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Nutrition Science · Public Health

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NUTRITION RESEARCH · TAJIKISTAN

Healthy Nutrition and Food Systems in Tajikistan

01

73%	30%	75%	40%	11%
energy from carbohydrates	children with stunting	womenin agriculture	working-age migrants	children underweight

Healthy nutrition is a fundamental pillar of population health and socio-economic development. In theRepublic ofTajikistan, dietary practices are deeply rooted in traditional food culture, shaped by centuries of agricultural heritage,regional cuisine, and household customs. Studies conducted across rural regions of the country demonstrate that food consumption patterns are determined by a complex interplay of economic conditions, cultural beliefs, food availability, and household decision-making structures. Understanding these patterns is essential for designing effective nutrition interventions and public health policies.

The traditional diet in Tajikistan is primarily based on staple foods such as wheat products, rice, and bread, which constitute the main source of energy for the population. Research indicates that carbohydrates provide approximately **73% of the total dietary energy consumption** in rural areas of the country — a figure that is close to the upper limit recommended by the World Health Organization for daily energy intake from carbohydrates.

Wheat products such as bread, noodles, porridge, and dumplings account for **more than two-thirds of the daily caloric intake** among many households. Fats and vegetable oils also play an important role, providing around **20% of total dietary energy consumption**.

CHILD NUTRITION AND THE CHALLENGE OF MALNUTRITION

Despite the important role of staple foods in providing energy, improving dietary diversity remains a key challenge for public health in Tajikistan. Micronutrient deficiencies, inadequate protein intake, and limited access to a wide variety of fresh foods — particularly in rural and remote areas — continue to affect the health and development of children. Studies indicate that approximately **5% of children under the age of five suffer from acute malnutrition**, while **30% experience chronic undernutrition, manifested as stunting**, and **11% are classified as underweight**. These figures highlight the urgent need for sustained investment in nutrition programs, early childhood feeding support, and maternal nutrition education.

Nutrition Indicator	Prevalence (%)	Affected Group	Public Health Priority
Acute malnutrition (wasting)	~5%	Children under 5 years	High
Chronic undernutrition (stunting)	~30%	Children under 5 years	Critical
Underweight	~11%	Children under 5 years	High
Dietary energy from carbohydrates	~73%	Rural households	Moderate
Dietary energy from fats/oils	~20%	Rural households	Moderate

