and biscuits, cake, doughnuts and pies (48.3%) were consumed more frequently by children, on 4 or more days per week.

Figure 5. Frequency of breakfast consumption of children participating in COSI Turkmenistan 2016



4 Health risk behaviours in children's eating habits and nutrition

Figure 6. Frequency of food and beverage consumption of children participating in COSI Turkmenistan 2016



5 Behaviours in children's patterns of physical activity and nutrition

Physical activity is an important factor inhibiting the development of overweight and obesity among children.[14] COSI Turkmenistan 2016 collected data on several variables related to children's physical activity and sedentary habits.

5.1. Active transportation to school

The majority of children reported walking or cycling to school (80.5%) (Figure 7). The regions with the lowest proportion of children walking or cycling were Ashgabat city (57.1%) and Balkan (71.5%). All other regions, ranging from Lebap (82.9%) to Mary (87.8%), had a higher proportion than the mean value (Figure 8).

Figure 7. Type of transport used by children participating in COSI Turkmenistan 2016 to go to school

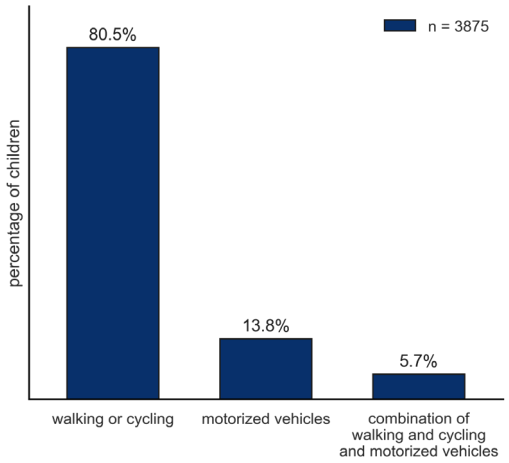
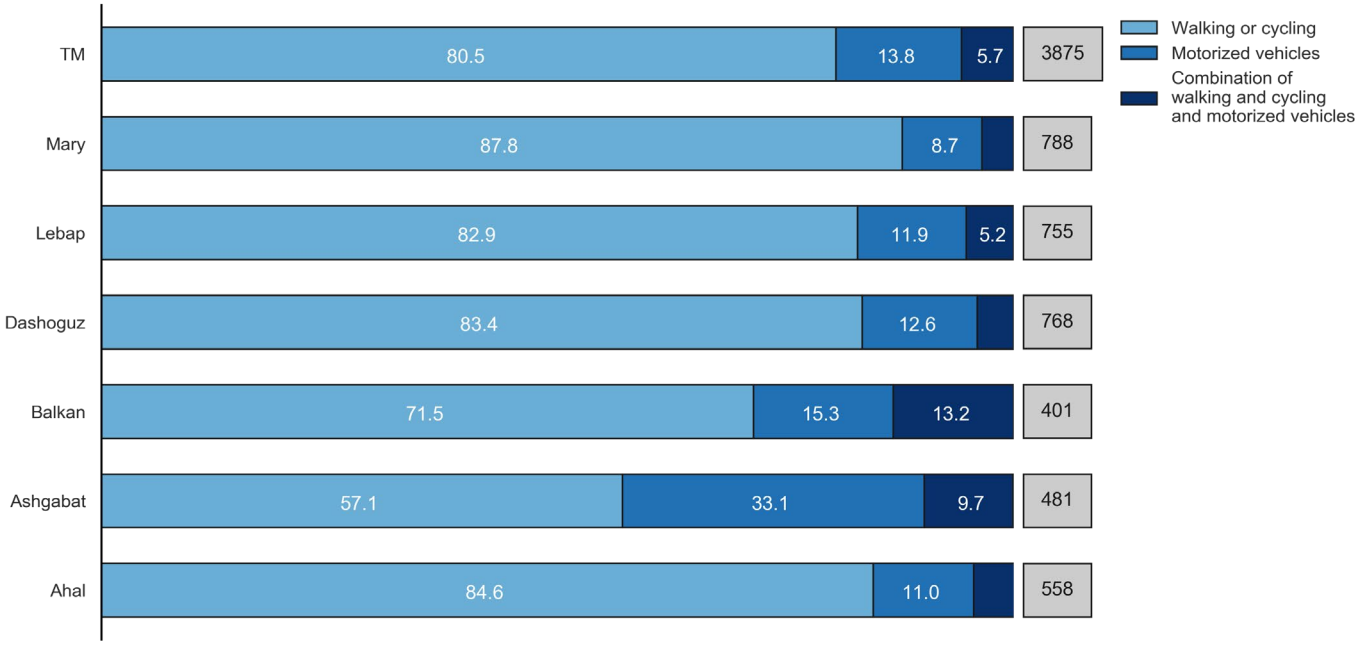


