World Health Organization

European Region

Childhood Obesity Surveillance Initiative (COSI): Kyrgyzstan

Fourth round of data collection (2017/2018)

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Abstract

Nutritional surveillance data are essential to effectively designing, implementing and evaluating policies and strategies aimed at counteracting childhood obesity, which remains an important public health problem in the WHO European Region. The WHO European Childhood Obesity Surveillance Initiative (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 – was established in 2007. Kyrgyzstan joined the WHO European COSI study in 2017/2018 (fourth round). COSI Kyrgyzstan was implemented in seven regions and two cities. Data collection followed the WHO European COSI study common protocol and data-collection procedures. A total of 8033 children (7–8-years-old) from 150 primary schools were measured. The COSI study allows better understanding of the progression of childhood overweight and obesity in each country and provides information on related factors, such as eating habits and patterns of physical activity. COSI Kyrgyzstan should be repeated every three years to monitor trends over time, which is of particular importance given that obesity (2.6%) coexists alongside thinness (3.1%), and to address the challenge of noncommunicable diseases in the country.

Keywords

CHILDHOOD OBESITY, CHILD, OVERWEIGHT, PUBLIC HEALTH SURVEILLANCE, NUTRITIONAL STATUS

Document number: WHO/EURO:2022-5680-45445-65044

Suggested citation. Childhood Obesity Surveillance Initiative (COSI): Kyrgyzstan. Fourth round of data collection (2017/2018). Copenhagen: WHO Regional Office for Europe; 2022. Licence: CC BY-NC-SA 3.0 IGO.

Cataloguing-in-Publication (CIP) data. CIP data are available at http://apps.who.int/iris.

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Acknowledgements

The WHO European Office for Prevention and Control of Noncommunicable Diseases (NCD Office) wishes to thank first of all the Republican Centre for Health Promotion and Mass Communication of the Ministry of Health of Kyrgyzstan under the support of the Ministry of Health for preparing this report and WHO Country Office in Kyrgyzstan for technical assistance in survey implementation in the country. Deep gratitude is given to the Ministry of Education and Science of Kyrgyzstan, with special thanks to Deputy Minister Nadira Dzhusupbekova for her support and endorsement of data collection in schools. Further thanks and appreciation are due to the principals and teachers of schools in which the survey was conducted, and to children and their families for participating in the survey.

The NCD Office also wishes to thank the National Statistical Committee of Kyrgyzstan for assisting in conducting population sampling and Gerben Rienk (Trial Data Solutions, the Netherlands) for data management. Special gratitude is expressed to the supervisors and interviewers from the Republican Centre for Health Promotion and Mass Communication, the Kyrgyz State Medical Institute for Re-training and Advanced Training, the National Centre for Maternal and Child Health, the e-Health Centre and regional family medicine centres for conducting the field work.

This publication was made possible through financial support from the Government of the Russian Federation within the context of the WHO European Office for the Prevention and Control of Noncommunicable Diseases.

Contributors

WHO Country Office in Kyrgyzstan

Oskon Moldokulov, technical oversight, management and supervision

Nurshaim Tilenbaeva, technical oversight and supervision of report development

Institute of Health Doutor Ricardo Jorge, Portugal

Ana Isabel Rito, conceptualized, drafting and final reviewing of the report, capacity building of the national Kyrgyzstan COSI team

WHO European Centre of Excellence for Quality in Care and Patient Safety

João Breda, technical support, management and supervision

WHO European Office for Prevention and Control of Noncommunicable Diseases

Marta Buoncristiano, statistical analysis and checking, drafting study report

Mirjam Heinen, reviewing the report, coordinating the publication

Ivo Rakovac, oversaw statistical analysis

Gerben Rienk, data management

Alena Tokareva, reviewing the report

Kremlin Wickramasinghe, technical oversight, management and supervision

Julianne Williams, technical oversight, reviewing the report

COSI Kyrgyzstan

Principal investigator

Zhamilya Usupova, Republican Center for Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic - study design, technical oversight and supervision, drafting study report

Study lead

Gulmira Aitmurzaeva, Republican Center for Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic - initiated the study, management and supervision, reviewing the report

Collaborators

Marina Duishenkulova, Republican Center for Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic - reviewing the report

Elmira Kabylova, National Centre for Maternal and Child Health under the Ministry of Health of the Kyrgyz Republic - study design, coordinator of data collection in Chui, phone consultation of parents

Nurjamal Sheisheeva, Republican Centre for Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic - drafting study report

Baktygul Tolonova, e-Health Centre of the Ministry of Health of the Kyrgyz Republic - study design, data collection and analysis of primary data in hard copies, coordinator of data collection in Jalal-Abad

Other Contributors

Sabirjan Abdikarimov, Kyrgyz Association of Public Health - external report reviewer

Sofia Mendes, Center for Studies and Research in Social Dynamics and Health (CEIDSS), Portugal - external report drafting and reviewer report

Coordinators of data collection

Ainagul Omurjanova, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic - coordinator of data collection in Issyk-Kul

Ainura Mergenbaeva, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic - coordinator of data collection in Naryn

Nasyikat Tajibaeva, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic - coordinator of data collection in Talas

Jyldyz Artykbaeva, Monitoring and Evaluation Centre, National Maternal and Child Health Centre under the Ministry of Health of the Kyrgyz Republic - coordinator of data collection in Osh

Jaanatkan Muratova, South branch of the Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic - coordinator of data collection in Batken

Sagyn Uezbaev, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic - coordinator of the data base

Data collection

We wish to thank the following for data collection:

Maksat Kurmanov, Health promotion unit of Issyk-Kul Oblast Family Medicine Centre

Nurjan Nooruzbaeva, Health promotion unit of Issyk-Kul Oblast Family Medicine Centre

Fatima Abdukerimova, Health promotion unit of Naryn Oblast Family Medicine Centre

Gulzat Jumabek Kyzy, Health promotion unit of Naryn Oblast Family Medicine Centre

Aimira Mendeeva, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Asel Aitekova, Health promotion unit of Chui Oblast Family Medicine Centre

Gulzat Aitbaeva, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Aigerim Beermanova, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Baktygul Toktorbaeva, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Nadejda Novoselova, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Anarbek Alimahunov, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Mairam Akisheva, Health promotion unit of Talas Oblast Family Medicine Centre

Magira Kutushbekova, Health promotion unit of Talas Rayon Family Medicine Centre

Baktygul Usubalieva, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Kulsun Rakova, National Center of Maternity and Childhood Care under the Ministry of Health of the Kyrgyz Republic

Shailoo Torobekova, Health Promotion Unit of Jalal-Abad Oblast Family Medicine Centre

Gulzat Jamilova, South branch of the Kyrgyz State Medical Institute for Retraining and Advanced Training named after S.B. Daniyarov

Mira Kurmanova, Municipal department of prevention, Centre of Disease Prevention and State Sanitary and Epidemiological Surveillance under the Ministry of Health of the Kyrgyz Republic

Temirlan Aknazarov, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Nazgulya Jumagulova, Kyrgyz State Medical Institute for Retraining and Advanced Training named after S.B. Daniyarov

Aijarkyn Iminova, South branch of the Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Gulnara Sulaimankulova, Family Medicine Centre No.8

Sono Joroeva, National Center of Maternity and Childhood Care under the Ministry of Health of the Kyrgyz Republic

Dilyara Isakova, National Center of Maternity and Childhood Care under the Ministry of Health of the Kyrgyz Republic

Bekzat Umarov, South branch of the Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Kumanjan Seitova, Republican Centre of Health Promotion and Mass Communication under the Ministry of Health of the Kyrgyz Republic

Foreword

Any nutrition disorder poses a serious threat to human health. Today, humankind is facing a double burden of malnutrition that includes undernutrition and overweight. Overweight among children causes numerous serious effects for their future health, increasing their risk of developing a number of noncommunicable diseases and decreasing their quality of life in adulthood.

The region of Europe and central Asia (ECA) is characterized by strong economic, social and environmental diversity. Countries of this region experience various problems with nutrition in areas such as food security. Malnutrition, in one or more of its three main forms – undernutrition, micronutrient deficiencies, and overweight and obesity – is present to varying degrees in all countries of the ECA region. Often, all three forms co-exist, creating the so-called triple burden of malnutrition.

Overweight among children and obesity among adults continue to increase – almost a quarter of the region's adult population is now living with obesity – and pose major challenges to future health and well-being and associated public health costs.

There was an urgent need for Kyrgyzstan to conduct a detailed and comprehensive assessment of this public health problem and its association with nutrition to drive specific responses at national level. Kyrgyzstan's participation in the Childhood Obesity Surveillance Initiative (COSI) enables it to complete comparative assessments at country and international levels. This contributes to the establishment of a national surveillance and monitoring system for childhood obesity that will provide routine surveillance data as a reliable source of information for the planning of nutrition programmes in the country.

The Ministry of Health of Kyrgyzstan endorses this initiative of the WHO Regional Office for Europe in promoting policy that controls obesity in line with the global goals set by the World Health Assembly in the areas of nutrition improvement and control of noncommunicable diseases.

Sabirzhan Abdikarimov
Chair, Kyrgyz Public Health Association

Abbreviations

BMI	body mass index
BMI/A	body mass index for age
CI	confidence interval
COSI	Childhood Obesity Surveillance Initiative
NCDs	noncommunicable diseases
SD	standard deviation
SMOP	School Meals Optimization Programme

Executive summary

Childhood obesity remains an important public health problem in the WHO European Region. While trends in the prevalence of overweight and obesity in children recently have plateaued in high-income countries, it still represents a great challenge, particularly among younger generations in low- and middle-income countries, especially those in urban areas.

Given the remarkable diversity within the European Region, many countries now face the burden of malnutrition in all its forms, with rising rates of childhood obesity occurring alongside high rates of child undernutrition and stunting.

Prevention is recognized as the only feasible option for curbing this epidemic. Nutritional surveillance data are essential to effectively designing, implementing and evaluating policies and strategies aimed at counteracting obesity.

In response to this need, the WHO Regional Office for Europe established the WHO European Childhood Obesity Surveillance Initiative (COSI) in 2007 – a systematic process of collection, analysis, interpretation and dissemination of descriptive information for use in monitoring excess body weight and in programme planning and evaluation. The common COSI protocol establishes the main characteristics of study design and sampling strategy, and the inclusion of a combination of mandatory and voluntary components affords participating countries some flexibility in adapting the system to their national context. This enables monitoring of trends in the epidemic and intercountry comparisons to be completed within the European Region.

The study was first initiated with 13 Member States of the WHO European Region in 2008 and was followed by four further rounds (2010, 2013, 2016 and 2019).

Kyrgyzstan, which is facing and addressing the challenges related to the so-called double burden of disease, needed to obtain detailed data on the magnitude of the two forms of malnutrition (obesity, and underweight or stunting) and joined the WHO European COSI study in 2017/2018 (fourth round).

COSI Kyrgyzstan was implemented in seven regions of Kyrgyzstan (Chuy, Naryn, Talas, Issyk-Kul, Jalal-Abad, Batken and Osh oblasts) and two cities (Bishkek and Osh). Data collection followed the COSI common protocol and data-collection procedures.

A total of 8033 children (aged 7–8 years) from 150 primary schools were assessed, corresponding to a participation rate of 91.1%. Data on anthropometric measurements included weight, height, and waist and hip circumferences, and were collected by trained examiners. A family questionnaire was used and indicators of children's dietary intakes and physical/inactivity patterns were collected. The family rate response was 86.2% (n = 7595). The school environment in relation to the School Meals Optimization Programme (SMOP) was assessed through a school questionnaire.

Key findings

- COSI Kyrgyzstan 2017/2018 was conducted in 150 schools, with 8033 children being measured (91.1% of children invited to participate in the study); 7595 returned the family questionnaire compiled by their parents or caregivers, reflecting a family participation rate of 86.2%.
- The prevalence of thinness among children aged 7 and 8 years was 3.1%, overweight (including obesity) 9.7% and obesity 2.6%, according to 2007 WHO growth reference criteria. The prevalence of all three criteria was slightly higher in boys than in girls. Children aged 7 years showed a prevalence of overweight of 9.9% and obesity of 2.6%. In those aged 8 years, the prevalence of overweight was 9.5% and obesity 2.5%. The highest thinness prevalence was observed among 8-year-olds (3.9%), against 2.8% in 7-year-olds.
- Bishkek city showed the highest prevalence of overweight (16.7%) and obesity (5.7%), while Osh city presented the highest prevalence of thinness (8.0%). The prevalence of thinness, overweight and obesity was higher in urban areas (3.6%, 12.0% and 4.2%, respectively) than in rural (2.8%, 8.5% and 1.8%, respectively).
- Less than 70% of the children had breakfast every day. The lowest proportion of children who reported having daily breakfast (44.3%) was observed in Naryn region.
- Data from COSI Kyrgyzstan 2017/2018 showed that over 90% of mothers from all regions reported ever having breastfed their children, suggesting a general breastfeeding prevalence of 95.7%. Most mothers (87.5%) breastfed their children for more than seven months; of these, 52.6% breastfed from 13 to 24 months. The majority of mothers reported having breastfed exclusively for six months or more (69.1%), while only 2.9% had never breastfed exclusively.
- A low proportion of parents reported that their children had a daily consumption of vegetables (31.1%), fresh fruit (18.2%) and fish (2.4%). Intake of dairy products was reported for fewer than three days a week by most of the participants, including for low-fat/semi-skimmed milk (80.5%), yoghurt and other dairy products (55.2%), and cheese (86.3%). Soft drinks containing sugar were reported to be consumed by 31.5% of children 1–3 days a week and by 27.9% on more than four days a week. Savoury snacks (52.4%), sweet treats such as candy bars or chocolate (76.9%) and biscuits, cake, doughnuts or pies (78.8%) were consumed at least once per week.
- Most children reported walking or cycling to school (71.6%), except in Bishkek city, where 40.8% reported going to school by motorized vehicles and 11.1% by a combination of means of transport. Data by residence area showed a higher proportion of walking or cycling to school among children who live in rural areas (79.4%) compared to those in urban (56.9%).
- Reported participation in sports clubs or in dancing activities was 14.4%. The highest proportion of children (26.1%) that reported practising sports or dance activities was observed in urban areas. While the majority of the participating children were not members of sports clubs or on dancing courses, most spent time playing actively outside for 1–3 hours per day during weekdays (86.5%) and at weekends (96.4%).

- Data showed that 67.3% of children spend 1–2 hours per day in sedentary activities (watching TV or using electronic devices) during the week. The amount of time children spent in these activities increased at weekends, with 74.1% spending two or more hours per day watching TV or using electronic devices. Other activities that usually do not demand great physical exertion and mostly can be performed while seated or resting are doing homework and reading. It was observed that most children (72.6% and 61.4%, respectively) spent 1–2 hours per day doing homework or reading a book during weekdays and at weekends.
- The school environment was analysed through the collection of data related to food and physical activity. Of the schools analysed in COSI Kyrgyzstan 2017/2018, 54.7% reported having the School Meals Optimization Programme (SMOP). The proportion of schools that included nutrition education lessons was higher among schools with the SMOP (58.5% against 30.2%).
- Few overall differences concerning the food items and beverages students can obtain on school premises were observed between schools with and without the SMOP. Many products considered unhealthy, such as soft drinks containing sugar, flavoured milk with added sugar, energy drinks, ice cream and savoury snacks, were not available on school premises. Fresh fruit (83.1%) and vegetables (66.2%) were also reported by most schools as not being available on the school premises, especially among those without the SMOP (fresh fruit: 89.1%; vegetables: 82.8%). A considerable percentage of schools (36.9%) reported having sweet snacks available for purchase on school premises, with the proportion being higher in schools without the SMOP than those with (45.3% against 30.9%, respectively). The only item reported as being available for free by a slight majority of schools (56.6%) was tea (without added sugar).
- The prevalence of overweight and obesity was slightly lower in schools with the SMOP than in those without (8.5% against 10.6% and 2.1% against 3.1%, respectively).
- Almost half of the schools reported including nutrition education in the school curriculum (46.6%) and most had canteens on the school premises (93.3%). Additionally, 31.3% of schools reported having shops or cafeterias and 2.0% had vending machines where foods or beverages could be purchased on the school premises. In relation to the physical activity environment, it was observed that most schools had outdoor playground areas (98.7%) and indoor gyms (84.7%) on the school premises.
- As part of the WHO European COSI study, Kyrgyzstan will be able to collect data on children's nutritional status and lifestyle characteristics, particularly those related to nutrition and patterns of physical activity, every three years. This will allow continuous monitoring of trends over time and support the need for ongoing or future interventions to promote healthier lifestyles among children and, consequently, ensure better health.

Introduction

WHO European Childhood Obesity Surveillance Initiative – childhood obesity as a priority public health issue

Childhood obesity is one of the major contributors to noncommunicable diseases (NCDs) and remains an important public health concern in the WHO European Region. There is clear scientific evidence that children with overweight or obesity are very likely to remain obese as adults and have further risk of developing chronic disorders, such as type 2 diabetes and cardiovascular diseases, at younger ages *(1)*. Childhood obesity also is linked to adverse psychosocial consequences such as lower self-esteem and may result in lower educational attainment *(2–4)*.

The report from the WHO Commission on Ending Childhood Obesity highlights obesogenic environments as the key driver for obesity among children *(5)*. The intake of energy-dense foods combined with more time spent on screen-based and sedentary activities with a consequent decline in physical activity are responsible for an energy imbalance that results in weight gain and obesity *(5–7)*.

Although trends in mean body mass index (BMI) in children's and adolescents' overweight and obesity recently have plateaued in high-income countries *(8)*, it still represents a great challenge, particularly among younger generations in low- and middle-income countries and especially in urban areas *(9)*. Additionally, given the remarkable diversity within the European Region, many countries now face the burden of malnutrition in all its forms, with rising rates of childhood obesity together with high rates of child undernutrition and stunting *(8)*.

Preventive measures are recognized as being among the most important and feasible strategies to tackle childhood overweight and obesity. Collecting nutritional surveillance data to obtain a detailed and comprehensive understanding of the magnitude of this public health problem therefore is crucial to effectively designing, implementing and evaluating measures and policies for tackling obesity *(10)*.

A decade ago, the WHO European Region lacked comparable data on children's overweight and obesity to provide a better understanding of this important public health problem. At the WHO European Ministerial Conference on Counteracting Obesity (Istanbul, 15–17 November 2006), it was recognized that standardized, harmonized surveillance systems were required to form a basis for policy development in the Region. The European Charter on Counteracting Obesity, which aims to drive action against obesity throughout the Region, encouraged the development of internationally comparable core indicators for inclusion in national health surveillance systems to enable the resulting data to be used for advocacy, policy-making and monitoring purposes *(11)*.

In response to this need, the WHO Regional Office for Europe and 13 Member States established the WHO European Childhood Obesity Surveillance Initiative (COSI) in 2007. This is a systematic process of collection, analysis, interpretation and dissemination of descriptive information for use in monitoring excess body weight and in programme planning and evaluation. In addition to collecting comparable information on children's nutritional status, COSI also collects information

on their dietary and physical activity patterns, screen time, sleep and more *(12)*. These data allow countries to establish national actions, monitor trends over time, make comparisons between countries and evaluate the effectiveness of obesity prevention efforts in place.

A common COSI protocol establishes the main characteristics of study design and sampling strategy, and by including a combination of mandatory and voluntary components, it also affords participating countries some flexibility in adapting the system to their national context *(13,14)*. The WHO European COSI therefore gives each country the potential to develop a childhood nutrition surveillance system with the main goal of creating a systematic network to collect, analyse, interpret and share descriptive information about the nutritional status of primary school-age children. The system produces data that are comparable among European countries and allows monitoring of childhood obesity every three years. The first round (2007/2008) included 13 countries, the second (2010) 17 and the third (2013) 19. In 2016–2018, 35 countries participated in the fourth WHO European COSI round.

COSI Kyrgyzstan

Nutrition has had a huge influence on the overall health of the population over the past century. Today, issues of food security and nutrition remain relevant and acute in Kyrgyzstan, which is facing and addressing the challenges related to the so-called double burden of disease *(15,16)*, with children presenting with two forms of malnutrition – obesity, and underweight or stunting – but also, within this, the serious condition of micronutrient deficiencies.