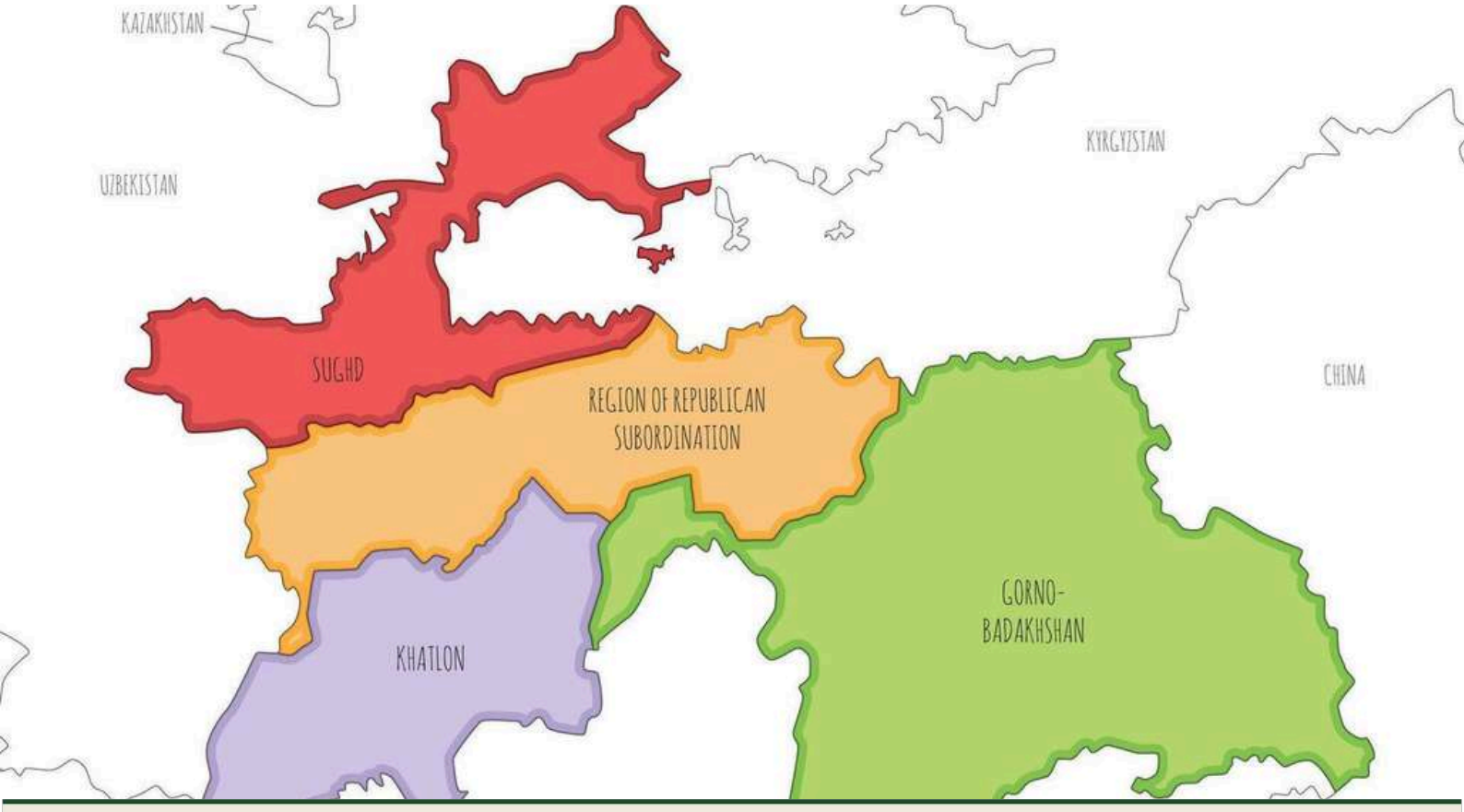
AGRICULTURE, WOMEN AND THE IMPACT OF MIGRATION

Agriculture plays a crucial role in ensuring food availability and supporting household nutrition across Tajikistan. Many rural households cultivate fruits and vegetables in home gardens or small farms, which contributes to food security and dietary diversity. Locally produced foods — including tomatoes, cucumbers, grapes, and watermelons — are widely grown and consumed, providing important vitamins and micronutrients that are otherwise difficult to obtain.

Women play a particularly significant role in maintaining household nutrition and food production. Economic and demographic changes, including large-scale labor migration, have increased women's participation in agriculture substantially. Research shows that approximately **75% of women in Tajikistan are involved in agricultural work**, contributing substantially to food production, crop management, and the stewardship of household food resources. It is estimated that around **40% of the working-age population migrates abroad for employment**, and most migrants are men from rural areas. As a result, women often assume additional responsibilities related to farming, food production, and household nutrition management, often without adequate technical support or resources.

> ***"Nutrition in Tajikistan is shaped by the interaction between traditional dietary practices, agricultural systems, and the evolving social structures within households — particularly as migration reshapes rural family life.***

While staple foods remain the primary source of energy, increasing attention is being given to improving dietary diversity and strengthening nutrition programs across the country. Continued development of agriculture, healthcare services, and nutrition education will play an essential role in promoting healthier diets, reducing malnutrition, and improving the overall well-being of the Tajik population. International partnerships such as the Erasmus+ BERNICA Project contribute directly to this effort by strengthening the capacity of academic institutions and healthcare professionals to understand and address nutrition challenges.