Figure 8. Type of transport used by children participating in COSI Turkmenistan 2016 to go to school, by region



5 Behaviours in children's patterns of physical activity and nutrition

5.2. Sports and physical activities, in sport clubs or dancing courses

Regular physical exercise measured by participation in sports/dance activities was not frequent among 7-year-olds in Turkmenistan, as 73.5% of children were not registered with, or did not have membership of, a sports club. Of those who had membership, most (9.0%) spent 2 hours per week on these activities. Ashgabat city was the region with the highest proportion of children (34.0%) who reported practising sport or dance activities (Table 7).

Table 7. Time spent on sports and physical activities, in sport clubs or dancing courses (COSI Turkmenistan 2016), by region

	Total (n)	not member of sports club / 0 h	1 h/ week	2 h/ week	3 h/ week	4 h/ week	5 h/ week	6 h/ week	7 h/ week or more
Region		%	%	%	%	%	%	%	%
Ahal	548	79.0	3.2	4.8	3.0	4.3	2.5	0.6	2.6
Ashgabat	455	66.0	2.7	6.9	11.1	5.6	2.3	2.2	3.2
Balkan	524	76.4	6.1	6.8	2.7	1.6	0.6	2.9	2.9
Dashoguz	767	71.8	5.6	8.4	4.6	4.1	1.0	2.4	1.9
Lebap	726	73.2	4.7	15.2	3.2	1.1	0.6	0.5	1.5
Mary	775	74.3	5.8	8.2	3.3	2.6	2.0	1.3	2.6
TURKMENISTAN	3795	73.5	4.9	9.0	4.3	3.1	1.4	1.5	2.3

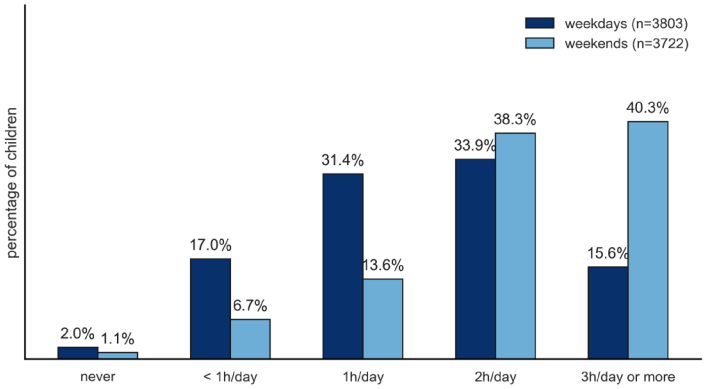
5 Behaviours in children's patterns of physical activity and nutrition

5.3. Children's time spent playing outside

Active play habits, such as the amount of their free time children spend playing, is presented in Figure 9. According to parents' reports, the majority of children (65.3%) play outside 1–2 hours on weekdays. However, the amount of active play increases at weekends, when 78.6% of children play 2–3 hours per day; of these, 40.3% play more than 3 hours.

On weekdays, the region that had the lowest proportion of children playing outside for 1 hour or more was Balkan (67.9%). At weekends, all regions saw an increase in children's hours of active play; more than 90% of children played outside for 1 hour or more per day in all regions except Balkan, where 86.6% of children did so (Figure 10, Figure 11).