Overall, the growing burden of NCDs is one of the public health priorities of Kyrgyzstan, where 80% of all deaths are attributable to NCDs *(17)*. Overweight and obesity affect 56% and 23%, respectively, of the population aged over 20 years *(17)*. Additionally, central Asian countries in the WHO European Region have experienced a nutritional transition as a result of growing urbanization and the globalization of the processed food supply in the past few decades *(18)*. This nutritional transition is reflected in several dietary changes, including decreased consumption of foods rich in fibre, such as legumes, fruits, vegetables and wholegrains, and more frequent intake of processed foods that are high in fats, sugars and salt *(19)* and are commonly associated with weight gain and greater frequency of NCDs.

Although few data are available on nutritional status, dietary habits and food composition in Kyrgyzstan, representative surveys *(20)* indicate a steady increase in the prevalence of overweight and obesity, especially in urban areas, while the prevalence of childhood undernutrition (including wasting and stunting) has been decreasing or stabilizing. The estimated prevalence of overweight (moderate and severe) in Kyrgyzstan among children is 7% *(21)*. Nutritional deficiencies nevertheless are still found in this age group: the Kyrgyzstan Multiple Indicator Cluster Survey from 2018 found that 12% of children under 5 years are stunted. Differences between urban and rural settings are also observed, with 13.1% of children under 5 in urban areas and 8.8% in rural being stunted *(21)*.

The Government of Kyrgyzstan has adopted several laws that aim to improve the population's nutritional status. These include a law on the prevention of iodine deficiency diseases and technical regulations on the safety of iodized salt, enrichment of baking flour, safety of enriched flour, protection of breastfeeding and regulating the marketing of products and means for

artificial feeding of children. In 2019, the Government approved the food security and nutrition programme for 2019–2023, one of the key priorities of which outlines measures to improve the population's nutritional status and ensure the universal right to a sufficient amount of varied, nutritious and high-quality food at all stages of the life cycle. This is supported by the provision of evidence-based nutrition information to improve knowledge of healthy eating and eating behaviour. To drive implementation of the national development strategy of Kyrgyzstan for 2018–2040 and the Government programme on public health protection and health-care system development for 2019–2030, the Healthy Person – Prosperous Country programme was created. The vision is that by 2030, every citizen, family and the whole of society will live healthy lifestyles, strive to be healthy and be involved in the health-care management system.

A law on organization of meals for schoolchildren was first signed in 2002, requiring schools to provide 200 g of milk and a bun to primary schoolchildren starting in 2006. The law also allowed the substitution of milk and buns with other drinks and bakery products with equivalent energy values. Ten years later, the intersectoral working committee under the chairmanship of the Vice-Prime Minister of Kyrgyzstan was established to promote optimization of the school meal programme. A pilot project was launched in 2013 with extensive support provided by the United Nations World Food Programme and the Mercy Corps. In 2014, the Government approved priority directions for gradual rollout of the national school meal programme, with further endorsement of the programme achieved in 2016 through a joint order of the Ministry of Education and Science and Ministry of Health. The law on organization of meals for schoolchildren was updated in 2019 to enforce procedures on school meals from first to fourth grade. The School Meals Optimization Programme (SMOP) currently benefits about 65% of Kyrgyzstan's primary school pupils by replacing the milk/tea and bun with hot meals. The Government plans to reach all young pupils in all primary schools in the country with nutritious hot meals by 2023 *(22)*.

To address issues related to improving the nutrition status of the overall population, Kyrgyzstan has also joined international networks, including the global Scaling Up Nutrition movement in 2011.

In 2016, the need arose to obtain detailed data on the magnitude of malnutrition in Kyrgyzstan. The Ministry of Health sent an official request to the WHO Regional Office for Europe to consider Kyrgyzstan's participation in COSI and ask for WHO technical support for implementation. Official confirmation of the opportunity to participate in the fourth round of COSI was received by November 2017.

It is important to have a surveillance system that allows monitoring of anthropometric indicators of children's development and enables understanding of the factors that could affect them to support the development of public health strategies to tackle and prevent childhood obesity and related problems. COSI Kyrgyzstan provides the data to allow national assessment of the situation and enable comparison with other countries of the WHO European Region. This report presents data collected in COSI Kyrgyzstan 2017/2018 within the fourth round of the WHO European COSI study. It determined the prevalence of thinness, overweight and obesity among children aged 7–8 years. The children's eating patterns, patterns of physical activity and sedentary habits were also identified, and school environments were reviewed in relation to the SMOP *(22)*.

1. Methodology

The fourth round of the WHO European COSI study took place in 2016, although the period was extended for some countries, including Kyrgyzstan. All participating Member States followed a standardized methodological protocol and data-collection procedures *(13,14)*.

The study has a semi-longitudinal design with repeated cross-sectional samples aimed at primary school-age children (6–10 years). This is a relevant age range, given that around the age of 6 years the so-called adiposity rebound begins, characterized by a period of rapid increase in BMI *(23)*. This age range precedes puberty, so focusing on prevention at this stage can reduce the incidence of obesity and promote remission.

1.1 Organizational structure

The Republican Centre of Health Promotion and Mass Communication was identified as the responsible organization for conducting COSI in Kyrgyzstan, and this was endorsed by the Ministry of Health. While the Centre was the lead organization for operationalizing the study, the COSI team members also included representatives from other organizations, such as the National Statistical Committee, the National Maternal and Child Health Centre, the Kyrgyz State Medical Academy, the Kyrgyz Medical Institute of Continuous Education and the e-Health Centre. The study was further supported and facilitated by the Ministry of Education and Science to promote successful implementation of this school-based survey.

The Director of the Republican Centre of Health Promotion was appointed the study leader and regional supervisor/coordinator, working with a technical leader and principal investigator for the study. COSI team members (such as coordinators and field work examiners) were appointed by the Ministry of Health.

The Republican Centre established 14 teams that were responsible for the field work in seven districts and two cities of the country. The National Statistical Committee supported the Republican Centre with a list of schools and sampling processes.

An orientation workshop organized by WHO and the Ministry of Health took place in Bishkek in December 2016, involving stakeholders from the Ministry of Education and Science, Republican Centre, Kyrgyz State Medical Academy, Kyrgyz State Medical Institute of Continuous Education, Department of Disease Prevention and State Epidemiological Surveillance, and the National Maternal and Child Health Centre.

A press conference was conducted in the information agency KABAR on 22 March 2018, with contributions by the Head of the Department of Public Health Care of the Ministry of Health, the Director of the Republican Centre, the Lead of the Department of Nutrition of the National Maternal and Child Health Centre and the Head of the WHO Country Office in Kyrgyzstan. The large-scale research project among school-aged children was announced.

The national research team consisted of 36 specialists from national and regional health organizations. Each region was covered by two groups of researchers (two researchers in

each group) led by a regional coordinator. Four researchers therefore were working in each region. A regional COSI coordinator was identified for each region (seven in total).

The regional coordinators were responsible for the logistics of conducting the research activities in general and provided practical and advisory assistance in filling out questionnaires. They also were personally responsible for the overall results of the research (including ensuring accuracy in questionnaire-filling, completion and validation of the questionnaires and data entry into the online data management system (OpenClinica)).

The researchers were responsible for carrying out the anthropometric measurements and filling out the questionnaires, and for arranging training facilities and coordinating activities (with the coordinators) to ensure reliable data measurements. Researchers were also responsible for the correctness, accuracy and completeness of the filled-out questionnaires and for transferring verified questionnaires to the coordinators.

The National Research Group consisted of representatives from the following organizations:

- the Republican Centre for Health Promotion and Mass Communication, which is a structural division of the public health service of the Ministry of Health of Kyrgyzstan whose mission is to develop and disseminate health promotion communication aimed at improving the health and quality of life of the population;
- the National Centre for Maternal and Child Health, a state medical and preventive research organization of tertiary health care that provides specialized medical care in the fields of obstetrics and gynaecology, neonatology, paediatrics and paediatric surgery using high-tech equipment and advanced scientific techniques;
- the Kyrgyz State Medical Institute for Re-training and Advanced Training, a national higher education institution that implements a system of continuing medical education for doctors, nurses and other professionals working in the health-care system; its mission is to improve the quality of medical services to the population in accordance with international standards and the needs of practical health care through the provision of continuing medical education;
- the e-Health Centre under the Ministry of Health, which provides organizational and methodological support for the Ministry of Health and aims to provide a unified e-health information system for Kyrgyzstan; and
- family medicine centres, which provide the framework for delivery of primary medical and sanitary support to the population.

1.1.1 Time and place

The field work was carried out from 2 April–22 May 2018, with geographical coverage in all seven regions of Kyrgyzstan (Chuy, Naryn, Talas, Issyk-Kul, Jalal-Abad, Batken and Osh oblasts) and two cities (Bishkek and Osh).

1.2 Ethical and operational considerations

Approval to conduct the study was received from the Ethics Committee of the Preventive Medicine Scientific and Production Organization of the Ministry of Health under the requirements for observing ethical standards for medical research (extract from Protocol No. 1/1 of 22 February 2018). The Ministry of Education and Science provided an endorsement letter (number 03-1/743 dated 6 February 2018) to assist in assessing the health and nutrition status of primary schoolchildren.

Together with regional, city and district departments of education, each group of researchers agreed on the schedule of visits and the readiness of schools to participate in the study. The group then informed school class leaders of the date and time of the study among pupils in grades 1 and 2 and about the class meeting.

The teachers responsible for the selected classes provided class registration journals from which the lists of pupils were compiled. Heads of the school educational unit were responsible for organizing the room to conduct the anthropometric measurements. Before the data-collection phase started, the teachers organized a meeting with parents to present the study and inform them about the upcoming research. Consent letters were distributed at this meeting to obtain parental approval, with a passive approach (under which parents who did not respond to the letter were assumed not to have withheld consent) implemented.

School management and class teachers provided assistance and support for organizing the measurement procedures, ensuring all ethical concerns were addressed. Following the WHO COSI protocol *(13)*, children's assent was obtained before the anthropometric measurements were taken. Parents came to school to participate in the measurement process in 5% of cases.

Codes that were exclusive to each region were used in all questionnaires used to register data collected from children, families and schools to ensure data confidentiality.

1.3 Study design and sampling

The COSI Kyrgyzstan study design and sampling process followed the COSI protocol procedures *(13)*. Kyrgyzstan targeted 7-year-old children who were enrolled in primary schools. Children were selected through a two-stage stratified cluster sampling design with primary schools defined as primary sampling units and first- and second-grade classes as secondary sampling units. One hundred and fifty schools were selected from the complete list of primary schools in the country in the school year 2017/2018 using a probability proportional to size sampling technique. The PSUs were stratified by regions/cities (nine strata – seven regions and two cities) and the urbanization grade of the school location (two strata – urban and rural areas). One first-grade class and one second-grade class were randomly sampled in each selected school and all children belonging to those classes were invited to participate in the survey. The sampling procedure was carried out by the National Statistical Committee (Table 1).

Table 1. Main features of the study and sampling design

Features	Sample	
Setting of enrolment	Primary schools	
Targeted age group	7 years	
Sampling design	Two-stage stratified cluster sampling	
Sampling unit definition	PSU	Primary school
	SSU	First- and second-grade classes
Stratification	By region and urbanization grade of the school location	
Sampling unit selected and participating proportions (%)	PSU	150 (100.0)
	SSU	297 (99.0)
Child questionnaire response rate (%)	91.1	
Family questionnaire response rate (%)	86.2	

PSU: primary sampling unit; SSU: secondary sampling unit.

1.4 Equipment and training procedures

An orientation meeting was held with the COSI data management coordination group on 17 January 2017. Thirteen representatives from the following organizations participated: Republican Centre for Health Promotion and Mass Communication; Department of Disease Prevention and State Sanitary and Epidemiological Surveillance; National Statistical Committee; Ministry of Education and Science; National Centre for Maternal and Child Health; and the United Nations World Food Programme.

The national team of researchers attended a three-day training session on 18–20 January 2017 in Bishkek, conducted by WHO international experts from Italy, Kazakhstan and Serbia. Thirty-eight representatives of national, republican and regional organizations attended the training.

On 9 February 2018, the national team of researchers and representatives of republican organizations held a one-day training event on practical skills in anthropometric measurement techniques, equipment calibration rules, interview techniques and filling-in of data-collection questionnaires. The training was conducted by an international COSI trainer (from Kazakhstan), with 22 people taking part (88% of the total application number of 25).

COSI regional coordinators simultaneously conducted one-day training sessions for researchers and representatives of primary health care services in all seven oblasts on 17 March 2018, with 36 participants attending.

The research tool consisted of a stadiometer, a control tripod (m^2) of floor scales, a 5-litre plastic bottle, a centimetre tape, alcohol napkins, a floor mat and a heater. It also included a backpack, a ballpoint pen, a pencil, a notebook and three types of questionnaires (the school, family and child questionnaires). As the study took place in early spring when the weather was not stable and central heating was shut off in schools, additional heaters and floor mats were purchased to create comfortable temperature conditions for the children. The

measurement room conditions were calibrated to ensure compliance with the COSI protocol by being well lit, ventilated, isolated and warm. Commonly the measurement rooms were medical centres or classrooms.

The purchase of equipment was provided by the WHO Regional Office for Europe, passed to the accounting balance of the Republican Centre for Health Promotion and Mass Communication of the Ministry of Health.

1.5 Data-collection questionnaires and procedures

All students participated in the anthropometric assessment, except those who were absent at the time of the study and those whose parents/guardians did not consent to their participation. The Republican Centre for Health Promotion and Mass Communication provided 9000 child and family questionnaires and 180 school questionnaires, of which 70% were in Kyrgyz and 30% in Russian languages.

The regional coordinators were responsible for distributing the questionnaires to groups according to the sample provided by the National Statistical Committee, collecting and submitting the results of the study using the three questionnaires. Each of the 18 groups organized their school visits, preparing all equipment and materials needed and supplying a complete set of questionnaires for each school by class and number of pupils (family questionnaires for parents/guardians were supplied in numbers equivalent to the numbers of pupils). Researchers used COSI codes to fill out the questionnaires for children.

Pupils from the same grade were measured in the first half of the day, and their parents were invited to complete the family questionnaire in the second. Researchers conducted door-to-door survey visits if parents were unable to visit schools. The research team worked for three days at each school to collect all the data.

The COSI Kyrgyzstan research procedure comprised the following steps.

1.5.1 First visit: meeting with school boards

Meetings with school boards consisted of:

- a presentation of the study and its methodology;
- introductory discussions with the selected class teachers;
- confirmation of the conditions of the classrooms and study room;
- identification of a person from the school management team to complete the school questionnaire;
- presentation by the research team of the prepared designated child and family questionnaires filled out in accordance with the class log (year of study and child code); and
- confirmation of the procedure for completing the family questionnaire (parent meeting/ providing information to parents about the research and obtaining their consent).

1.5.2 Second visit: measuring students

The process involved:

- preparing the room/office space for the measurement (ensuring an acceptable room temperature);
- calibrating the instruments;
- collecting any family questionnaires that refused consent; and
- following the research process of:
  - providing brief information for pupils about the measurement procedure;
  - a teacher or researcher taking the children into the room one at a time, preparing them for the measurement after receiving their verbal agreement;
  - measuring children in their underwear (pants and t-shirts), with one researcher measuring the weight, height, and waist and hip circumference and a second recording the measurement data on individual child questionnaires; and
  - giving children data sheets for their parents to review.

1.5.3 Third visit: continuation of the research

The process involved:

- completing the anthropometric measurement of pupils;
- collecting family questionnaires and conducting a door-to-door survey of parents of pupils in grades 1 or 2 whose measurements were taken but who were not able to come to school and fill out the questionnaire there;
- checking for the completeness and quality of the questionnaires;
- compiling a complete set of the three types of questionnaires separately for each school; and
- dismantling the stadiometer and packing all accessories in a backpack at the end of the study at the school, with each member of the group being personally responsible for the proper functioning of the equipment.

1.5.4 Final stage

The final process involved:

- regional coordinators submitting questionnaires to the researcher in charge at national level;
- transferring research tools to the programme coordinator; and
- the chief researcher passing the questionnaires to IT specialists, who were the data clerks for entering data into the online system (data entry was completed in September 2018).

1.6 Data analysis

Data were collected using paper questionnaires. The team of data clerks entered the data from the paper questionnaires to the WHO/COSI data entry system OpenClinica, which was created by the WHO Regional Office for Europe in collaboration with Trial Data Solutions.

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 data codebook and was shared with the WHO Regional Office for Europe, as per the COSI protocol. 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 questionnaire) from the measured body weight provided on the child questionnaire.

The 2007 WHO-recommended cut-offs for school-age children and adolescents were used to compute BMI for age (BMI/A) Z-scores and interpret anthropometric indicators *(24)*. 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; and obesity, as the proportion of children with a BMI/A value above +2 Z-score *(24)*. In accordance with WHO definitions, the prevalence estimates for overweight children include those who are living with obesity.

Children with biologically implausible (or extreme) BMI values were excluded from the analysis: this was defined as BMI/A values below –5 or above +5 Z-score relative to the 2007 WHO growth reference median.

Data gathered through the family and child record questionnaires were analysed by applying sampling design to infer results from the surveyed children to the population and produce unbiased estimates. Unweighted data analysis was carried out for information about the school environment.

The main findings of these analyses are shown in the tables and figures included in this report. For completeness, the number (n) of sampled children used to produce each finding is also reported. Subnational estimates are provided for the following regions and cities: Batken, Chuy, Issyk Kul, Jalal-Abad, Naryn, Osh and Talas regions, and Bishkek and Osh cities.

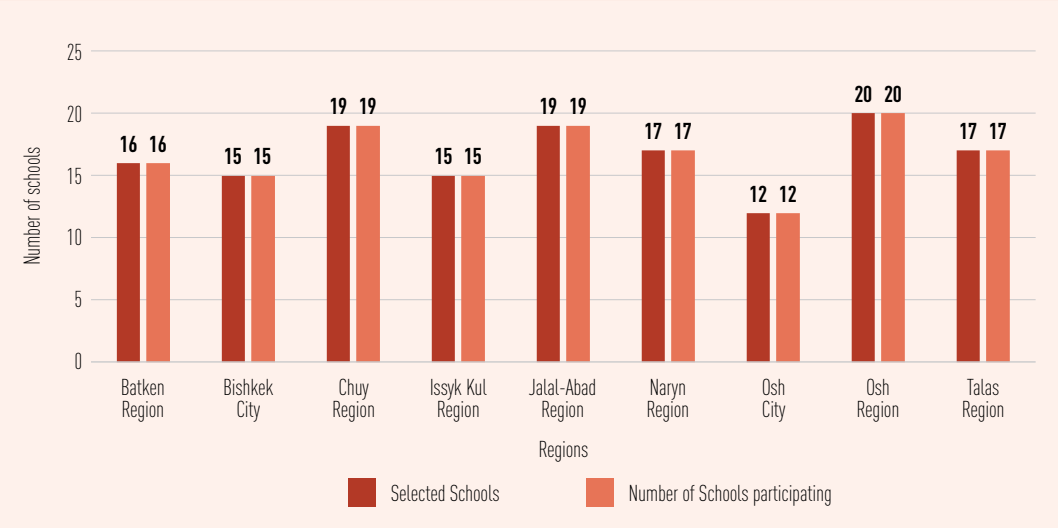
Data analyses were carried out using Stata Statistical Software: Release 15 (StataCorp LLC, College Station (TX), United States of America).