EVIDENCE-BASED DIETETICS · GLOBAL RESEARCH

The Importance of Healthy Dietary Patterns for HumanHealth

02

Scientific evidence accumulated over decades of clinical research demonstrates clearly that dietarypatterns—theoverall combination of foods and beverages consumed regularly — exert a powerful influence on humanhealth.Ratherthanfocusing on single nutrients, modern nutritional science increasingly recognises that it is the overall dietarypatternthatdetermines long-term health outcomes. Diets rich in plant-based foods, whole grains, and healthy unsaturatedfatsareassociatedwith significantly reduced risks of a wide range of non-communicable diseases, including cardiovasculardisease,type2diabetes, obesity, and certain types of cancer. This article reviews the evidence base for the most extensivelystudieddietarypatterns.

THE MEDITERRANEAN DIET

One of the most widely studied healthy dietary patterns in the world is the Mediterranean diet, characterised by high consumption of fruits, vegetables, whole grains, legumes, nuts, olive oil, and moderate amounts of fish and poultry, with limited red meat and processed foods. Clinical research has shown that adherence to the Mediterranean dietary pattern is associated with approximately a **30% reduction in major cardiovascular events** compared with a standard low-fat diet, demonstrating its remarkable protective role for heart health.

In addition, studies have found that the Mediterranean diet can significantly improve blood pressure levels. Participants following this dietary pattern experienced reductions in **systolic blood pressure of about 5.8–7.3 mmHg and diastolic blood pressure of 3.3–3.4 mmHg**, which contributes meaningfully to a lower overall risk of cardiovascular disease and stroke.

THE DASH DIET

The DASH diet (Dietary Approaches to Stop Hypertension) was specifically designed to reduce hypertension and improve cardiovascular health. It emphasises fruits, vegetables, whole grains, low-fat dairy, lean proteins, and limits sodium, red meat, sweets, and sugary beverages. Clinical trials have demonstrated that individuals following the DASH dietary pattern experienced significant reductions in blood pressure compared with those following a typical Western diet. On average, **systolic blood pressure decreased by 5.5 mmHg and diastolic blood pressure by 3.0 mmHg**. Furthermore, when sodium intake was additionally reduced, blood pressure decreased even further, reaching reductions of **8.9 mmHg for systolic pressure and 4.5 mmHg for diastolic pressure**.

In addition to blood pressure improvements, the DASH diet contributes to broader cardiometabolic benefits. Meta-analyses of clinical studies have shown that this diet can reduce **LDL cholesterol by approximately 0.1 mmol/L and total cholesterol by about 0.2 mmol/L**, while also leading to an average **body weight reduction of around 1.42 kg**. Improvements in insulin sensitivity have also been observed, with fasting insulin decreasing by approximately **0.15 µU/mL**, indicating better metabolic regulation and reduced risk of type 2 diabetes.

Dietary Pattern	Cardiovascular Benefit	Blood Pressure Effect	Additional Benefit
Mediterranean	~30% reduction in major events	Systolic –5.8–7.3 mmHg Diastolic –3.3–3.4 mmHg	Reduced stroke and heart failure risk
DASH	20–29% lower CV disease risk	Systolic –5.5–8.9 mmHg Diastolic –3.0–4.5 mmHg	LDL –0.1 mmol/L; weight –1.42 kg
MIND	Improved brain health, 53% lower Alzheimer's risk	Indirect benefits via cardiovascular protection	~35% risk reduction with moderate adherence
Nordic	Total chol. –0.98 mmol/L; LDL –0.83 mmol/L	Blood pressure –6.6 mmHg	Weight loss ~3 kg; improved metabolic health

THE MIND DIET AND COGNITIVE HEALTH

The MIND diet (Mediterranean-DASH Intervention for Neurodegenerative Delay) represents an innovative fusion of the Mediterranean and DASH diets with a specific focus on brain-healthy foods. It prioritises leafy green vegetables, berries, nuts, olive oil, whole grains, fish, poultry, and beans, while limiting red meat, butter, cheese, pastries, sweets, and fried or fast food. Studies have demonstrated that individuals who follow the MIND diet consistently have a **53% lower risk of developing Alzheimer's disease** compared with those following a standard Western diet. Even moderate adherence to the MIND diet has been associated with approximately a **35% reduction in Alzheimer's risk**, suggesting that any step towards this dietary pattern is beneficial for brain health.