Figure 9. Amount of time children participating in COSI Turkmenistan 2016 spent playing outside, during the week and at the weekend



5 Behaviours in children's patterns of physical activity and nutrition

Figure 10. Amount of time children participating in COSI Turkmenistan 2016 spent playing outside, on weekdays, by region

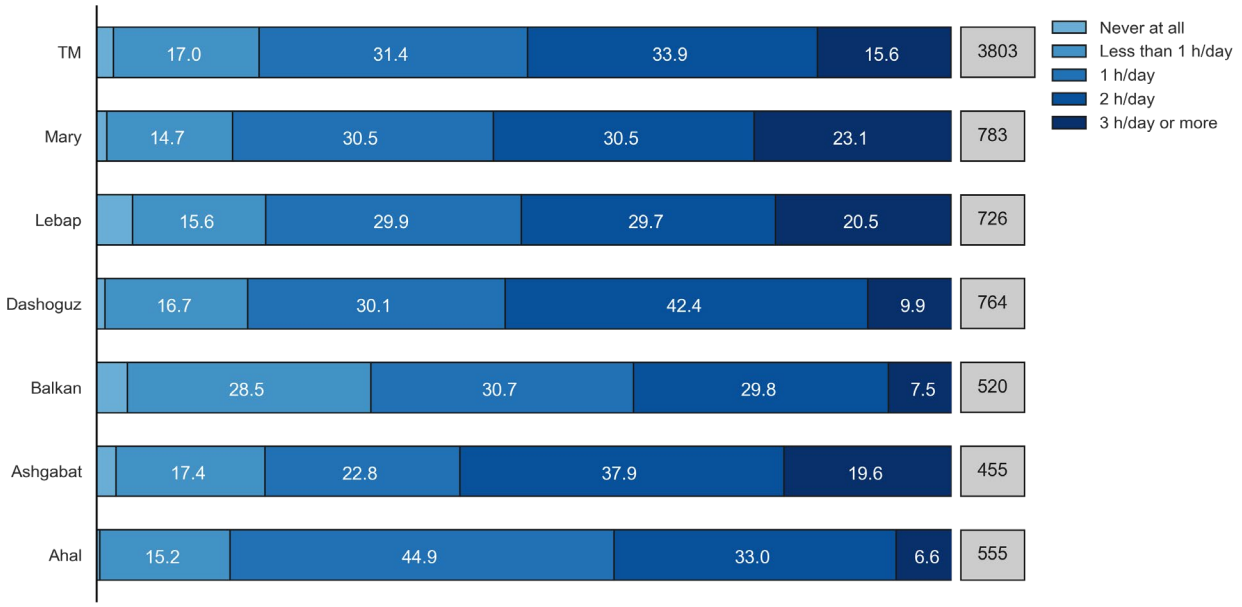
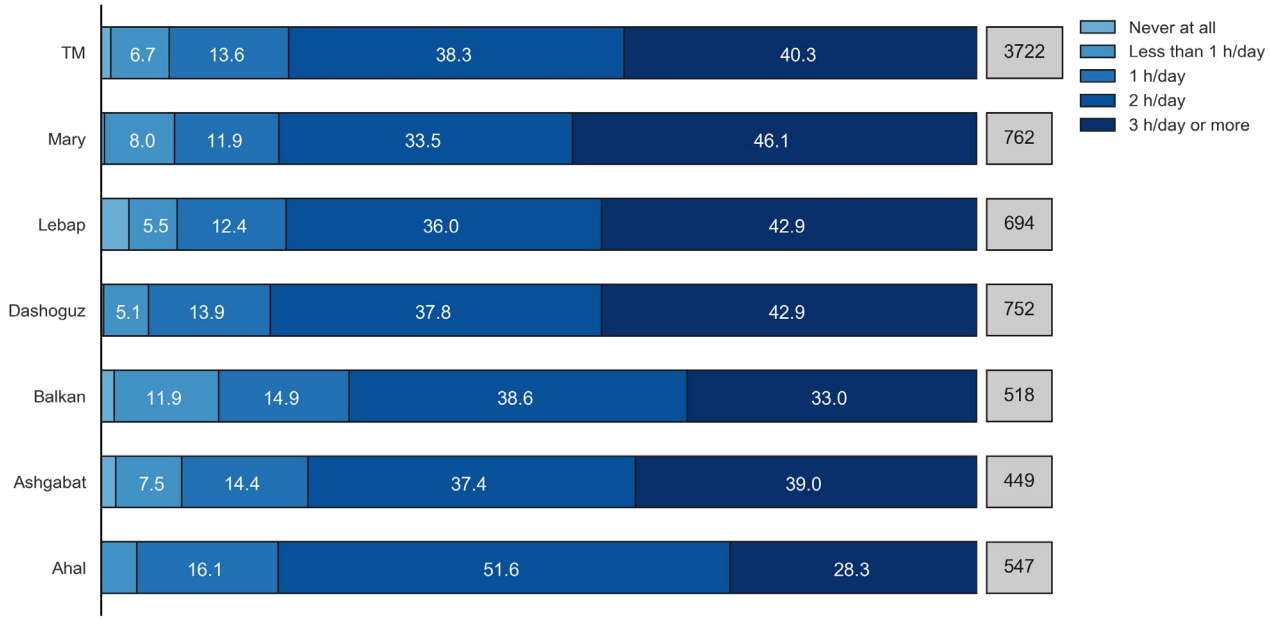