2. Children's nutritional status

2.1 Participation rate

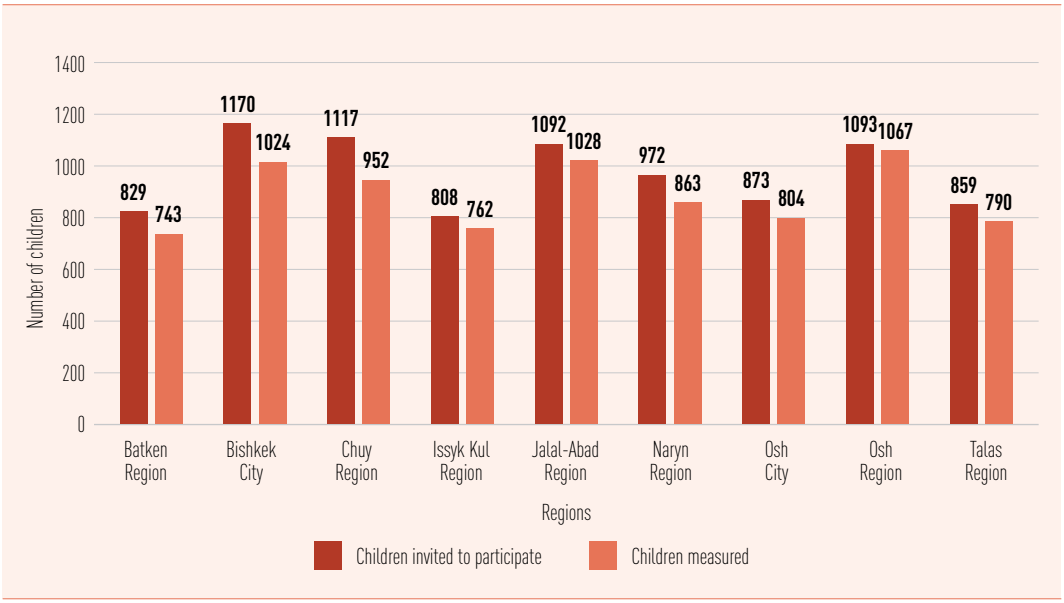
COSI Kyrgyzstan 2017/2018 was conducted in 150 schools from nine regions, with a participation rate of 100% of schools (Fig. 1).

Fig. 1 Participation of schools in COSI Kyrgyzstan 2017/2018, by region



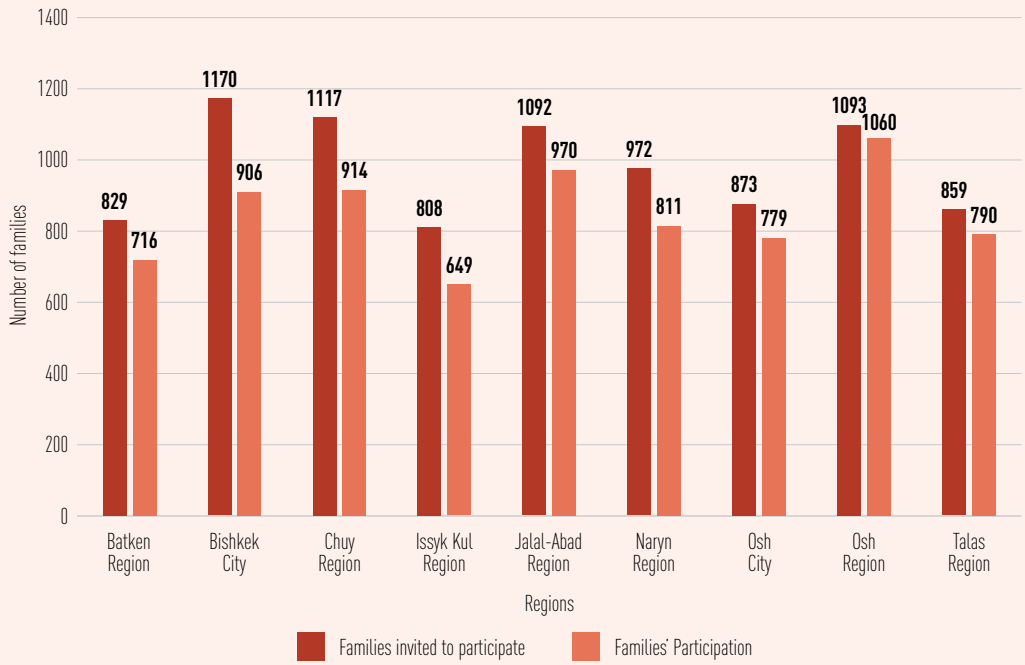
Of the 8813 primary school-aged children initially invited to participate in the study, 8033 children were measured, corresponding to a student participation rate of 91.1% (Fig. 2).

Fig. 2. Participation of children in COSI Kyrgyzstan 2017/2018, by region



Of 8813 family questionnaires issued, 7595 were completed by parents/guardians, corresponding to a family response rate of 86.2% (Fig. 3).

Fig. 3. Participation of families in COSI Kyrgyzstan 2017/2018, by region



2.2 Anthropometric indicators

Anthropometric measurements of height (cm), weight (kg) and BMI (kg/m^2) by region are shown in Table 2. The mean values of all the anthropometric indicators were slightly higher for boys than for girls (124.5 cm against 123.0 cm, 24.5 kg against 23.5 kg and 15.7 kg/m^2 against 15.5 kg/m^2, respectively). The tallest children (mean value 127.3 cm) and those with the highest weight (mean value 26.2 kg) were found in Bishkek city, which means the children with the highest BMI (mean value 16.1 kg/m^2) were found there also.

The average values for waist and hip circumference are displayed in Table 3. Average waist circumference among girls was 54.0 cm and hip circumference 62.6 cm. Boys presented slightly higher values, with average waist circumference of 55.4 cm and hip circumference of 62.8 cm.

Table 2. Mean values of height (cm), weight (kg) and BMI (kg/m²) of children in COSI Kyrgyzstan 2017/2018, by sex and region

Anthropometric indicators	Sex	Batken region			Bishkek city			Chuy region			Issyk Kul region			Jalal-Abad region			Naryn region			Osh city			Osh region			Talas region			Kyrgyzstan		
		n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
Height (cm)	Male	384	122.4	6.0	477	128.3	5.6	475	125.8	6.3	390	125.5	5.9	511	123.5	6.1	440	125.8	6.3	361	123.3	6.4	530	122.4	6.1	386	124.1	5.7	3954	124.5	6.4
	Female	355	121.3	5.7	468	126.3	6.4	458	124.0	6.2	365	124.5	5.9	513	122.4	5.8	418	124.6	6.6	410	121.9	5.9	529	120.7	6.0	394	123.2	5.8	3910	123.0	6.3
	Total	739	121.9	5.9	945	127.3	6.1	933	124.9	6.3	755	125.0	5.9	1024	122.9	6.0	858	125.2	6.4	771	122.6	6.2	1059	121.5	6.1	780	123.7	5.8	7864	123.8	6.4
Weight (kg)	Male	384	23.5	3.3	477	26.9	5.1	475	25.1	4.8	390	25.0	4.2	511	23.8	3.8	440	24.1	3.3	361	23.4	3.9	530	23.5	3.8	386	24.6	4.1	3954	24.5	4.3
	Female	355	22.7	3.4	468	25.4	4.7	458	24.1	4.6	365	24.0	3.8	513	22.9	3.5	418	23.7	4.1	410	22.4	4.0	529	22.7	3.7	394	24.0	3.9	3910	23.5	4.1
	Total	739	23.1	3.4	945	26.2	4.9	933	24.6	4.7	755	24.5	4.1	1024	23.3	3.7	858	23.9	3.7	771	22.9	4.0	1059	23.1	3.7	780	24.3	4.0	7864	24.0	4.2
BMI (kg/m²)	Male	384	15.6	1.3	477	16.3	2.3	475	15.8	2.0	390	15.8	1.7	511	15.5	1.6	440	15.2	1.3	361	15.3	1.7	530	15.7	1.6	386	15.9	1.8	3954	15.7	1.8
	Female	355	15.4	1.6	468	15.9	2.1	458	15.6	1.9	365	15.4	1.6	513	15.2	1.5	418	15.2	1.9	410	15.0	1.9	529	15.5	1.6	394	15.7	1.7	3910	15.5	1.8
	Total	739	15.5	1.5	945	16.1	2.2	933	15.7	2.0	755	15.6	1.7	1024	15.4	1.5	858	15.2	1.6	771	15.1	1.8	1059	15.6	1.6	780	15.8	1.8	7864	15.6	1.8

SD: standard deviation.

Table 3. Waist and hip circumferences of children in COSI Kyrgyzstan 2017/2018, by sex and region

Anthropometric indicators	Sex	Batken region			Bishkek city			Chuy region			Issyk Kul region			Jalal-Abad region			Naryn region			Osh city			Osh region			Talas region			Kyrgyzstan		
		n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
Waist circumference (cm)	Male	387	54.5	3.9	525	57.3	6.5	490	56.3	5.3	396	56.5	4.1	513	55.4	4.6	442	56.3	4.9	377	52.6	5.0	534	53.4	4.3	390	56.8	5.1	4054	55.4	5.2
	Female	356	53.2	4.0	499	55.6	6.7	462	54.5	4.9	366	56.0	4.9	515	54.1	4.5	421	55.1	5.0	427	51.6	4.5	533	52.3	4.3	400	55.1	4.3	3979	54.0	5.1
	Total	743	53.8	4.0	1024	56.5	6.6	952	55.4	5.2	762	56.3	4.5	1028	54.7	4.6	863	55.7	5.0	804	52.1	4.7	1067	52.9	4.3	790	55.9	4.8	8033	54.7	5.2
Hip circumference (cm)	Male	387	61.3	3.9	525	65.8	5.7	490	64.0	5.2	396	64.0	4.5	513	62.7	4.8	442	62.3	4.3	377	60.1	4.7	534	60.3	4.2	390	64.2	4.9	4054	62.8	5.2
	Female	356	62.0	4.3	499	64.9	5.4	462	64.0	5.1	366	64.6	5.0	515	62.7	4.4	421	62.8	4.7	427	60.0	4.8	533	59.9	4.4	400	64.3	4.8	3979	62.6	5.1
	Total	743	61.6	4.1	1024	65.4	5.6	952	64.0	5.1	762	64.2	4.7	1028	62.7	4.6	863	62.5	4.5	804	60.0	4.8	1067	60.1	4.3	790	64.2	4.8	8033	62.7	5.1

SD: standard deviation.

2.3 Prevalence of thinness, overweight and obesity

COSI Kyrgyzstan 2017/2018 data revealed that the prevalence of thinness among primary schoolchildren (7 and 8 years old) was 3.1%, overweight (including obesity) 9.7% and obesity 2.6%. The highest prevalence of all three categories of nutritional status was found among boys (Table 4 and Fig. 4).

Table 4. Nutritional status of children in COSI Kyrgyzstan 2017/2018, by sex (WHO criteria)

Sex	Thinness			Overweight (including obesity)			Obesity		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
Male	3954	3.8	[2.7–4.0]	3954	11.0	[9.9–12.2]	3954	3.6	[2.9–4.5]
Female	3910	2.8	[2.0–3.9]	3910	8.4	[7.5–9.3]	3910	1.6	[1.2–2.1]
Total	7864	3.1	[2.5–3.8]	7864	9.7	[8.9–10.6]	7864	2.6	[2.2–3.2]

CI: confidence interval.

Fig. 4. Nutritional status of girls and boys in COSI Kyrgyzstan 2017/2018

Analysis of nutritional status of the participating children by age showed that in the group aged 7 years the prevalence of overweight was 9.9% and obesity 2.6%, while in the group aged 8 years the corresponding figures were 9.5% and 2.5%. The highest prevalence of thinness was observed among 8-year-olds (3.9%) (Table 5).

Table 5. Nutritional status of children in COSI Kyrgyzstan 2017/2018, by age and sex (WHO criteria)

Age	Sex	Thinness			Overweight (including obesity)			Obesity		
		n	%	95% CI	n	%	95% CI	n	%	95% CI
Only 7-year-olds	Male	1646	3.0	[2.0–4.0]	1646	10.9	[8.9–12.9]	1646	3.5	[2.2–4.9]
	Female	1602	2.6	[1.4–3.7]	1602	8.8	[7.3–10.4]	1602	1.6	[1.0–2.3]
	Total	3248	2.8	[2.1–3.8]	3248	9.9	[8.7–11.3]	3248	2.6	[2.0–3.4]
Only 8-year-olds	Male	1666	4.5	[3.5–5.9]	1666	10.6	[9.0–12.4]	1666	3.6	[2.7–4.8]
	Female	1652	3.3	[2.4–4.6]	1652	8.4	[7.0–10.1]	1652	1.4	[0.9–2.2]
	Total	3318	3.9	[3.1–4.9]	3318	9.5	[8.4–10.8]	3318	2.5	[2.1–3.1]

CI: confidence interval.

Nutritional status by region (Table 6) showed the highest prevalence of thinness in Osh city (8.0%) and the highest prevalence of overweight (16.7%) and obesity (5.7%) in Bishkek city.

Table 6. Nutritional status of children in COSI Kyrgyzstan 2017/2018, by region (WHO criteria)

Regions	Thinness			Overweight (including obesity)			Obesity		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
Batken region	739	1.7	[0.9–3.5]	739	7.1	[5.6–8.9]	739	1.3	[0.7–2.5]
Bishkek city	945	3.0	[1.8–5.1]	945	16.7	[14.8–18.8]	945	5.7	[4.5–7.3]
Chuy region	933	2.9	[2.1–4.1]	933	11.6	[9.1–14.7]	933	4.2	[2.7–6.5]
Issyk Kul region	755	2.1	[1.5–3.1]	755	8.6	[6.3–11.7]	755	1.6	[1.0–2.6]
Jalal-Abad region	1024	2.8	[1.9–4.0]	1024	6.5	[5.0–8.3]	1024	1.8	[0.9–3.5]
Naryn region	858	4.9	[3.4–7.0]	858	6.4	[4.7–8.7]	858	0.7	[0.4–1.1]
Osh city	771	8.0	[3.2–18.9]	771	7.9	[5.8–10.7]	771	1.1	[0.6–2.1]
Osh region	1059	2.8	[1.5–5.4]	1059	8.8	[6.6–11.7]	1059	1.9	[1.2–3.0]
Talas region	780	1.7	[1.0–2.9]	780	12.0	[9.8–14.6]	780	2.8	[1.7–4.5]
Kyrgyzstan	7864	3.1	[2.5–3.8]	7864	9.7	[8.9–10.6]	7864	2.6	[2.2–3.2]

CI: confidence interval.

Table 7 presents data on nutritional status of children by residence area. The prevalence of overweight and obesity was higher among children who reported living in urban than those living in rural areas (12.0% against 8.5% and 4.2% against 1.8%, respectively).

Table 7. Nutritional status of children in COSI Kyrgyzstan 2017/2018, by residence area (WHO criteria)

Residence area	Thinness			Overweight (including obesity)			Obesity		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
Urban	3208	3.6	[2.4–5.3]	3208	12.0	[10.8–13.3]	3208	4.2	[3.3–5.2]
Rural	4655	2.8	[2.3–3.4]	4655	8.5	[7.4–9.6]	4655	1.8	[1.3–2.4]
Kyrgyzstan	7863	3.1	[2.5–3.8]	7863	9.7	[8.9–10.6]	7863	2.6	[2.2–3.2]

CI: confidence interval.

3. Health risk behaviours in eating habits and nutrition among children

3.1 Birthweight

The mean values of birthweight (g) reported in COSI Kyrgyzstan 2017/2018 by region are shown in Table 8. The highest mean value of birthweight was observed in Bishkek city (3332 g) and the lowest in Naryn region (3177 g). More than 85% of children in all regions of Kyrgyzstan reported birthweight values between 2500 g and 4000 g.

Table 8. Birthweight values of children in COSI Kyrgyzstan 2017/2018, by region

Regions	Mean (g)	SD	< 2 500 g (%)	2 500–4 000 g (%)	> 4 000 g (%)
Batken region	3202	478	4.6	91.8	3.7
Bishkek city	3332	493	5.0	85.7	9.4
Chuy region	3256	464	6.5	86.6	6.9
Issyk Kul region	3181	566	7.0	87.3	5.7
Jalal-Abad region	3293	408	5.1	89.7	5.2
Naryn region	3177	710	6.9	88.9	4.2
Osh city	3305	620	4.2	90.0	5.8
Osh region	3240	421	6.0	89.2	4.8
Talas region	3242	778	6.0	88.3	5.7
Kyrgyzstan	3258	511	5.7	88.5	5.9

SD: standard deviation.

3.2 Breastfeeding

Data from COSI Kyrgyzstan 2017/2018 showed that over 90% of mothers from all regions reported breastfeeding their children, producing a general breastfeeding rate in Kyrgyzstan of 95.7% (Fig. 5).

Fig. 5. General breastfeeding rates of children in COSI Kyrgyzstan 2017/2018, by region

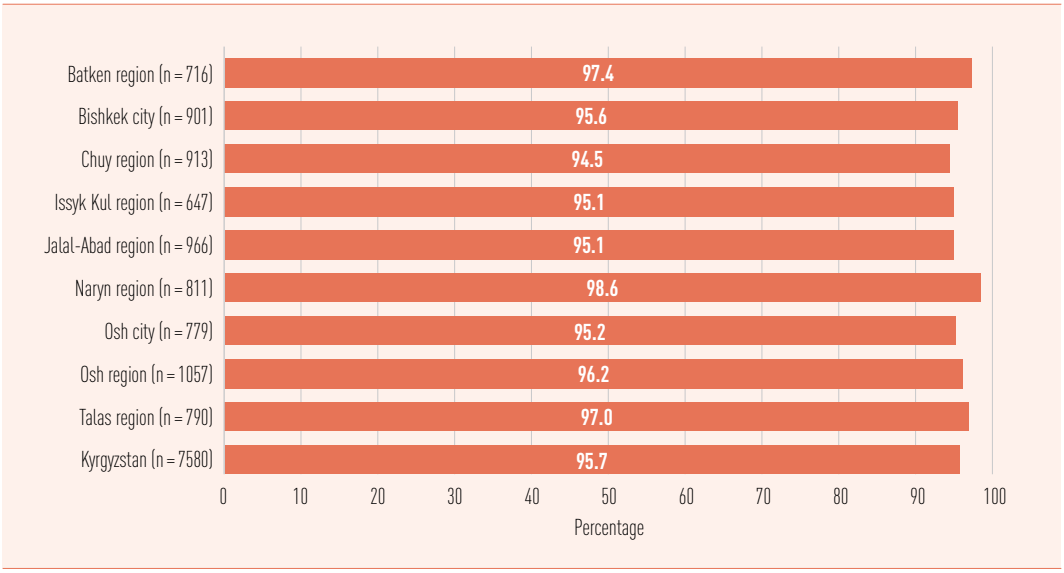
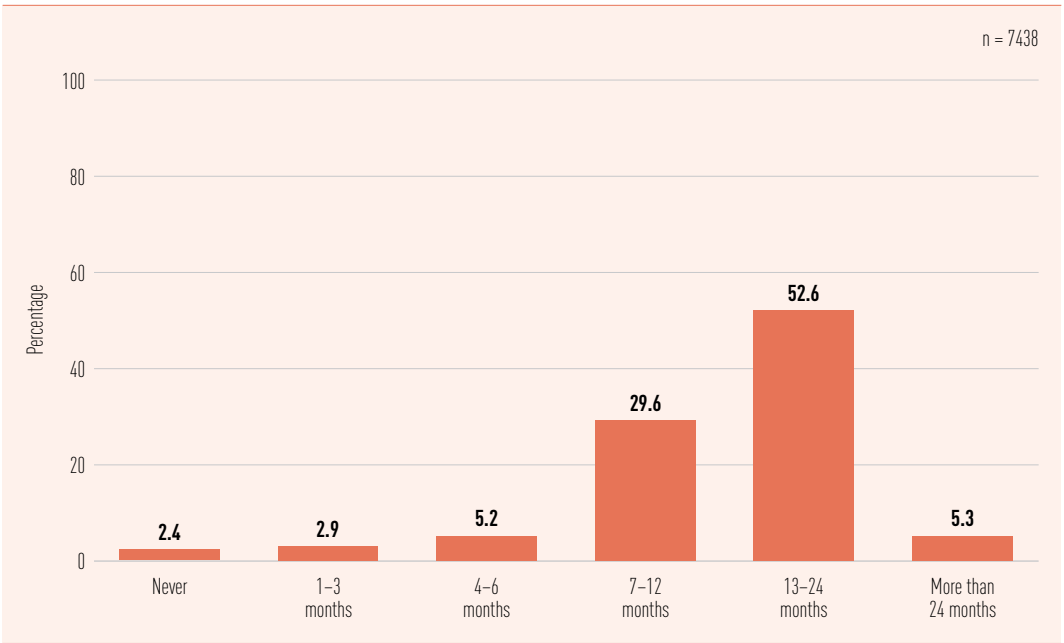


Fig. 6 presents the duration of breastfeeding of children in COSI Kyrgyzstan 2017/2018. The figure shows that 2.4% of mothers had never breastfed and 87.5% reported breastfeeding for more than seven months, with the highest prevalence of breastfeeding between 13 and 24 months.