OVERALL DISEASE RISK REDUCTION

Condition	Risk Reduction
Cardiovascular disease	~20% lower risk
Stroke	~19% lower risk
Heart failure	~29% lower risk
Type 2 diabetes	~18% lower risk
Alzheimer's disease	~53% lower (MIND)

Research has shown that adherence to balanced diets such as the DASH and Mediterranean dietary patterns can reduce the risk of cardiovascular disease by about 20%, stroke by 19%, and heart failure by 29%. These dietary approaches are also associated with an **18% lower risk of developing type 2 diabetes**, highlighting the importance of diet in the prevention of metabolic disorders.

In addition to specific food choices, proper hydration is an essential component of healthy lifestyle. Most guidelines recommend consuming approximately **1.5–2 litres of water per day**, equivalent to about eight glasses, to support metabolic processes, nutrient transport, and overall physiological functioning.

> ***"Scientific evidence clearly demonstrates that healthy dietary patterns — characterised by high consumption of fruits, vegetables, whole grains, legumes, nuts, and healthy fats — can significantly improve health outcomes and reduce chronic disease burden worldwide.***

PUBLIC HEALTH · WHO GUIDELINES

Modern Principles, Recommendations & Public Health Measures

03

Nutrition plays a key role in maintaining human health and well-being both at the individual and populationlevels.Anunhealthy diet is one of the leading modifiable risk factors for disease, disability, and premature mortality worldwide.Abalanceddiethelps protect the body against all forms of malnutrition — including both undernutrition and obesity —andsignificantlyreducesthe risk of noncommunicable diseases such as diabetes, cardiovascular diseases, stroke, and certaincancers.Healthyeating habits are established from an early age, and dietary patterns formed in childhood and adolescencetendtopersistthroughout life, making early nutrition education and support especially important.

THE FOUR CORE PRINCIPLES OF HEALTHY NUTRITION

Regardless of cultural background, food availability, or individual circumstances, healthy nutrition should be guided by four fundamental principles that have been validated by decades of nutritional science research.

Adequacy means that the diet meets — but does not exceed — the body's needs for macro- and micronutrients, preventing deficiency of each of them. An adequate diet provides sufficient energy and nutrients to support normal growth, maintenance, and physical activity.

Balance means that total calorie intake corresponds to the body's energy expenditure while maintaining an appropriate ratio between the three main energy sources: proteins, fats, and carbohydrates. A balanced diet distributes energy appropriately across these macronutrients.

Moderation means limiting intake of those nutrients, ingredients, and foods that may adversely affect health when consumed in excess, including free sugars, saturated fats, trans fats, and sodium.

Variety means including a wide range of foods both within individual food groups and across different food groups, ensuring that the diet provides all essential vitamins, minerals, and other beneficial compounds.

MACRONUTRIENT RECOMMENDATIONS

Nutrient	Recommended Intake	Primary Sources	Key Restriction
Carbohydrates	45–75% of daily energy	Whole grains, vegetables, fruits, legumes	≥400 g fruit/veg daily; limit starchy vegetables
Free sugars	< 10% of energy (ideally < 5%)	Naturally occurring in fruits	~50 g/day max; avoid in complementary feeding
Total fats	15–30% of daily energy	Fish, avocado, nuts, plant oils	Prefer unsaturated over saturated fats
Saturated fats	< 10% of daily energy	Dairy, meat (limited amounts)	Replace with polyunsaturated fats
Trans fats	< 1% of daily energy	Naturally in ruminant meat/dairy only	Avoid all industrially produced trans fats

Proteins	10–15% of daily energy	Lean meat, fish, eggs, legumes, dairy	~50–75 g/day for normal body weight adults
Salt (sodium)	< 5 g/day (< 2 g sodium)	Iodized table salt in modest amounts	Limit processed foods, sauces, pickles
Potassium	≥90 mmol (3,510 mg)/day	Fresh vegetables, fruits, legumes	Low-sodium salt substitutes where appropriate

INFANT AND YOUNG CHILD NUTRITION

Optimal nutrition during the first two years of life is of exceptional importance for healthy growth, cognitive development, and the prevention of overweight, obesity, and noncommunicable diseases later in life. During this critical window, the WHO recommends that infants receive **exclusive breastfeeding for the first six months of life**, with continued breastfeeding for at least two years or beyond.