Figure 11. Amount of time children participating in COSI Turkmenistan 2016 spent playing outside, at weekends, by region



5 Behaviours in children's patterns of physical activity and nutrition

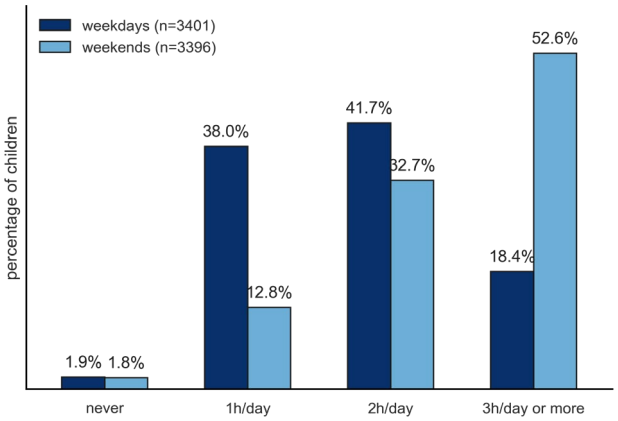
5.4. Time spent watching TV or using electronic devices

Sedentary habits, as indicated by total time spent in activities such as watching TV or using electronic devices, are presented in Fig. 12. It is widely recognized that watching TV and, in particular, using electronic devices have become more common among young children.[25] COSI Turkmenistan 2016 data showed that on weekdays 79.7% of children spent 1–2 hours per day watching TV or using electronic devices; however, at weekends the majority of children (85.3%) increased their time with TV and electronic devices to 2 hours or more per day.

Data organized by region showed that, on weekdays, in all regions except Balkan, well over half of all children (56.5% or more) spent 2 hours or more per day watching TV or using electronic devices; and in Ahal three quarters (75.2%) of children spent this much time in front of their TV and other screens. The figure for Balkan was just under half (48.9%).

Again, at weekends, the time children spent watching TV and using electronic devices increased in all regions. The proportion of children spending 2 or more hours in front of TV or other screens was very similar across the country, ranging between 83.8% in Mary and 86.9% in Lebap (Figure 13, Figure 14).