Fig. 6. Duration of breastfeeding of children in COSI Kyrgyzstan 2017/2018



The highest frequency of mothers who had never breastfed (4.3%) was observed in Chuy region. Between regions, breastfeeding duration for more than seven months varied from 80.7% in Biskek city to 94.5% in the Batken region (Table 9).

Table 9. Duration of breastfeeding of children in COSI Kyrgyzstan 2017/2018, by region

Regions	n	Never	1–3 months	4–6 months	7–12 months	13–24 months	More than 24 months	Don't know
		%	%	%	%	%	%	%
Batken region	716	1.0	1.2	1.7	18.7	66.4	9.4	1.6
Bishkek city	845	2.7	6.1	8.5	33.9	41.9	4.9	2.0
Chuy region	899	4.3	5.1	8.2	30.4	47.2	3.6	1.3
Issyk Kul region	641	3.1	2.3	4.2	33.5	49.7	5.4	1.8
Jalal-Abad region	937	1.9	2.1	3.4	24.4	58.3	6.7	3.2
Naryn region	809	0.9	3.0	6.3	31.2	52.8	5.4	0.6
Osh city	761	2.6	2.3	3.5	27.6	54.3	7.5	2.3
Osh region	1042	1.7	1.2	4.7	32.2	54.2	3.8	2.1
Talas region	788	1.6	2.1	4.8	40.0	48.1	2.0	1.4
Kyrgyzstan	7438	2.4	2.9	5.2	29.6	52.6	5.3	2.0

Exclusive breastfeeding until 6 months of age, meaning that the infant receives no other food or liquid aside from breast milk until the age of 6 months, is a key WHO recommendation *(25)*. Thereafter, WHO recommends continued breastfeeding along with complementary foods up to 2 years of age or beyond *(25)*. Table 10 presents the duration of exclusive breastfeeding of children reported by parents/guardians during COSI Kyrgyzstan 2017/2018. Most mothers reported exclusively breastfeeding for six months or more (69.1%), and only 2.9% had never exclusively breastfed.

Table 10. Duration of exclusive breastfeeding of children in COSI Kyrgyzstan 2017/2018, by region

Regions	n	Never	1–3 months	4–5 months	6 months or more	Breastfed children but with no information on exclusive breastfeeding
		%	%	%	%	%
Batken region	705	1.4	6.4	10.9	81.3	0.0
Bishkek city	885	3.3	12.3	11.7	55.9	16.9
Chuy region	901	4.3	14.5	20.9	54.9	5.4
Issyk Kul region	635	3.3	8.3	16.9	68.4	3.1
Jalal-Abad region	936	2.2	6.3	7.6	78.8	5.1
Naryn region	807	0.9	6.2	8.6	84.0	0.3
Osh city	761	2.7	8.3	10.1	74.2	4.7
Osh region	1032	2.0	10.0	13.2	71.1	3.8
Talas region	780	8.7	10.4	12.8	67.9	0.3
Kyrgyzstan	7442	2.9	9.7	12.9	69.1	5.4

3.3 Eating habits

Eating habits are among the most important risk factors and determinants of obesity *(26)*. The family questionnaire collected information about children's dietary habits by asking parents to report how frequently their children consumed various foods, including breakfast, fresh fruit, fish, soft drinks, dairy products, savoury snacks and more.

3.3.1 Breakfast

Just under 70% (68.8%) of responses indicated that children had breakfast every day (Fig. 7). The lowest frequency of daily breakfast every day was observed in Naryn region (44.3%) (Table 11).

Fig. 7. Frequency of breakfast consumption among children in COSI Kyrgyzstan 2017/2018

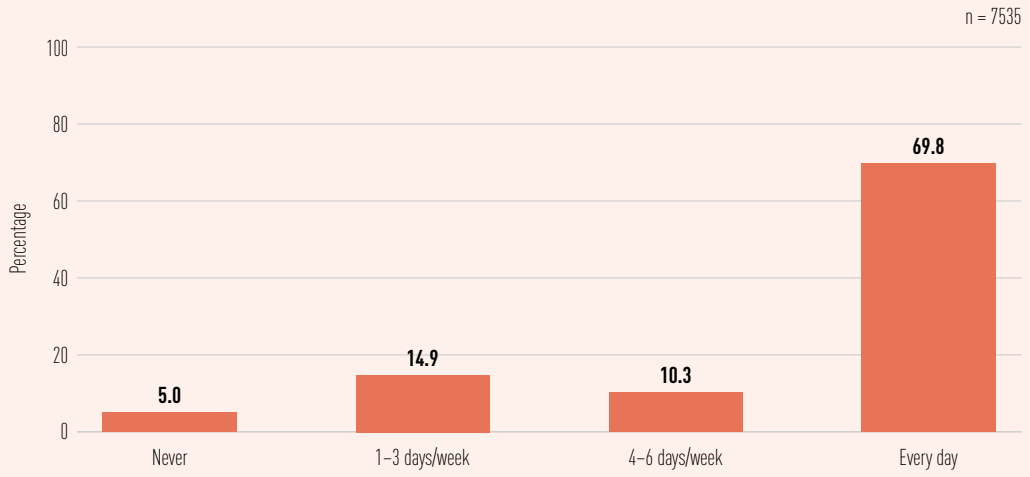


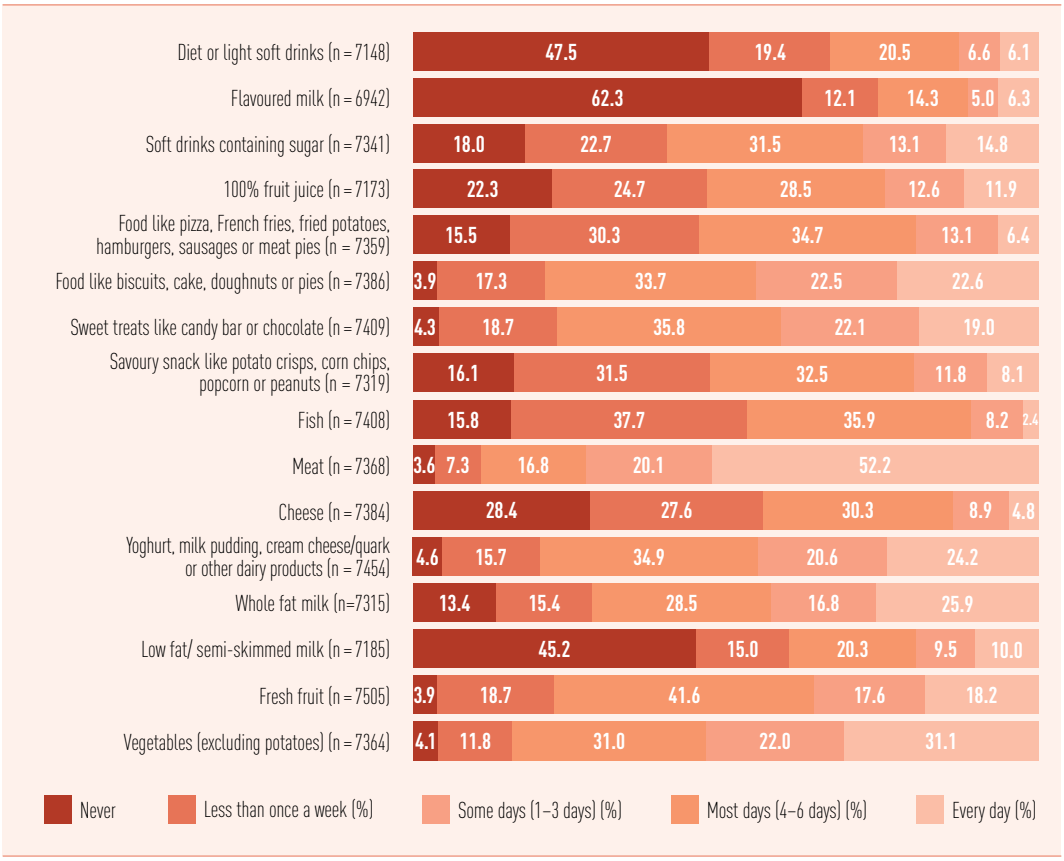
Table 11. Frequency of breakfast consumption among children in COSI Kyrgyzstan 2017/2018

Regions	n	Never	1–3 days/week	4–6 days/week	Every day
		%	%	%	%
Batken region	716	4.8	22.9	8.3	64.0
Bishkek city	879	4.3	12.5	9.5	73.8
Chuy region	903	5.2	11.4	11.9	71.5
Issyk Kul region	645	4.9	21.9	6.0	67.2
Jalal-Abad region	962	6.7	12.9	15.1	65.3
Naryn region	811	11.6	35.5	8.5	44.3
Osh city	774	4.9	7.1	14.5	73.5
Osh region	1056	2.3	11.9	6.7	79.1
Talas region	789	6.1	18.1	8.8	67.0
Kyrgyzstan	7535	5.0	14.9	10.3	69.8

3.3.2 Consumption of food and beverages

Children's food and beverage consumption, according to their family questionnaires, is displayed in Fig. 8.

Fig. 8. Frequency of food and beverage consumption of children in COSI Kyrgyzstan 2017/2018



Only 18.2% of parents/guardians reported that their children consumed fresh fruit items every day, and daily consumption of vegetables (excluding potatoes) was 31.1%. Daily intake of fish (2.4%) was low compared to that of meat (52.2%).

Soft drinks containing sugar were reported to be consumed by 31.5% of children 1–3 days a week and by 27.9% on more than four days a week.

Dairy product consumption generally was low. Low-fat/semi-skimmed milk was consumed three or fewer days per week by 80.5% of children, whole-fat milk by 57.3%, yoghurt and other dairy products by 55.2% and cheese by 86.3%.

Over half (52.4%) of children consumed savoury snacks such as potato crisps, corn chips or peanuts at least once per week. Similar values were reported for the consumption of pizza, French fries, fried potatoes, hamburgers, sausages, meat pies or similar (54.2%). While the frequency of consumption of sweet treats like candy bars or chocolate was the same (at least once per week), the proportion of children involved was higher (76.9%), as was the case for consumption of biscuits, cake, doughnuts or pies (78.8%).

4. Health risk behaviours in physical activity among children

Physical activity is also considered an important factor that directly influences childhood obesity *(26,27)*. Low levels of physical activity during childhood have been associated with morbidity and mortality in adulthood *(27)*. Active play, movement and physical activity are essential for healthy growth and development in childhood. WHO recommends that children and young people (aged 5–17 years) should accumulate at least 60 minutes of moderate-to-vigorous-intensity physical activity daily *(28)*.

4.1 Transportation to school

Fig. 9 shows the type of transport children use to get to school. Most parents reported their children walking or cycling to school (71.6%). Bishkek city and Osh city had the lowest proportion of children walking or cycling to school, reporting values of 48.2% and 59.4%, respectively (Fig. 10).

Fig. 9. Type of transport used by children to go to school in COSI Kyrgyzstan 2017/2018

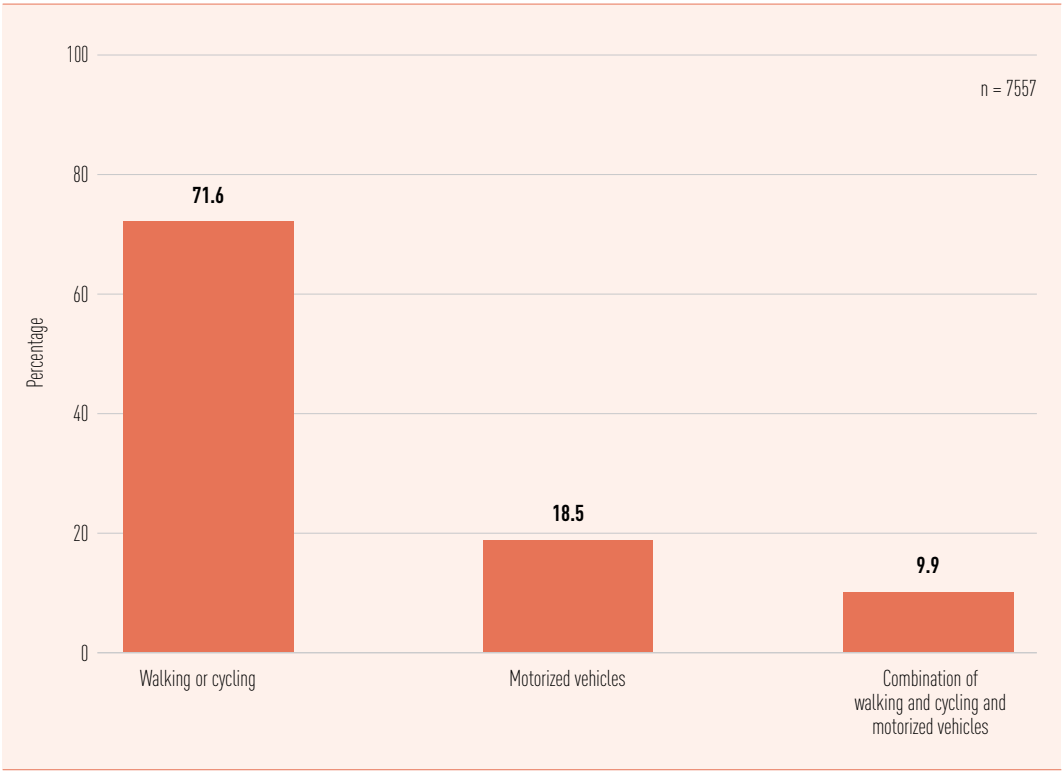
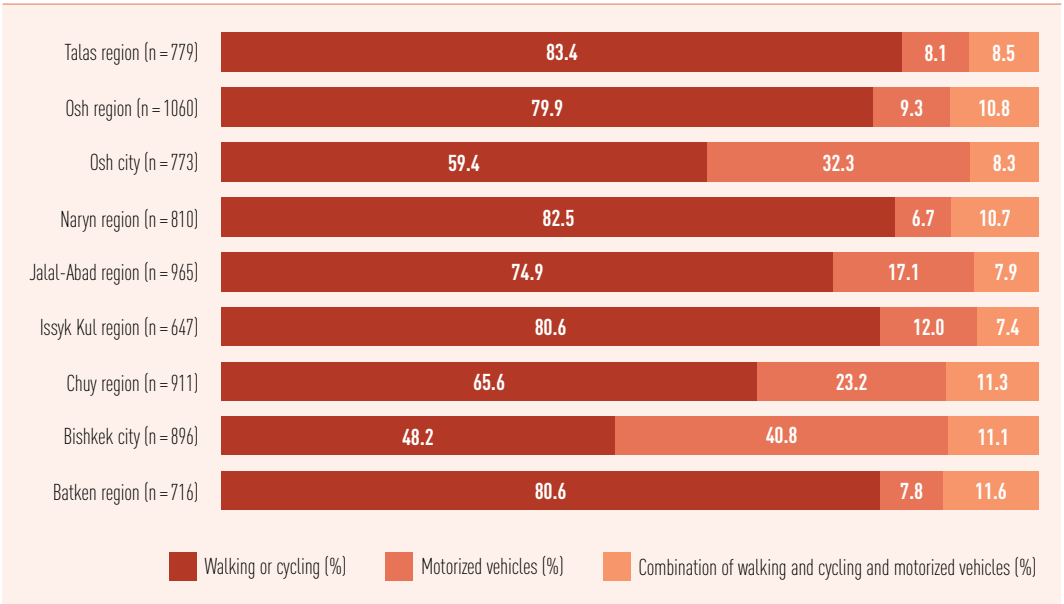
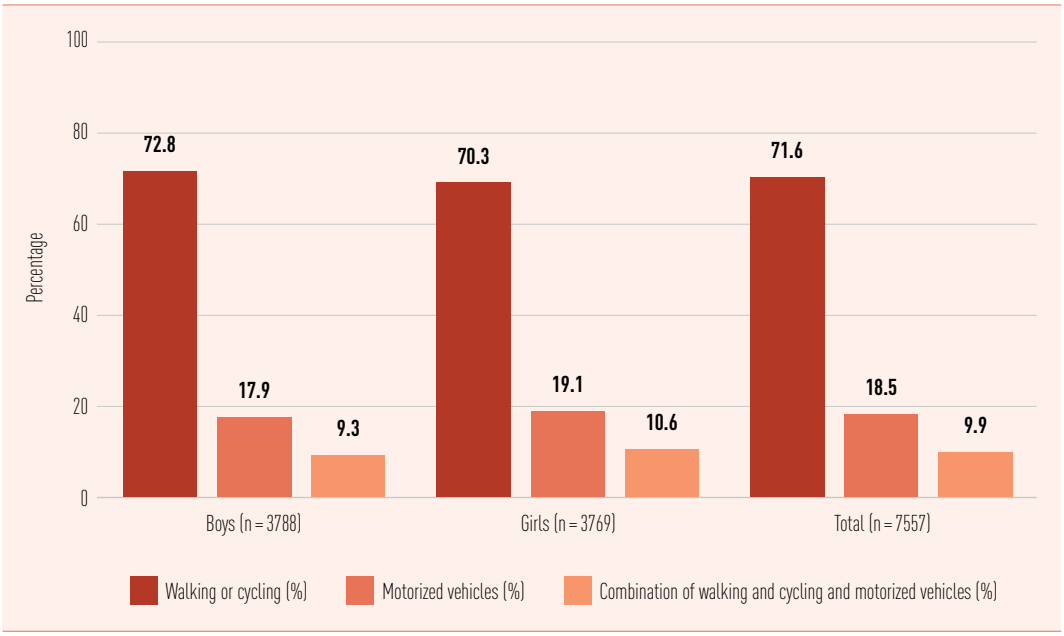


Fig. 10. Type of transport used by children to go to school in COSI Kyrgyzstan 2017/2018, by region



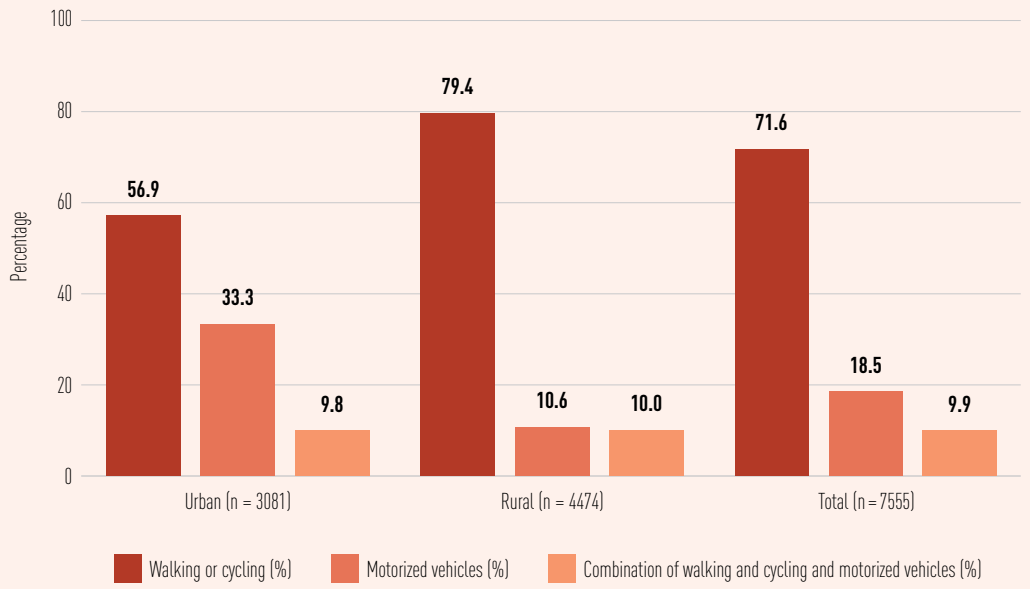
Numbers are quite similar between boys and girls regarding the type of transport used to go to school (Fig. 11).

Fig. 11. Type of transport used by children to go to school in COSI Kyrgyzstan 2017/2018, by sex



Data by residence area showed a higher proportion of children who live in rural areas walking or cycling to school (79.4%) compared to those in urban areas (56.9%). The proportion of children who reported going to school by motorized vehicles was higher among those living in urban areas (33.3%) than rural (10.6%) (Fig. 12).