From six months of age, breast milk should be complemented by appropriately selected **complementary foods of high nutrient density**, including animal-source foods (meat, fish, eggs) and a wide variety of fruits and vegetables. No salt or sugar should be added to complementary foods. Starchy foods should be kept to a minimum, and sweetened beverages must be avoided entirely during this developmental period.

MICRONUTRIENT DEFICIENCY — A GLOBAL CHALLENGE

Micronutrients — comprising approximately 30 major vitamins and minerals — are required by the body in small amounts for normal development and functioning. They include 13 vitamins (vitamin A, B vitamins, vitamins C, D, E, and K) as well as 16 minerals including iron, iodine, zinc, and calcium. Deficiencies can lead to serious health disorders, from anemia and scurvy to cognitive impairment and congenital malformations. More than **half of children under five years of age** and **more than two-thirds of non-pregnant women of reproductive age** worldwide experience a deficiency of at least one key micronutrient, most often iron, zinc, vitamin A, or folates.

PUBLIC POLICY MEASURES TO PROMOTE HEALTHY NUTRITION

Fiscal Measures	Taxes and levies on unhealthy processed foods high in saturated fats, trans fats, free sugars, and sodium; subsidies and incentives for fresh fruits, vegetables, and whole grains to improve affordability.
Product Reformulation	Mandatory requirements for the food industry to reduce levels of saturated fats, trans fats, free sugars, and salt in manufactured products, including the complete elimination of industrially produced trans fats from the food supply.
Marketing Restrictions	Government regulations to protect children from the marketing and advertising of unhealthy food products, including digital advertising, school-based promotions, and packaging targeting children.
Institutional Standards	Requirements for schools, hospitals, workplaces, and public institutions to provide healthy, energy-sufficient, affordable, and safe food options for all staff, students, and visitors.

Labeling & Information	Standard front-of-pack interpretive labeling to help consumers make informed food choices quickly and accurately, complemented by clear and complete nutrition information in accordance with Codex Alimentarius Commission guidelines.
Nutrition Education	School-based nutrition programs, cooking skills development for children and adults, and community-level nutrition counseling to build lasting healthy eating habits from an early age.
Breastfeeding Support	Implementation of the International Code of Marketing of Breast-milk Substitutes, policies protecting working mothers' breastfeeding rights, and the Baby-friendly Hospital Initiative to promote, protect, and support breastfeeding.
WHO REPLACE Initiative	WHO's comprehensive REPLACE action package providing governments with a roadmap to completely eliminate industrially produced trans fats from the food supply — already protecting more than 50% of the world's population from exposure to these harmful substances.

> ***"The creation of a food environment favorable to health requires the involvement of governments, public institutions, academia, and the private sector — working together across sectors and disciplines to make healthy eating the easier choice for every person.***

ACADEMIC ACTIVITY · AVICENNA TAJIK STATE MEDICAL UNIVERSITY

Modern Approaches to Nutrition Science and Dietetics: Seminar Report 2025

04

May 26–31	20	9	4	6
seminar dates, 2025	academic staff trained	nutrition topics	departments represented	days of intensive training

Healthy nutrition is one of the most important determinants of human health and quality of life. In modern medicine, nutrition is considered not only a preventive factor but also an essential component of treatment for many chronic diseases. Within the framework of international cooperation and the **Erasmus+ BERNICA Project**, higher medical institutions in Central Asia are actively developing educational and research activities in the field of nutrition and dietetics.