Figure 12. Amount of time children participating in COSI Turkmenistan 2016 spent watching TV or using electronic devices, on weekdays and at weekends



5 Behaviours in children's patterns of physical activity and nutrition

Figure 13. Amount of time children participating in COSI Turkmenistan 2016 spent watching TV or using electronic devices, on weekdays, by region

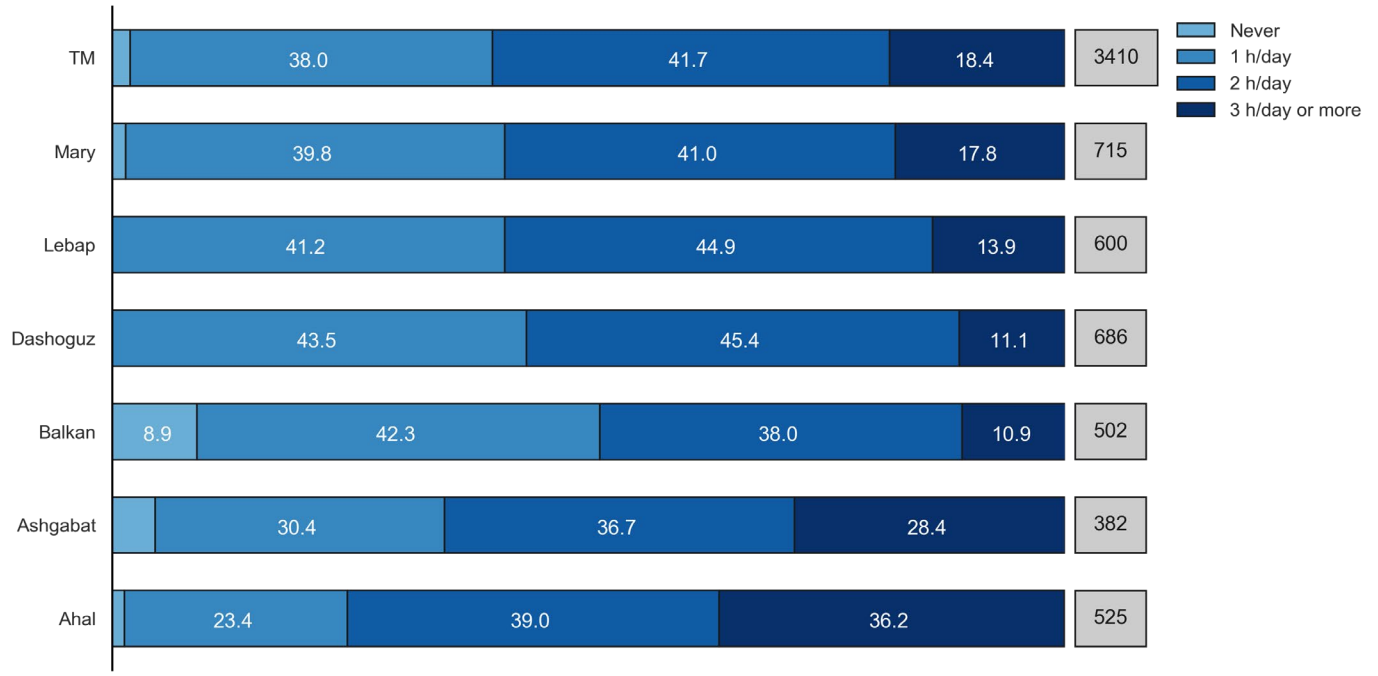
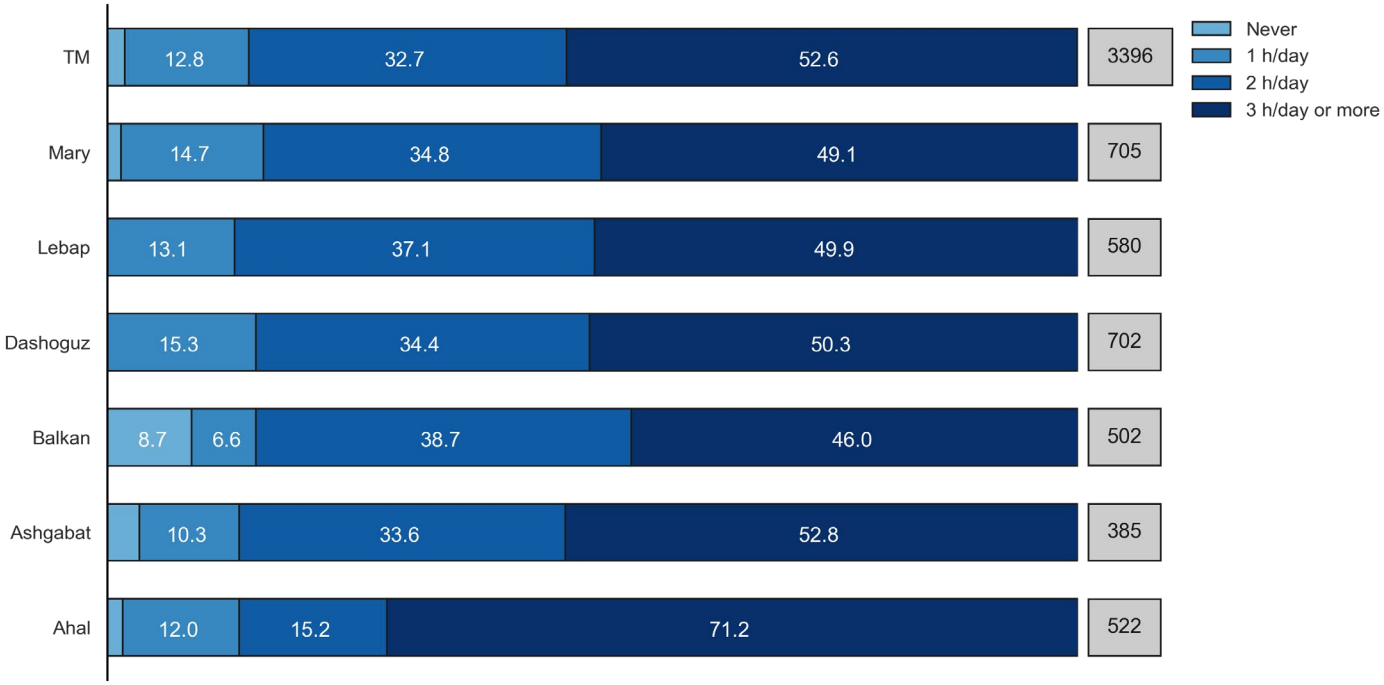