Fig. 12. Type of transport used by children to go to school in COSI Kyrgyzstan 2017/2018, by residence area



4.2 Sports and physical activities in sports clubs or on dancing courses

Most parents/guardians (85.6%) reported that their children did not have sports-club memberships or took part in dancing courses (Fig. 13). Figures for boys and girls were similar (Fig. 14).

Fig. 13. Membership of sport clubs or taking part in dancing courses by children in COSI Kyrgyzstan 2017/2018, by region

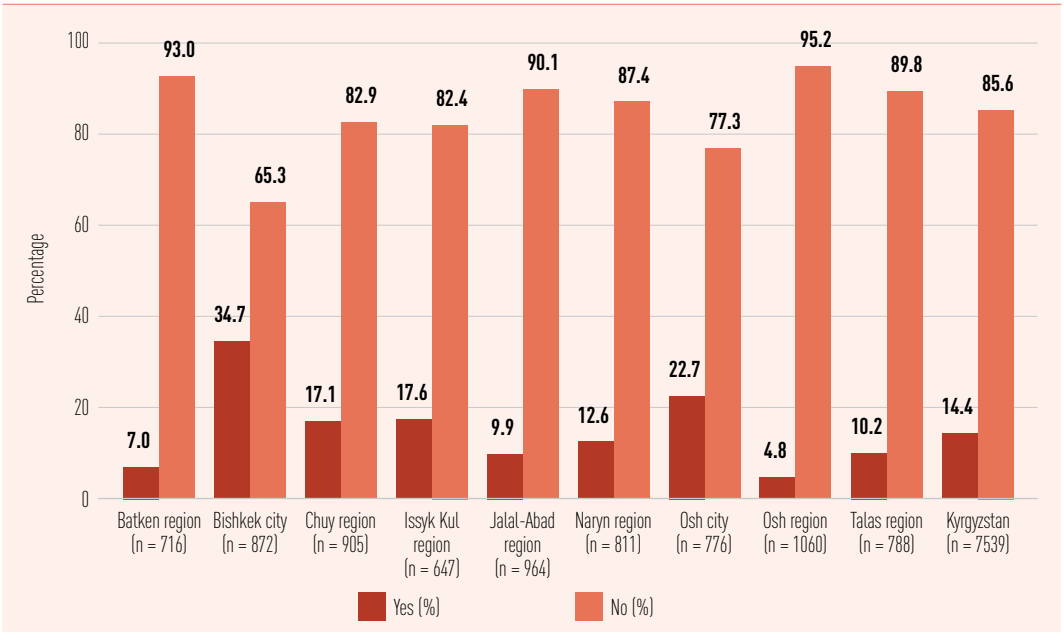
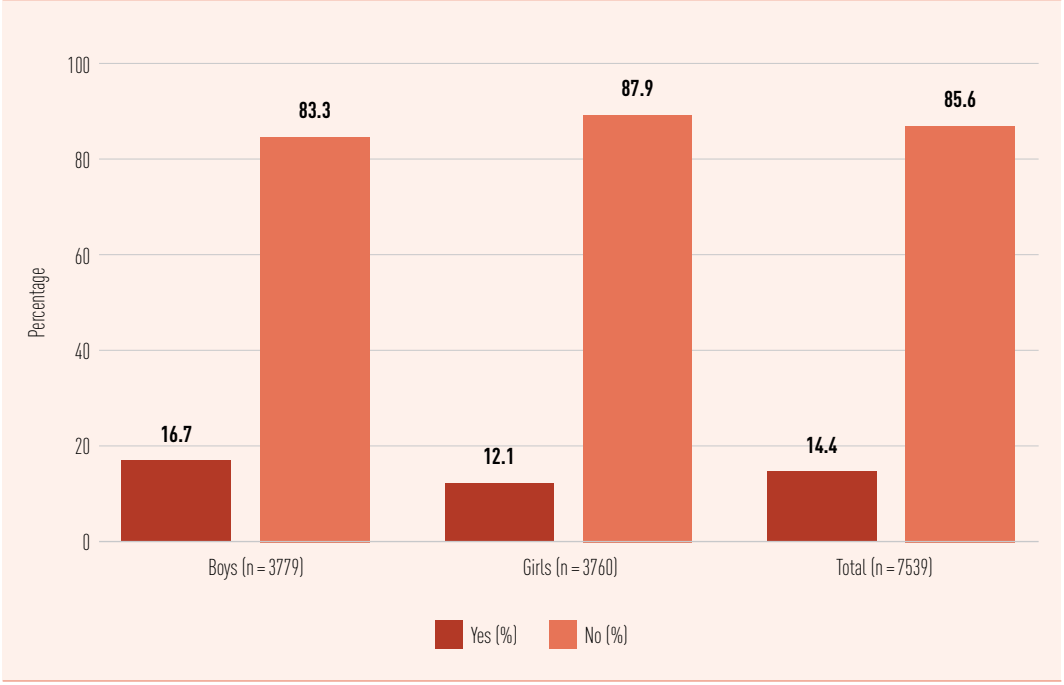
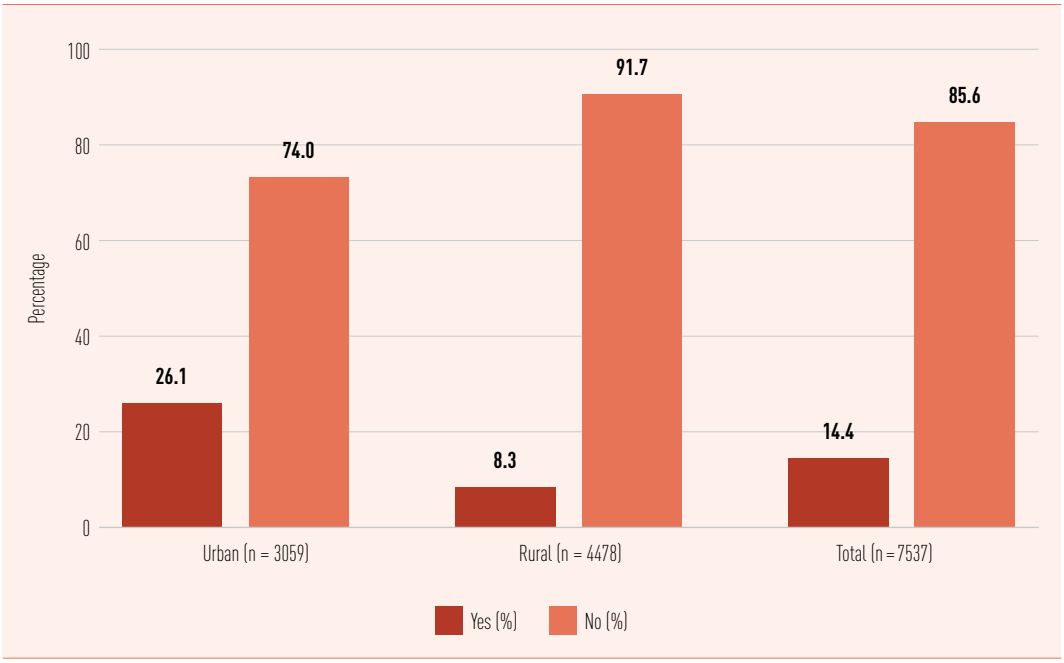


Fig. 14. Membership of sports clubs or taking part in dancing courses by children in COSI Kyrgyzstan 2017/2018, by sex



The proportion of parents who reported that their children did not have sports-club memberships or took part in dancing courses was higher in rural areas (91.7%) than urban (74.0%) (Fig. 15).

Fig. 15. Membership of sport clubs or taking part in dancing courses of children in COSI Kyrgyzstan 2017/2018, by residence area



Of those children who had a sports-club membership (14.4%), 3.1% spent three hours per week on these activities (Table 12). Bishkek city had the highest proportion of children (34.5%) who reported practising sport or dance activities (Table 12).

Table 12. Time spent on sports and physical activities in sport clubs or on dancing courses in COSI Kyrgyzstan 2017/2018, by region

Regions	Total	Not a member	1 hour/ week	2 hours/ week	3 hours/ week	4 hours/ week	5 hours/ week	6 hours/ week	7 hours/ week or more
	n	%	%	%	%	%	%	%	%
Batken region	716	93.0	1.3	3.1	1.4	0.6	0.2	0.2	0.2
Bishkek city	869	65.5	1.2	5.0	8.9	2.2	5.8	6.3	5.2
Chuy region	905	82.9	1.8	3.4	4.5	1.8	2.0	1.8	1.7
Issyk Kul region	647	82.4	0.8	4.3	4.1	3.3	0.9	1.1	3.1
Jalal-Abad region	963	90.2	1.7	2.0	1.3	1.4	0.9	1.4	1.2
Naryn region	811	87.4	2.8	3.1	1.9	1.3	1.1	1.3	0.9
Osh city	776	77.5	3.0	2.3	3.5	2.3	2.8	4.7	4.1
Osh region	1060	95.2	1.3	1.1	0.7	0.2	0.4	0.3	0.8
Talas region	788	89.8	2.0	2.2	2.0	0.8	1.2	1.5	0.6
Kyrgyzstan	7535	85.6	1.6	2.8	3.1	1.4	1.7	1.9	1.9

Small differences in the time spent on sports and physical activities in sport clubs or dancing courses were observed between boys and girls, with 8.9% of boys spending four hours or more per week on such activities versus 4.9% of girls (Table 13).

Table 13. Time spent on sports and physical activities in sport clubs or on dancing courses in COSI Kyrgyzstan 2017/2018, by sex

Sex	Total	Not a member	1 hour/ week	2 hours/ week	3 hours/ week	4 hours/ week	5 hours/ week	6 hours/ week	7 hours/ week or more
	n	%	%	%	%	%	%	%	%
Boys	3 775	83.4	1.7	3.0	3.0	1.7	2.0	2.7	2.5
Girls	3 760	87.9	1.6	2.5	3.1	1.1	1.4	1.2	1.2
Total	7 535	85.6	1.6	2.8	3.1	1.4	1.7	1.9	1.9

Analysis of data by residence shows that overall, children from urban areas spent more time on sports and physical activities in sport clubs or on dancing courses (Table 14).

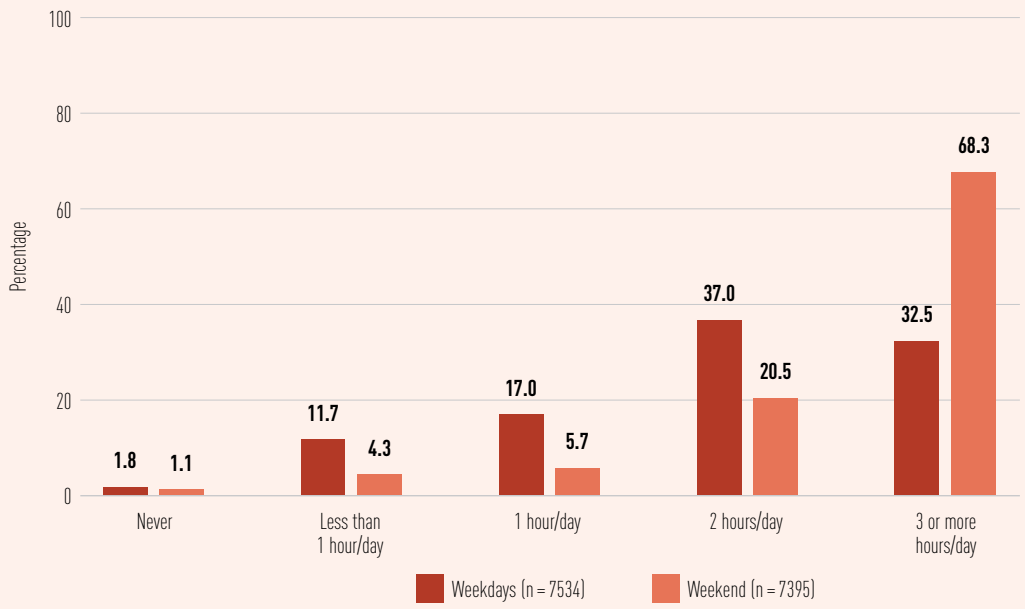
Table 14. Time spent on sports and physical activities in sport clubs or on dancing courses in COSI Kyrgyzstan 2017/2018, by residence area

Residence area	Total	Not a member	1 hour/ week	2 hours/ week	3 hours/ week	4 hours/ week	5 hours/ week	6 hours/ week	7 hours/ week or more
	n	%	%	%	%	%	%	%	%
Urban	3055	74.1	1.7	4.0	6.3	2.3	3.3	4.4	3.9
Rural	4478	91.7	1.6	2.1	1.4	0.9	0.8	0.7	0.8
Total	7533	85.6	1.6	2.8	3.1	1.4	1.7	1.9	1.9

4.3 Children's time spent playing actively/vigorously

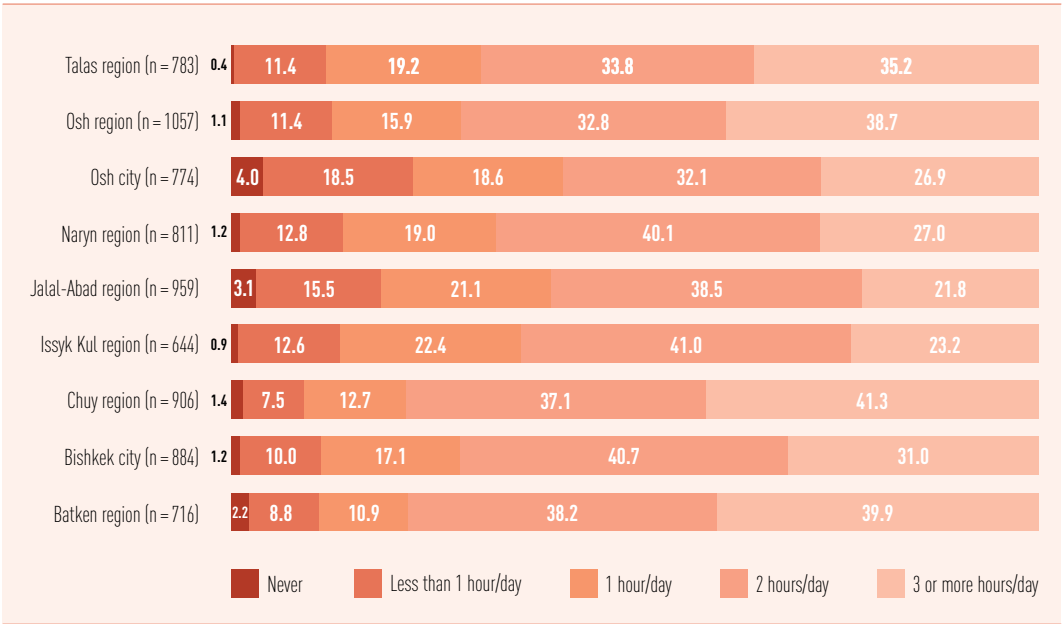
Data from COSI Kyrgyzstan show that even though most of the participating children were not members of sports clubs or on dancing courses, most spent time playing actively outside for 1–3 hours during weekdays (86.5%) and at weekends (96.4%) (Fig. 16).

Fig. 16. Time spent playing outside during the week and at weekends in COSI Kyrgyzstan 2017/2018



All regions except one reported that the proportion of children who spent at least one hour per day (1–3 hours) playing outside during weekdays was higher than 80%; the exception was Osh city, where the number was slightly lower (77.5%) (Fig. 17).

Fig. 17. Time spent playing outside during weekdays in COSI Kyrgyzstan 2017/2018, by region



The proportions of children who spent at least one hour per day playing outside at weekends were higher than 90% in all regions (Fig. 18).

Fig. 18. Time spent playing outside during weekends in COSI Kyrgyzstan 2017/2018, by region

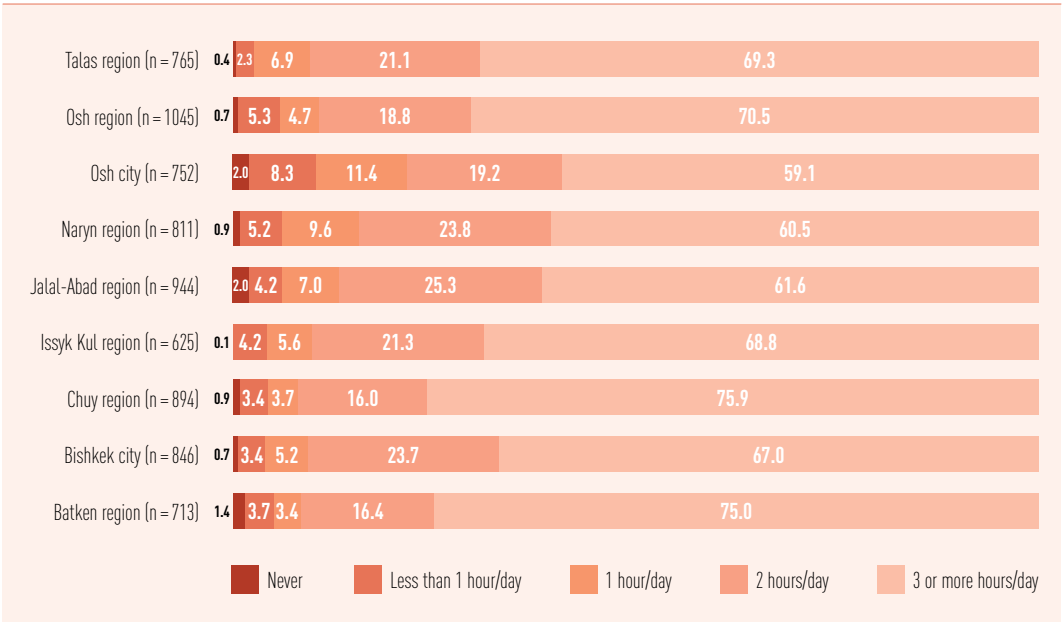
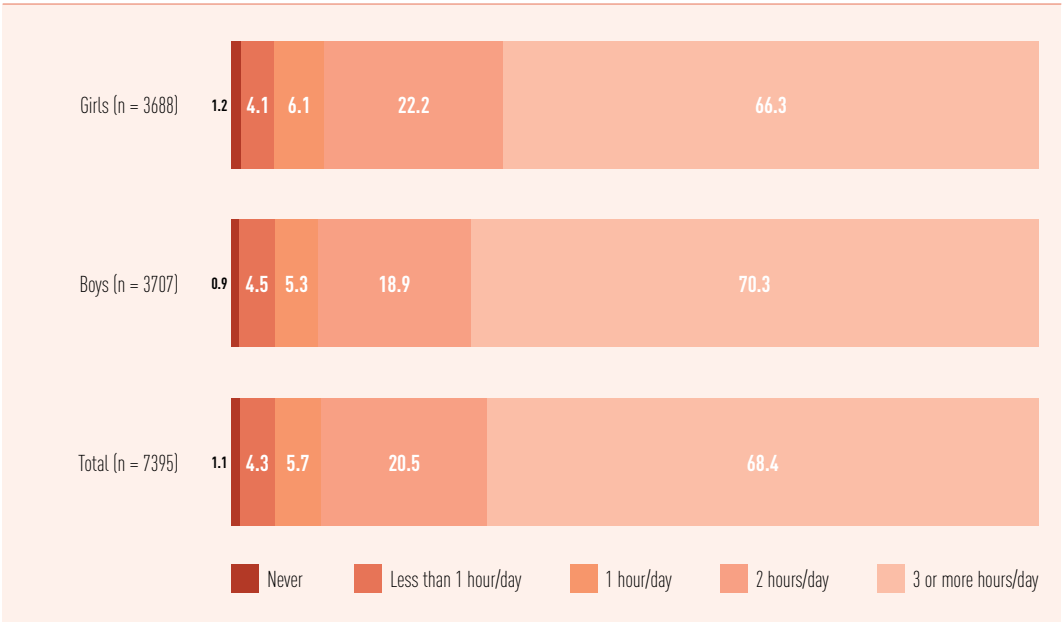


Fig. 19 shows that the proportion of children who spent at least one hour per day playing outside during weekdays was higher than 85.0% for both girls and boys, with more boys spending three or more hours playing outside per day than girls (35.6% and 29.4%, respectively).