From **May 26 to May 31, 2025**, an intensive six-day seminar dedicated to modern issues of nutrition science and dietetics was organized at the **Department of Environmental Health of Avicenna Tajik State Medical University**. The seminar was conducted as part of the Erasmus+ BERNICA Project, which supports the development of innovative educational programs and strengthens cooperation between universities in Europe and Central Asia.

SEMINAR PARTICIPANTS AND GROUP PHOTO

The training brought together **20 academic staff members**, including professors, associate professors, and assistant lecturers from different departments of the university. The main goal of the seminar was to enhance the knowledge of university teachers in the field of nutrition science and to promote the integration of modern educational modules into the medical curriculum. Each lecture included discussion sessions and the exchange of professional experience among participants.

SEMINAR SPEAKERS AND TRAINERS

The training sessions were conducted by leading specialists of Avicenna Tajik State Medical University who are actively involved in the implementation of the BERNICA project. Each speaker brought deep subject matter expertise and practical clinical experience to their presentations.

Khuseyn Nazarzoda
Assoc. Prof., Environmental Health

Soleh Sharifzoda
Head of Dept., Environmental Health

Mahina Pirmatova
Assoc. Prof., Endocrinology

Sayora Saidova
Assistant Lecturer, Public Health

Khuseyn Nazarzoda	Associate Professor of the Department of Environmental Health and BERNICA project coordinator. During the seminar, he introduced modern scientific research in nutrition science and discussed practical approaches to applying dietary recommendations in clinical practice.
Soleh Sharifzoda	Head of the Department of Environmental Health. Provided an overview of the fundamentals of human nutrition and led discussions on evidence-based dietary recommendations relevant to the Central Asian context and Tajikistan in particular.
Mahina Pirmatova	Associate Professor of the Department of Endocrinology. Delivered sessions on metabolic syndrome, nutrition and mental health, and nutritional needs of elderly people, drawing on her extensive clinical experience.
Sayora Saidova	Assistant Lecturer at the Department of Public Health and Medical Statistics. Contributed sessions on nutrition for school-aged children, sports nutrition, and the role of innovative food products in modern dietetics.

SEMINAR PROGRAMME — TOPICS IN DETAIL

Nutrition in Chronic Obstructive Pulmonary Disease (COPD)

Malnutrition and weight loss are common complications among patients with COPD, arising from increased energy expenditure during breathing, reduced appetite, and systemic inflammation. Proper nutritional support can help maintain muscle mass, improve respiratory function, and enhance the overall quality of life of patients. The presenters highlighted the importance of balanced diets rich in proteins, vitamins, and antioxidants, with particular attention to adequate intake of vitamins A, C, and E, which strengthen the immune system and reduce inflammation in the respiratory tract.

Fundamentals of Human Nutrition

The speakers provided a comprehensive overview of the fundamental principles of human nutrition and their role in maintaining health and preventing diseases. They explained the importance of macronutrients such as proteins, fats, and carbohydrates, as well as micronutrients including vitamins and minerals essential for normal physiological processes. Special attention was paid to the importance of balanced dietary patterns and regular meal schedules. The speakers emphasised that understanding the basic principles of nutrition is essential not only for healthcare professionals but also for the general population.

Nutrition and Metabolic Syndrome

During this session, the speakers addressed the growing global problem of metabolic syndrome, which includes conditions such as obesity, hypertension, insulin resistance, and dyslipidemia. It was noted that improper dietary habits and sedentary lifestyles are key factors contributing to this syndrome. The lecturers discussed dietary strategies including reducing refined sugars, saturated fats, and highly processed foods, while increasing fruits, vegetables, whole grains, and healthy fats. Lifestyle modification combined with appropriate nutrition was presented as the most effective approach for reducing chronic disease risk.

The Relationship Between Nutrition and Mental Health

One of the seminar's most innovative sessions focused on the connection between nutrition and mental health. The speakers explained that certain nutrients play a significant role in brain function and emotional well-being. Diets rich in omega-3 fatty acids, vitamins of the B group, and antioxidants were identified as beneficial for maintaining cognitive function and reducing the risk of depression. The presenters also emphasised the importance of maintaining a balanced diet to support neurological health, noting that poor dietary habits may negatively affect mood, concentration, and overall mental performance.