Figure 14. Amount of time children participating in COSI Turkmenistan 2016 spent watching TV or using electronic devices, at weekends, by region



6 Final remarks

In conclusion, systematic data collection by COSI allows better understanding of the progression of childhood overweight and obesity in each country, as well as comparability between countries within the WHO European Region. It also provides information on related factors, such as eating habits and patterns of physical activity.

In Turkmenistan it was reported that 7-year-olds consumed on a daily basis healthier food items such as fresh fruit (70.1%) and vegetables (68.1%); however, daily intake of fish was low (3.9%), while dairy products such as low-fat/semi-skimmed milk (75.7%), yoghurt and other dairy (65.6%), and cheese (70.9%) were only consumed up to 3 days per week. Moreover, it was reported that soft drinks containing sugar were consumed by 42.5% of children on most days of the week (> 4 days), while savoury snacks (20.4%), sugary food items such as candy bars and chocolate (43.9%), and biscuits, cake, doughnuts and pies (48.3%) were consumed 4 or more days per week.

Physical activity indicators showed that most children walk or cycle to school (80.5%). A majority of children (65.3%) play outside their homes 1–2 hours per day on weekdays, while 78.6% of children play 2–3 hours per day at weekends; of these, 40.3% play more than 3 hours per day. Nevertheless, data showed that, on weekdays, 79.7% of children spent 1–2 hours per day watching TV and using electronic devices; and at weekends, the majority of children (85.3%) increased their time in front of TV and other screens to 2 hours or more per day.

Almost 4000 children in Turkmenistan were assessed during the 2016/2017 school year, as part of the fourth round of data collection of the WHO European COSI study. This assessment showed that the prevalence of childhood overweight was 11.5%, obesity 2.9%, and thinness 4.3%. Participation in a surveillance initiative such as COSI will allow Turkmenistan to pay continuous attention to the double burden of malnutrition in the changing nutrition landscape. It is recommended that the COSI study should be repeated in Turkmenistan every three years in order to monitor trends and track progress over time.

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* Unless otherwise stated, all websites mentioned in the References were accessed on 11 June 2019.

The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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