Fig. 19. Time spent playing outside during weekdays in COSI Kyrgyzstan 2017/2018, by sex

Figures by sex for weekend play were similar, with the proportion spending at least one hour per day playing outside being around 94.0% in both boys and girls (Fig. 20).

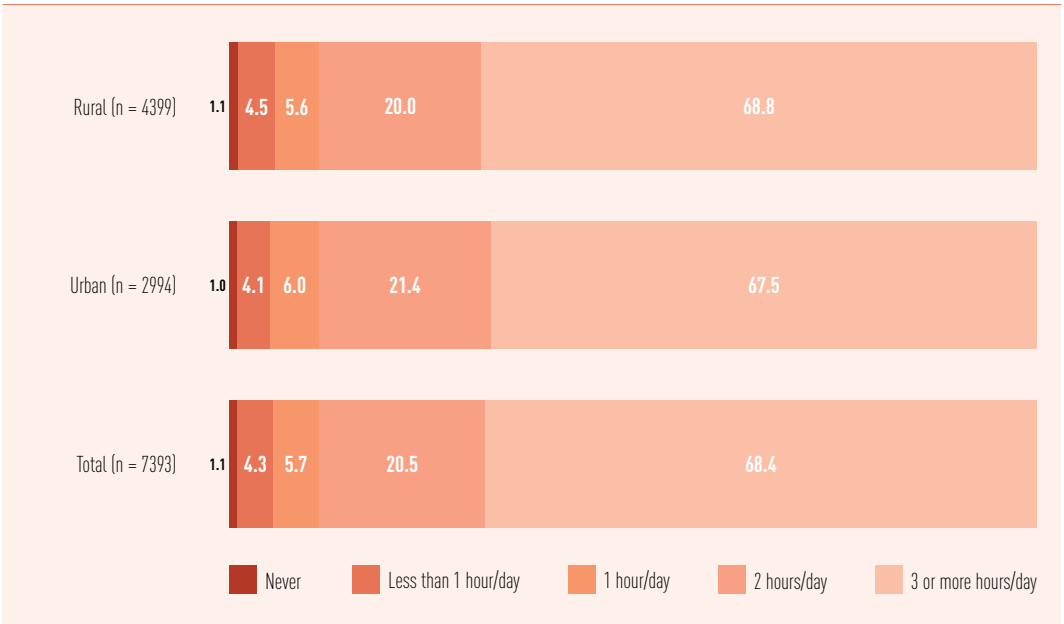
Fig. 20. Time spent playing outside during weekends in COSI Kyrgyzstan 2017/2018, by sex



The amount of time children spent playing outside on weekdays and at weekends was very similar between rural and urban areas (Fig. 21 and 22).

Fig. 21. Time spent playing outside during weekdays in COSI Kyrgyzstan 2017/2018, by residence area

Fig. 22. Time spent playing outside during weekends in COSI Kyrgyzstan 2017/2018, by residence area



4.4 Time spent watching TV or using electronic devices

Children's sedentary habits are indicated by the total time spent in activities such as watching TV or using electronic devices, which were also reported by parents/guardians.

Sedentary habits, particularly watching TV and excessive use of electronic devices, are potential contributors to obesity, especially among younger children, in whom such habits have become more common *(29)*. The data concerning these habits are presented in Fig. 23. They show that 67.3% of children spent 1–2 hours per day watching TV or using electronic

devices during weekdays. This increased at weekends, with 74.1% of the children spending two or more hours per day in such activities. The trend was observed in all regions, with most of the children spending 1–2 hours per day on weekdays and two or more hours per day at weekends watching TV or using electronic devices (Fig. 24 and 25).

Fig. 23. Time spent watching TV or using electronic devices on weekdays and at weekends in COSI Kyrgyzstan 2017/2018

Fig. 24. Time spent watching TV or using electronic devices on weekdays in COSI Kyrgyzstan 2017/2018, by region

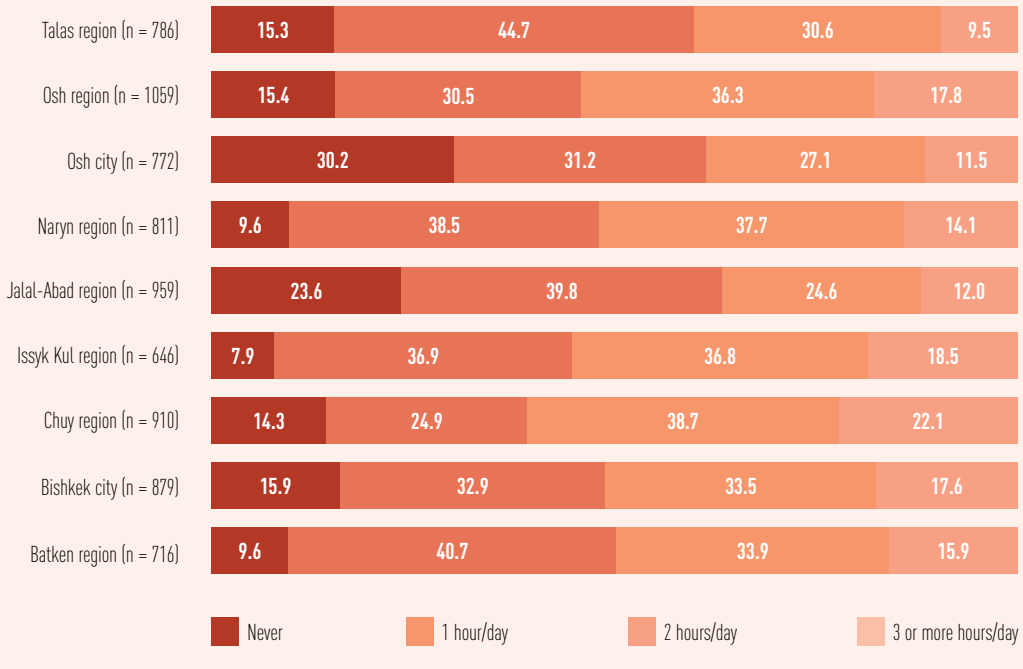
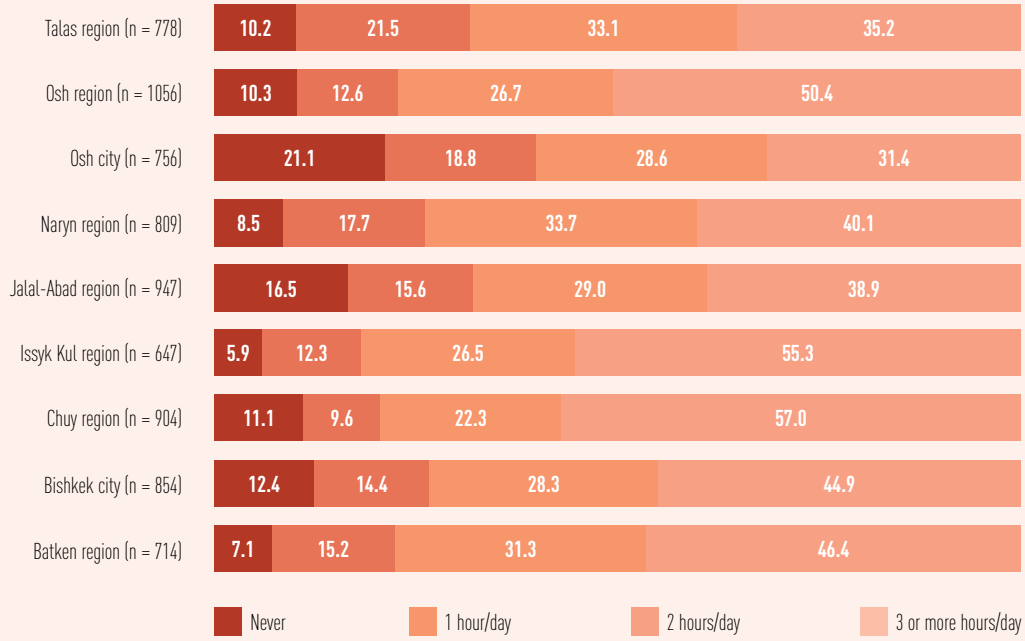


Fig. 25. Time spent watching TV or using electronic devices at weekends in COSI Kyrgyzstan 2017/2018, by region



Very small differences were observed in the time children spent watching TV or using electronic devices during weekdays and at weekends by sex and by residence area (Fig. 26–29).

Fig. 26. Time spent watching TV or using electronic devices on weekdays in COSI Kyrgyzstan 2017/2018, by sex

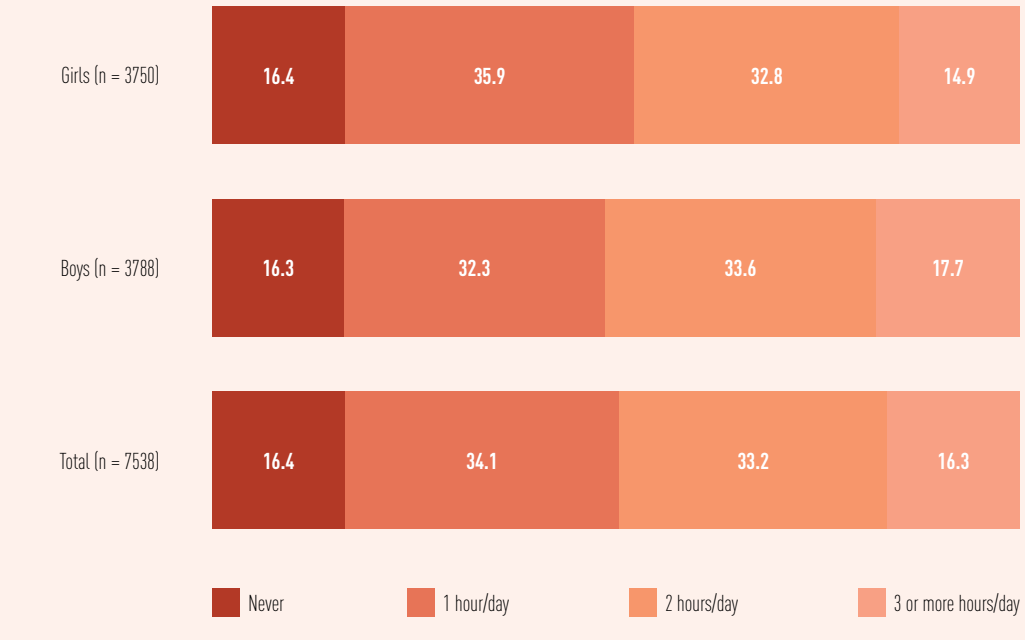


Fig. 27. Time spent watching TV or using electronic devices at weekends in COSI Kyrgyzstan 2017/2018, by sex

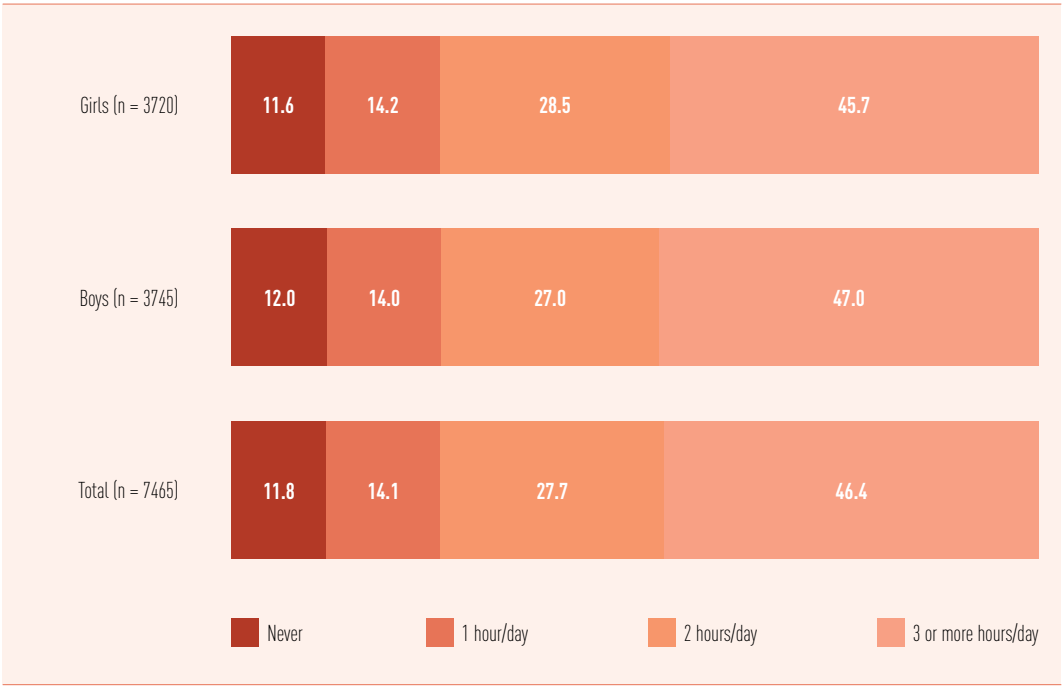


Fig. 28. Time spent watching TV or using electronic devices on weekdays in COSI Kyrgyzstan 2017/2018, by residence area

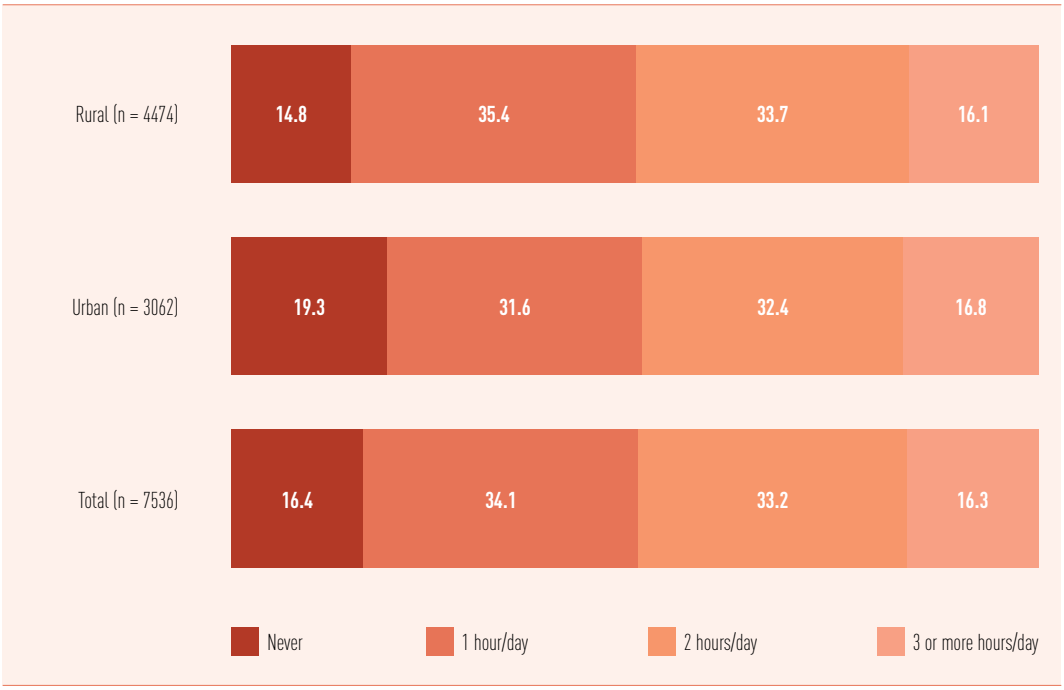
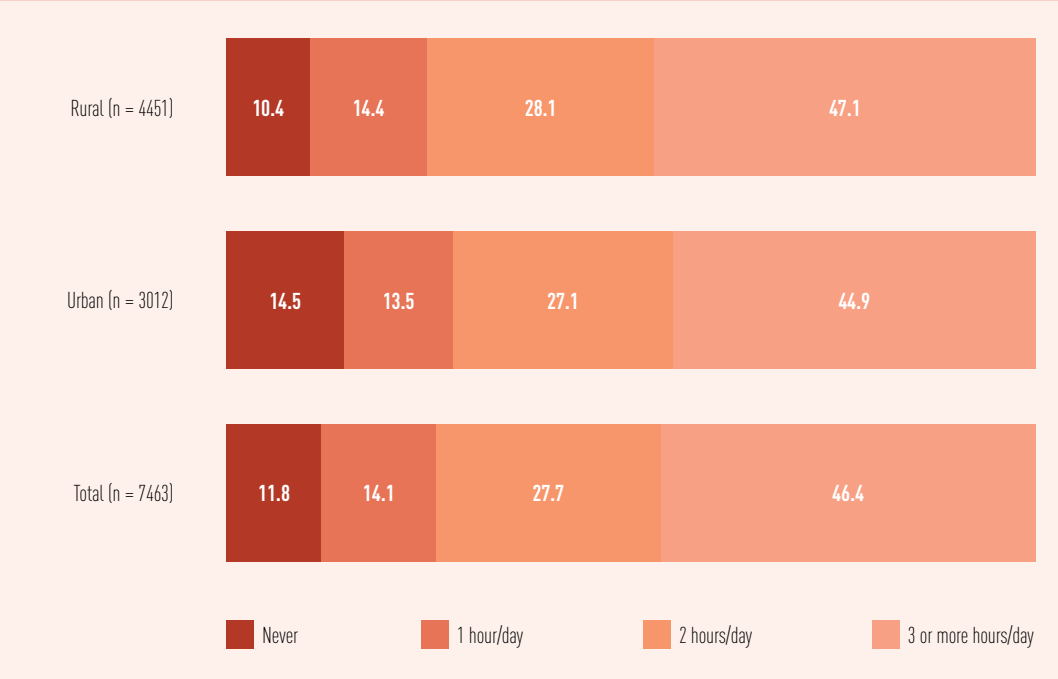


Fig. 29. Time spent watching TV or using electronic devices at weekends in COSI Kyrgyzstan 2017/2018, by residence area



The amount of time children spent doing homework or reading a book was also assessed through the family questionnaire. Fig. 30 presents the amount of time children spent on such activities during weekdays and at weekends. It was observed that most children spent 1–2 hours per day on weekdays and at weekends doing homework or reading a book (72.6% and 61.4%, respectively). This trend was consistent across all regions (Fig. 31 and 32).