Nutritional Needs of Elderly People

The physiological changes that occur with aging significantly affect dietary needs. Reduced metabolism, decreased appetite, and impaired nutrient absorption are common challenges among older adults. The lecturers emphasised the importance of ensuring adequate intake of proteins, calcium, vitamin D, and other essential nutrients in the diets of elderly people. Proper nutrition in this age group can help prevent muscle loss (sarcopenia), maintain bone health, and reduce the risk of chronic diseases such as osteoporosis and cardiovascular conditions.

Nutrition for School-Aged Children

Balanced nutrition is essential for the healthy growth and cognitive development of school-aged children. The presenters emphasised providing children with diets rich in fruits, vegetables, dairy products, whole grains, and high-quality proteins. They also discussed the need to strictly limit the consumption of sugary drinks, fast food, and highly processed products, which negatively affect children's health, concentration, and academic performance.

Innovative Approaches in Food Products

The speakers introduced modern innovations in food production, including the development of functional food products enriched with vitamins, minerals, probiotics, and bioactive compounds designed to improve human health and prevent diseases. During the discussion, participants learned about the growing role of food technology in creating healthier options and the importance of scientific research in developing new products that meet the nutritional needs of modern society.

Sports Nutrition and Physical Performance

The session on sports nutrition focused on the role of diet in improving physical performance and supporting recovery after exercise. Special attention was given to the importance of carbohydrates for energy production, proteins for muscle repair, and adequate hydration during physical activity. The presenters also discussed the role of vitamins and minerals in maintaining optimal athletic performance and discussed practical meal planning strategies for athletes.

Clinical Nutrition in Chronic Kidney Diseases

The final topic addressed nutritional therapy in patients with chronic kidney diseases. Diet plays a critical role in slowing the progression of kidney damage and managing related complications. Participants learned about dietary recommendations such as controlling protein intake carefully, limiting sodium and phosphorus consumption, and maintaining proper fluid balance. The speakers emphasised that individualised, regularly monitored nutrition plans are essential for effective management of kidney disease patients.

EDUCATIONAL IMPACT AND FUTURE PLANS

One of the most important outcomes of the seminar was the productive discussion on how new nutrition-related modules can be effectively integrated into the university curriculum across departments. Participants emphasised the importance of interdisciplinary teaching of nutrition, evidence-based dietary recommendations, practical training for medical students, and strengthening cooperation between medical departments.

It is planned that these modules will be gradually incorporated into teaching programs for students, residents, and postgraduate researchers at Avicenna Tajik State Medical University, creating a sustainable impact on medical education quality in Tajikistan.

Participants highlighted several positive outcomes from the seminar:

- Improved understanding of modern approaches to nutrition science
- Meaningful exchange of scientific and teaching experience across departments
- Strengthened interdepartmental collaboration and professional networks
- Development of concrete plans for future educational initiatives
- Identification of areas for further research and curriculum development

ADDITIONAL SEMINAR PARTICIPANTS

The seminar brought together academic staff from multiple departments. Space is reserved below for additional participant portraits and photos from seminar activities.

CONCLUSION

Participation in international educational initiatives such as the **Erasmus+ BERNICA Project** plays an important and growing role in the development of medical education in Central Asia. The seminar held at Avicenna Tajik State Medical University demonstrated the strong interest and commitment of academic staff to advancing nutrition science and preventive medicine as core components of modern medical training.

Further activities within the project will focus on expanding educational opportunities, developing new teaching materials adapted to the Central Asian context, and strengthening international cooperation in the field of nutrition and dietetics. The knowledge and experience gained during the seminar will contribute to improving the quality of medical education across the region and promoting evidence-based nutrition practices in healthcare.

> *"The BERNICA Project demonstrates that when academic institutions across borders collaborate with communities.*

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