Fig. 30. Time spent doing homework or reading a book on weekdays and at weekends in COSI Kyrgyzstan 2017/2018

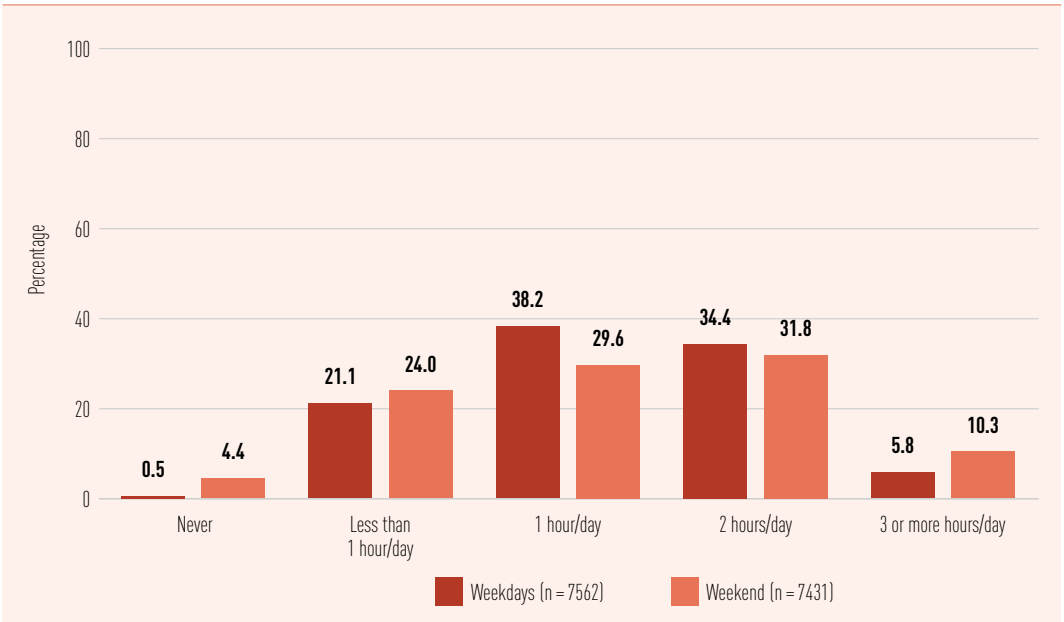


Fig. 31. Time spent doing homework or reading a book on weekdays in COSI Kyrgyzstan 2017/2018, by region

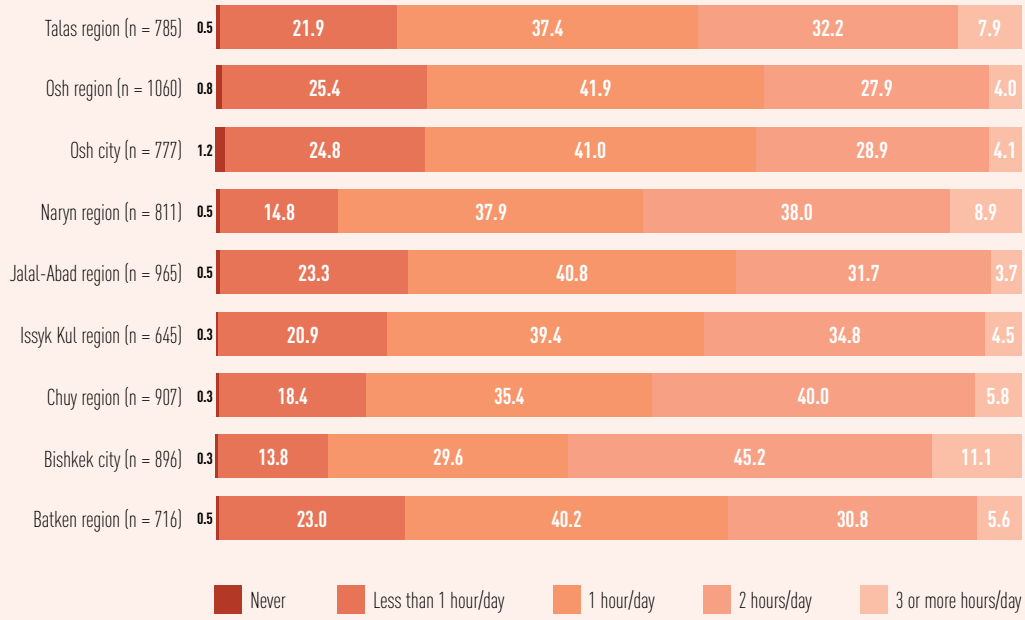
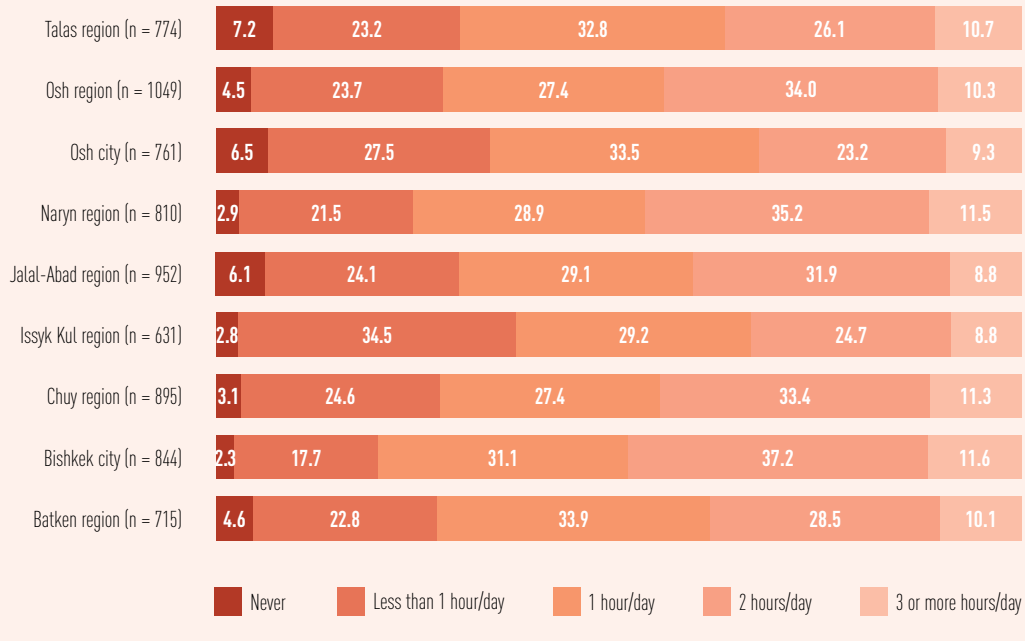


Fig. 32. Time spent doing homework or reading a book at weekends in COSI Kyrgyzstan 2017/2018, by region



The proportions for spending 1–2 hours per day on weekdays and at weekends doing homework or reading a book were 71.9% (weekdays) and 60.2% (weekends) for boys and 73.3% and 62.6%, respectively, for girls (Fig. 33 and 34).

Fig. 33. Time spent doing homework or reading a book on weekdays in COSI Kyrgyzstan 2017/2018, by sex

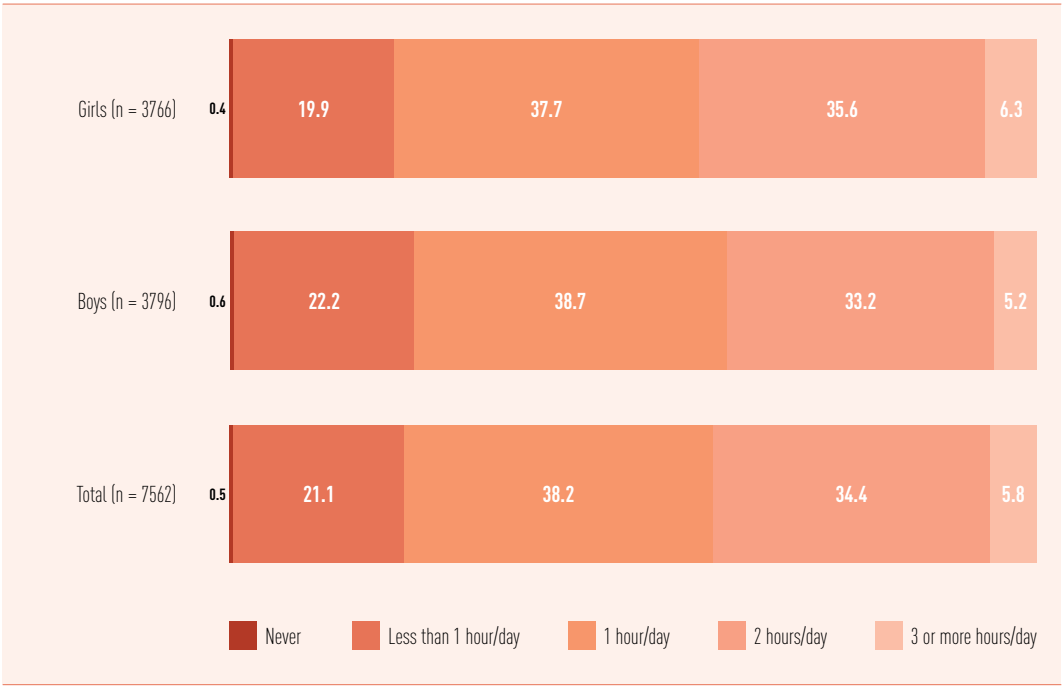
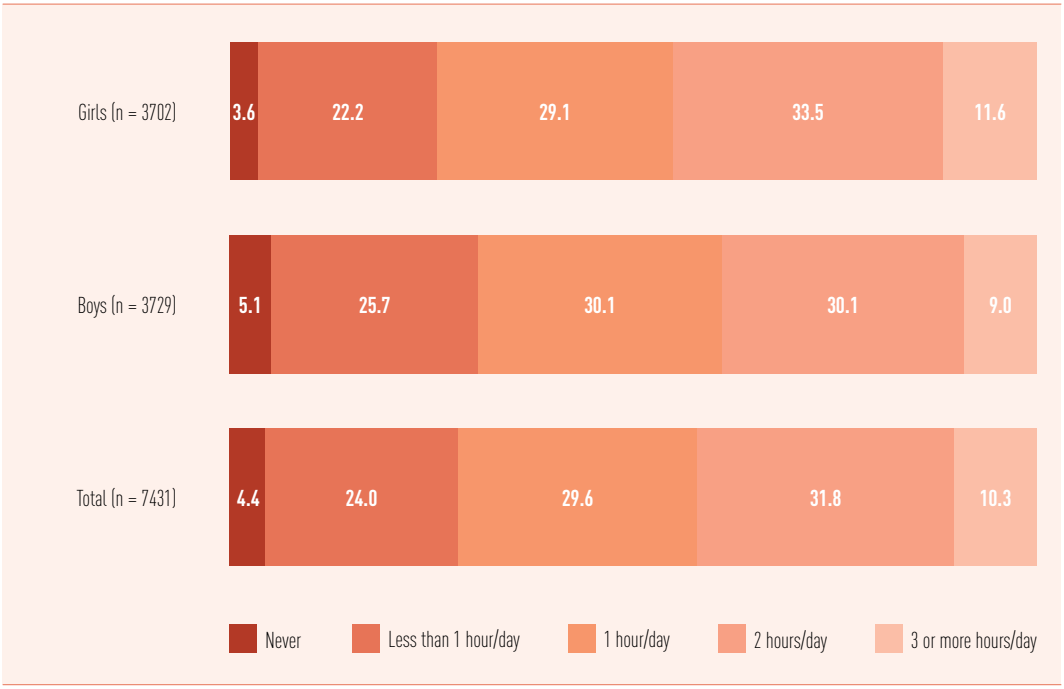


Fig. 34. Time spent doing homework or reading a book at weekends in COSI Kyrgyzstan 2017/2018, by sex



This trend on weekdays and at weekends was also observed by residence area, with small differences between children from rural areas (72.1% on weekdays and 60.3% at weekends) and those from urban (73.6% and 63.5%, respectively) (Fig. 35 and 36).

Fig. 35. Time spent doing homework or reading a book on weekdays in COSI Kyrgyzstan 2017/2018, by residence area

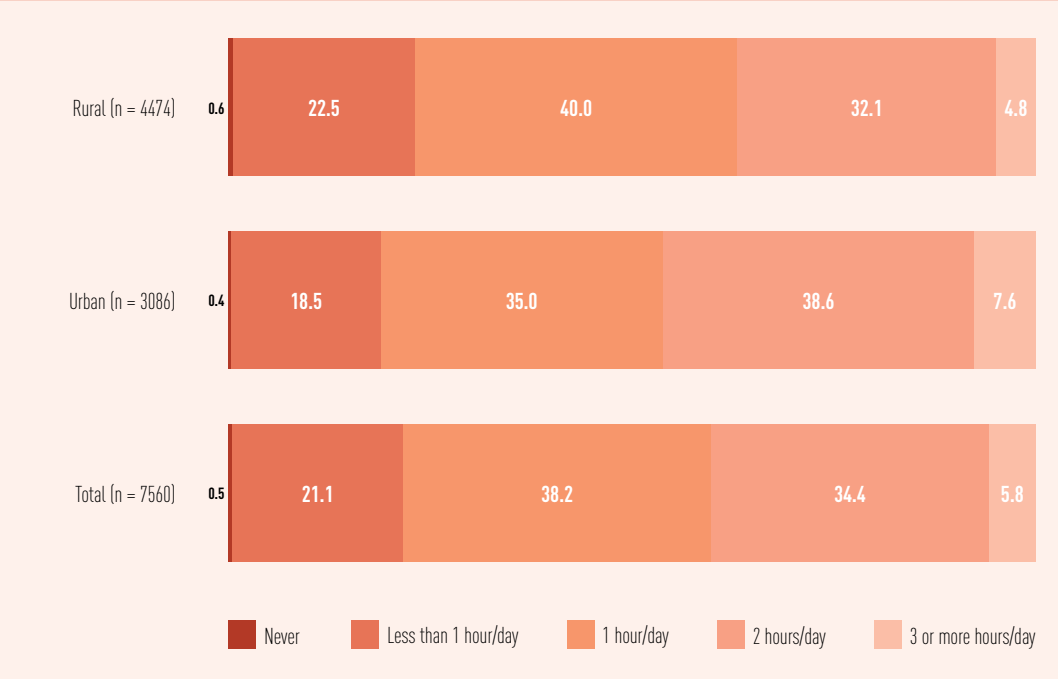


Fig. 36. Time spent doing homework or reading a book at weekends in COSI Kyrgyzstan 2017/2018, by residence area

5. School environment

Kyrgyzstan's law on the organization of meals for schoolchildren was first signed in 2002. Measures started with the provision of 200 g of milk and a bun for all primary schoolchildren in 2006. The law allowed replacement of milk and buns with other drinks and bakery products with equivalent energy value.

Ten years later, the intersectoral working committee was established under the chairmanship of the Vice-Prime Minister to promote optimization of the school meal programme through the launch of a pilot project in 2013, with extensive support provided by the United Nations World Food Programme and the Mercy Corps *(22)*. The Government approved the priority directions for gradual rolling out of the national school meals programme in 2014, with further endorsement of the programme achieved in 2016 through a joint order of the Ministry of Education and Science and Ministry of Health. The law on the organization of meals for schoolchildren was updated in 2019 to enforce procedures for children from grades 1–4. The main objectives for organization of school meals outlined in the law are to: reduce social inequalities among families; use environmentally friendly technologies and methods; ensure quality, balanced and safe meals; and improve dietary habits and promote the adoption of healthy dietary intakes *(22,30)*.

The SMOP currently benefits about 65% of Kyrgyzstan's primary school pupils by replacing the initially provided milk/tea and bun with a wide range of recipes and menus, including hot porridge, soups and salads, that meet nutrient requirements. The Government has plans to reach young pupils in all primary schools in the country with nutritious hot meals by 2023 *(22)*.

5.1 School food environment

The school questionnaire collected data about the school food environment, such as the proportion of schools with the SMOP. Of the schools analysed, 54.7% reported having the SMOP (Fig. 37).

Fig. 37. Schools in COSI Kyrgyzstan 2017/2018 with the SMOP

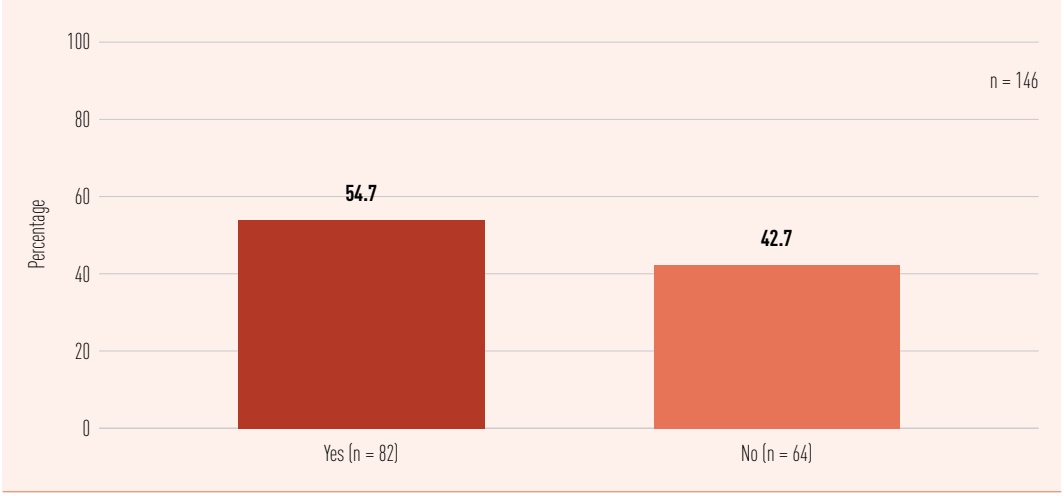


Table 15 presents the distribution of schools that included nutrition education lessons (either given as a separate lesson or integrated within other lessons) in the school curriculum. Of the 148 schools that provided data about this topic, 46.6% reported including nutrition education lessons in the school curriculum. The proportion of schools that included nutrition education lessons was higher among those with the SMOP (58.5% against 30.2%, respectively) (Table 15).

Table 15. Nutrition education included in the school curriculum, either given as a separate lesson or integrated within other lessons, COSI Kyrgyzstan 2017/2018

Response	Schools with SMOP		Schools without SMOP		All schools	
	n	%	n	%	n	%
Yes	48	58.5	19	30.2	69	46.6
No	34	41.5	44	69.8	79	53.4
Total	82	100.0	63	100.0	148	100.0

Table 16 presents data on food items and beverages students could obtain on school premises, comparing schools with the SMOP and those without. Few overall differences were observed.

Many food products considered as unhealthy, such as soft drinks containing sugar, flavoured milk with added sugar, energy drinks, ice cream and savoury snacks, were not available on school premises, with over 80% of schools reporting that such products were not available to pupils. Healthy food items whose intake is highly recommended were also reported by most schools as not being available on the school premises (fresh fruit: 83.1%; vegetables: 66.2%), especially among those without the SMOP (fresh fruit: 89.1%; vegetables: 82.8%). The availability on school premises of sweet snacks (like chocolate, sugar confectionery, cakes, breakfast and/or cereal bars, sweet biscuits and/or pastries) is also worth noting, as these items were available for purchase in a considerable percentage of schools (36.9%) (higher among the schools without the SMOP (45.3% against 30.9%, respectively)). The only item reported as being available for free by a slight majority of schools (56.6%) was tea (without added sugar).

Table 16. Foods and beverages pupils could obtain on school premises, COSI Kyrgyzstan 2017/2018

Item	Availability	Schools with SMOP		Schools without SMOP		All schools	
		n	%	n	%	n	%
Tea (without added sugar)	Not available	23	29.1	3	4.7	27	18.4
	Free	34	43.0	48	75.0	83	56.5
	For pay	14	17.7	6	9.4	22	15.0
	Free and for pay (both options)	8	10.1	7	10.9	15	10.2
	Total	79	100.0	64	100.0	147	100.0
100% fruit juices with no added sugar	Not available	54	70.1	46	73.0	103	71.5
	Free	15	19.5	4	6.3	19	13.2
	For pay	7	9.1	13	20.6	21	14.6
	Free and for pay (both options)	1	1.3	0	0.0	1	0.7
	Total	77	100.0	63	100.0	144	100.0
Fruit juices or other non-carbonated drinks containing added sugar	Not available	36	43.9	38	61.3	75	50.7
	Free	25	30.5	6	9.7	32	21.6
	For pay	18	22.0	18	29.0	38	25.7
	Free and for pay (both options)	3	3.7	0	0.0	3	2.0
	Total	82	100.0	62	100.0	148	100.0
Carbonated (soft) drinks containing added sugar	Not available	67	81.7	48	76.2	117	78.5
	Free	0	0.0	0	0.0	0	0.0
	For pay	15	18.3	15	23.8	31	20.8
	Free and for pay (both options)	0	0.0	0	0.0	1	0.7
	Total	82	100.0	63	100.0	149	100.0
Flavoured milk with added sugar	Not available	76	92.7	58	92.1	138	92.6
	Free	2	2.4	1	1.6	3	2.0
	For pay	4	4.9	4	6.3	8	5.4
	Free and for pay (both options)	0	0.0	0	0.0	0	0.0
	Total	82	100.0	63	100.0	149	100.0
Hot drinks (cocoa, tea, latte)	Not available	40	48.8	20	31.3	62	41.3
	Free	20	24.4	22	34.4	42	28.0
	For pay	14	17.1	16	25.0	31	20.7
	Free and for pay (both options)	8	9.8	6	9.4	15	10.0
	Total	82	100.0	64	100.0	150	100.0
Dairy (milk, yoghurt, ayran)	Not available	55	67.1	46	71.9	104	69.8
	Free	17	20.7	13	20.3	30	20.1
	For pay	8	9.8	5	7.8	13	8.7
	Free and for pay (both options)	2	2.4	0	0.0	2	1.3
	Total	82	100.0	64	100.0	149	100.0
Other drinks with non-sugar sweeteners	Not available	65	80.2	55	87.3	123	83.1
	Free	5	6.2	2	3.2	7	4.7
	For pay	7	8.6	6	9.5	14	9.5
	Free and for pay (both options)	4	4.9	0	0.0	4	2.7
	Total	81	100.0	63	100.0	148	100.0
Energy drinks	Not available	78	97.5	64	100.0	146	98.6
	Free	0	0.0	0	0.0	0	0.0
	For pay	2	2.5	0	0.0	2	1.4
	Free and for pay (both options)	0	0.0	0	0.0	0	0.0
	Total	80	100.0	64	100.0	148	100.0

Item	Availability	Schools with SMOP		Schools without SMOP		All schools	
		n	%	n	%	n	%
Fresh fruit	Not available	63	78.8	57	89.1	123	83.1
	Free	8	10.0	2	3.1	10	6.8
	For pay	9	11.3	3	4.7	13	8.8
	Free and for pay (both options)	0	0.0	2	3.1	2	1.4
	Total	80	100.0	64	100.0	148	100.0
Vegetables	Not available	43	53.8	53	82.8	98	66.2
	Free	24	30.0	3	4.7	28	18.9
	For pay	10	12.5	8	12.5	19	12.8
	Free and for pay (both options)	3	3.8	0	0.0	3	2.0
	Total	80	100.0	64	100.0	148	100.0
Sweet snacks (such as chocolate, sugar confectionery, cakes, breakfast and/or cereal bars, sweet biscuits and/or pastries)	Not available	39	48.1	18	28.1	59	39.6
	Free	11	13.6	14	21.9	25	16.8
	For pay	25	30.9	29	45.3	55	36.9
	Free and for or pay (both options)	6	7.4	3	4.7	10	6.7
	Total	81	100.0	64	100.0	149	100.0
Ice cream	Not available	65	81.3	53	84.1	122	83.0
	Free	0	0.0	0	0.0	0	0.0
	For pay	15	18.8	10	15.9	25	17.0
	Free and for pay (both options)	0	0.0	0	0.0	0	0.0
	Total	80	100.0	63	100.0	147	100.0
Savoury snacks (such as potato crisps, salted popcorn, salted nuts, savoury biscuits and/or pretzels)	Not available	64	80.0	50	80.6	117	80.1
	Free	0	0.0	0	0.0	0	0.0
	For pay	16	20.0	12	19.4	29	19.9
	Free and for pay (both options)	0	0.0	0	0.0	0	0.0
	Total	80	100.0	62	100.0	146	100.0

Most schools reported having canteens on the school premises (Table 17). It was also observed that schools with the SMOP reported having a higher proportion of canteens on their premises than those without.

Table 17. Canteens on school premises, COSI Kyrgyzstan 2017/2018

Response	Schools with SMOP		Schools without SMOP		All schools	
	n	%	n	%	n	%
Yes	79	96.3	56	88.9	139	93.3
No	3	3.7	7	11.1	10	6.7
Total	82	100.0	63	100.0	149	100.0

Most schools (68.7%) reported not having shops or cafeterias where food items or beverages could be purchased on the school premises (Table 18).

Table 18. Shops or cafeterias where foods or beverages could be purchased on the school premises, COSI Kyrgyzstan 2017/2018

Response	Schools with SMOP		Schools without SMOP		All schools	
	n	%	n	%	n	%
Yes	26	31.7	19	29.7	47	31.3
No	56	68.3	45	70.3	103	68.7
Total	82	100.0	64	100.0	150	100.0

Almost all schools (98.0%) reported not having vending machines on the school premises (Table 19).

Table 19. Vending machines where children could purchase foods or beverages (other than water, fruit and vegetables) on the school premises, COSI Kyrgyzstan 2017/2018

Response	Schools with SMOP		Schools without SMOP		All schools	
	n	%	n	%	n	%
Yes	2	2.4	1	1.6	3	2.0
No	80	97.6	63	98.4	147	98.0
Total	82	100.0	64	100.0	150	100.0

Information was also collected about advertising and marketing (such as posters, billboards or banners with food company names or products featured, food company imagery or names on vending machines and/or branded school materials such as books and sports equipment) of food items and beverages (including any energy-dense and nutrient-poor foods such as cakes, pastries and sweets) in schools that could undermine the promotion of a healthy, balanced diet. About 40.0% of the schools reported that they were free from such advertising and marketing (Table 20).

Table 20. Schools free from advertising and marketing of food items and beverages that could undermine the promotion of a healthy, balanced diet, COSI Kyrgyzstan 2017/2018

Response	Schools with SMOP		Schools without SMOP		All schools	
	n	%	n	%	n	%
Yes	31	38.3	29	45.3	62	41.6
No	50	61.7	35	54.7	87	58.4
Total	81	100.0	64	100.0	149	100.0

5.1.1 School food environment: effect on children's nutritional status

The prevalence of overweight and obesity was slightly lower in schools with the SMOP than in those without (8.5% against 10.6% and 2.1% against 3.1%, respectively) (Table 21).

Table 21. Children's weight status and type of school (with or without the SMOP), COSI Kyrgyzstan 2017/2018

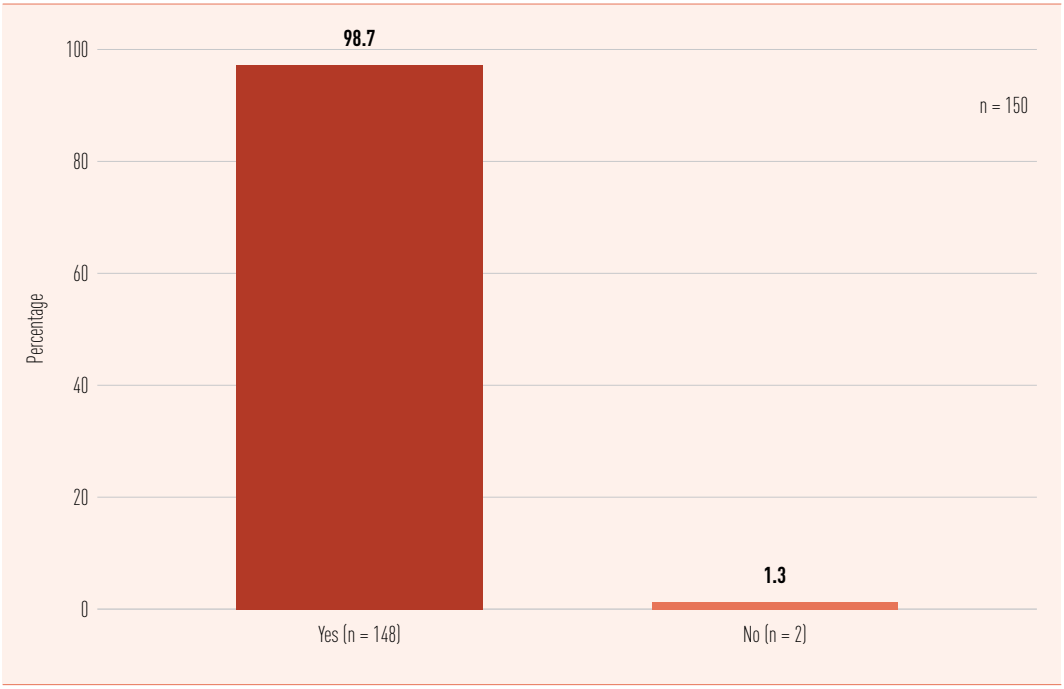
SMOP status	n	Thinness		Overweight (including obesity)		Obesity	
		%	95% CI	%	95% CI	%	95% CI
Schools with SMOP	4156	3.0	[2.4–3.8]	8.5	[7.4–9.7]	2.1	[1.5–2.9]
Schools without SMOP	3464	3.2	[2.2–4.6]	10.6	[9.2–12.2]	3.1	[2.4–4.0]

CI: confidence interval.

5.2 School physical activity environment

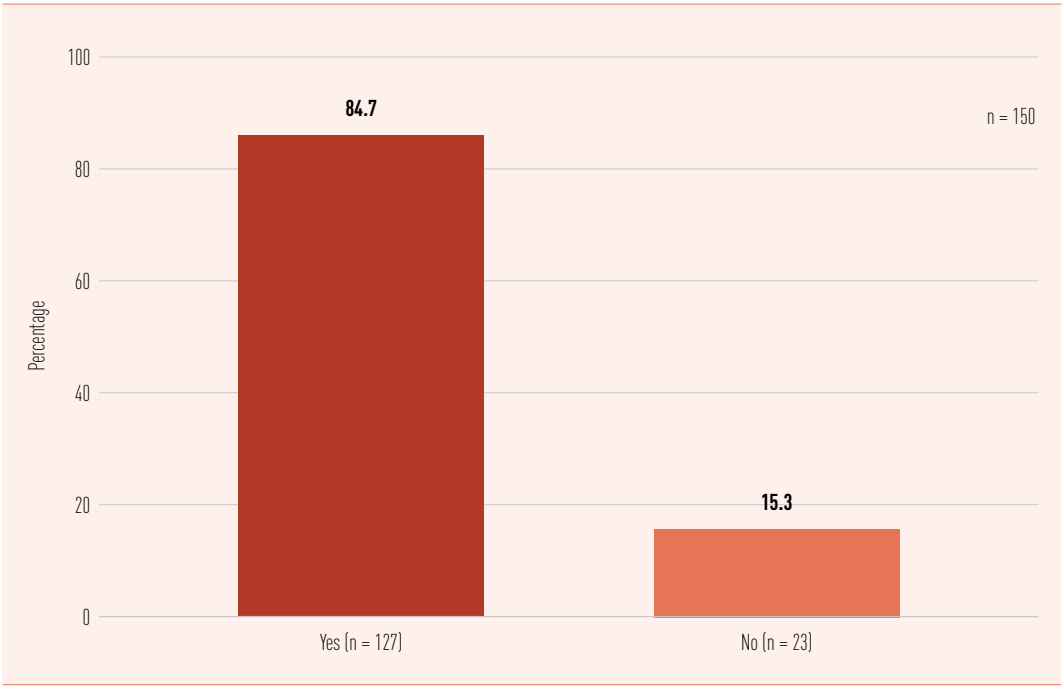
The school questionnaire provided information on the school physical activity environment. Of the 150 schools analysed in COSI Kyrgyzstan 2017/2018, 98.7% reported having outdoor playground area(s) on the school premises (Fig. 38).

Fig. 38. Outdoor playground area(s) on the school premises, COSI Kyrgyzstan 2017/2018



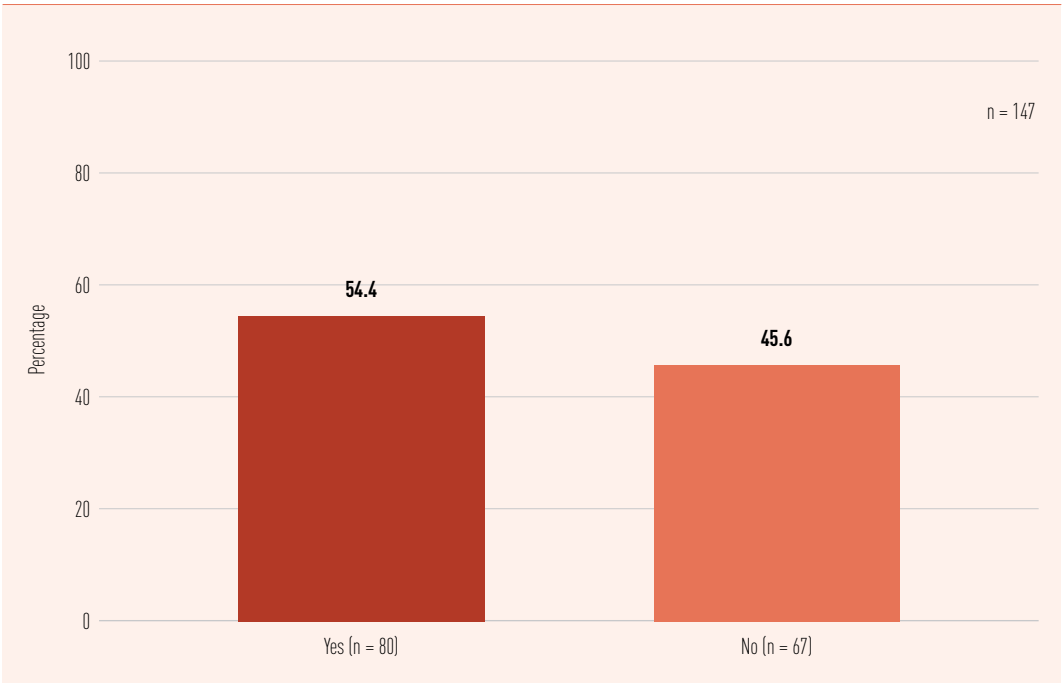
Most schools (84.7%) reported having indoor gyms on the school premises (Fig. 39).

Fig. 39. Indoor gym on the school premises, COSI Kyrgyzstan 2017/2018



More than half of the schools (54.4%) reported including initiatives or projects to promote healthy lifestyles (Fig. 40).

Fig. 40. Schools with initiatives or projects to promote healthy lifestyles, COSI Kyrgyzstan 2017/2018



6. Discussion

Around 8000 children and their families took part in the fourth round of data collection for the WHO European COSI study in Kyrgyzstan. COSI Kyrgyzstan 2017/2018 showed that the prevalence of childhood overweight was 9.7%, obesity 2.6% and thinness 3.1%.

Assessment of the children's eating habits highlighted the need to address the consumption of soft drinks containing sugar, as these items were reported to be consumed by almost 30% of children on more than four days a week. The daily intake of healthier food items such as fresh fruit and vegetables was relatively low (18.2% for fruit and 31.1% for vegetables), which reflects a need to encourage greater consumption. Daily intake of fish was also low (2.4%), while dairy products, such as low-fat/semi-skimmed milk (80.5%), yoghurt and other dairy products (55.2%) and cheese (86.3%), were consumed only on up to three days per week. It was reported that savoury snacks were consumed by 52.4% of children at least once a week, while sugary food items were consumed by almost 80% at least once a week.

Most children (71.6%) walk or cycle to school. The majority spend time playing outside for 1–3 hours per day during weekdays (86.5%) and at weekends (96.4%). COSI Kyrgyzstan data show nevertheless that 67.3% of children spend 1–2 hours per day watching TV or using electronic devices. This frequency increases at weekends, with 74.1% of children spending two or more hours per day watching TV or using electronic devices.

Regarding the school environment, 54.7% of the schools analysed in COSI Kyrgyzstan 2017/2018 reported having the SMOP. Few overall differences were observed regarding food items and beverages students can obtain on school premises between schools with and without the SMOP. Fruit (83.1%) and vegetables (66.2%) were reported by most schools as not being available in any form on the school premises, with a greater percentage among those without the SMOP (fresh fruit: 89.1%; vegetables: 82.8%). A considerable proportion of schools (36.9%) reported having sweet snacks available for purchase on the school premises, with the percentage being higher among schools without the SMOP than those with (45.3% against 30.9%).

Systematic data collection by COSI not only allows better understanding of the progression of childhood overweight and obesity in each country and enables comparability between countries of the WHO European Region, but also provides information on related factors, such as eating habits and patterns of physical activity. COSI data are collected every three years, which will allow Kyrgyzstan to monitor progress toward the WHO global NCD target of halting the rise in obesity by 2025 and support the need for ongoing or future interventions to promote healthier lifestyles among children and, consequently, ensure their better health.

7. Suggested actions

In light of the findings from the fourth round of the WHO European COSI study in Kyrgyzstan set out in this report, and in alignment with the WHO Action Plan for the Prevention and Control of Noncommunicable Diseases in the WHO European Region (2016–2025) *(31)*, the following suggested actions and initiatives provide the basis for recommendations to the Government of Kyrgyzstan.

i) Healthy food environments should be facilitated.

This can be achieved by:

- providing appropriate and context-specific nutrition information and guidelines;
- implementing interpretive front-of-pack labelling;
- incentivizing reformulation of high-fat, -sugar or -salt foods;
- implementing WHO's recommendations on the marketing of foods and non-alcoholic beverages to children;
- taking into account the child's right to protection from marketing of non-healthy food products;
- taking legislative action;
- promoting fiscal incentives, such as implementing an effective tax on sugar-sweetened beverages;
- increasing access to healthy foods, particularly for underserved communities; and
- considering a policy of healthy nutrition as a priority of the national development strategy.

In addition, initiatives to create opportunities for physical activity and active travel (including urban planning) are important in facilitating a healthy physical activity environment.

ii) Policies to promote healthy school environments should be implemented.

This can be achieved by:

- establishing nutrition standards for food and beverages provided in schools;
- eliminating the provision of unhealthy foods and beverages in schools;
- ensuring access to free potable water in schools;
- improving regulatory documentation on the organization and implementation of school nutrition;
- ensuring high coverage of the hot-meal programme provision to primary and secondary schools;
- developing and introducing mechanisms to improve the school food environment by, for example, optimizing school food menus, which can contribute to achieving children's nutritional requirements;

- developing education programmes (as part of school curricula) aimed at improving the nutrition culture among students, promoting healthy dietary behaviours and driving healthy nutrition advocacy among actors in the educational process;
- improving equipment in, and the technical structure of, school canteens through reconstruction and re-equipping school food facilities;
- improving quality and food safety in the school environment and eliminating low-quality food products; and
- developing methodological guidelines for physical activity that reflect the age and characteristics of school-aged children and describing therapeutic exercises for children with chronic/acute diseases.

iii) Appropriate infant and young child feeding and nutrition should be promoted.

This should include a focus on responsible family planning and maintaining and continuously supporting the high percentage of exclusive breastfeeding practice among nursing mothers of children under 6 months of age. Further promotion of the package of essential nutrition actions throughout the first 2 years of life to improve physical and mental growth and development, and improve productivity is also recommended. Implementing the Baby-friendly Hospital Initiative and the International Code of Marketing of Breast milk Substitutes can support good nutrition.

iv) Regular (every 2–3 years) epidemiological monitoring surveys on children's nutritional status should be conducted to track trends and the effectiveness of the introduction of programmes addressing child thinness, overweight and obesity.

This can be achieved by:

- creating a budget, allocated by the Ministry of Health, to continue support for, and management of, COSI and to participate in further rounds;
- creating a database of preventive measures for school students in a unified register held by the e-Health Centre; and
- developing scientific research in public health areas related to nutrition issues.

v) Monitoring initiatives should be supported.

This can be achieved through continued surveillance of children's eating habits, anthropometric measurements and food environments to monitor policy impacts, with disaggregation of data by gender and socioeconomic status.

vi) School medical care and health systems should be oriented towards more sustainable and continuous monitoring of children who are most at risk through enhancing programmes on promoting healthy lifestyles and implementing prevention measures effectively.

This can be achieved by:

- identifying children with overweight and NCD risk factors and involving their families in programmes to help the children and families to develop healthier lifestyles; and
- including a health professional in the school education system to improve the school environment in this regard.

vii) Nutrition and physical activity in the school education system should be improved.

Nutrition can be improved by:

- decreasing marketing of food with high saturated fat, trans-fatty acids, free sugars or salt content at school;
- involving local government bodies and parents in the organization and implementation of full hot-meal provision for young children at school; and
- creating and enabling a healthier school environment in compliance with requirements for water, sanitation and hygiene, and healthy diets.

Physical activity can be improved through providing children in rural and urban settings access to physical activity education programmes as part of the school curriculum.

viii) Building capacity for management of overweight and obesity

As obesity and overweight in the WHO European Region rise, it will be important to build capacity for management of overweight and obesity in primary care and among health workers.

ix) The level of parent education, particularly focusing on the education of mothers, should be increased.

This can be achieved through providing educational programmes, promoting information on health and nutrition and increasing health literacy on NCD risk factors. The knowledge acquired will increase self-confidence, especially among women, and help them to make healthier decisions regarding food choices and healthier lifestyles.

x) The safe cultivation, cooking and consumption of meals should be promoted by improving the level of education of those having private farms.

This can be achieved through providing educational programmes and promoting information on adequate cultivation of agricultural products and effective storage. The knowledge acquired will enhance people's understanding of the need for reduced use of pesticides, hormones and antibiotics and increase their confidence in purchasing healthier food for their own families.

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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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World Health Organization
Regional Office for Europe

UN City, Marmorvej 51,
DK-2100, Copenhagen Ø, Denmark
Tel.: +45 45 33 70 00
Fax: +45 45 33 70 01
Email: eurocontact@who.int
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WHO/EURO:2022-5680-45445-65044