

Cross-country skiing as a factor in adolescent physical activity and health education: a theoretical aspect

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ANNOTATION

Cross-country skiing is one of the most universal forms of winter physical activity, helping to develop both physical and mental health. In recent years, there has been increasing talk about the lack of physical activity in children and adolescents and its impact on their health. This theoretical review examines the significance of cross-country skiing for improving the health of 14–16-year-old adolescents, including their motivation to move and the development of physical activity. Based on the analysis of scientific literature, the physiological and psychological aspects of skiing, the characteristics of adolescent development, and the possibilities of integrating skiing into the educational process are discussed. The article also highlights the motivational factors that encourage adolescents to actively participate in sports activities. The presented analysis allows us to better understand the potential of skiing as a health-improving tool and the importance of its application in the educational system.

Keywords: cross-country skiing, physical activity, health, adolescents, education, motivation, winter sports.

INTRODUCTION

Relevance and novelty. The rapidly changing social and technological environment has a significant impact on the lifestyle and physical activity of the younger generation. Scientific research shows that the lack of movement in adolescents is becoming an increasingly relevant public health problem, which is associated with declining physical capacity, overweight, psychological difficulties, and lack of motivation to participate in active activities (Ostermeier et al., 2024; World Health Organization, 2021). During the winter period, opportunities for physical activity in the natural environment are significantly reduced, therefore it is necessary to promote winter sports, such as cross-country skiing, which can help maintain and strengthen the health and motivation of young people to move (Babaei-Zarch et al., 2024). Although cross-country skiing has obvious physiological and psychological benefits, the impact of this sport on the health and physical activity of adolescents is still insufficiently studied, especially in Lithuania. Therefore, it is relevant to systematically analyse the role of cross-country skiing in the health promotion and development of adolescents (Hoffman & Clifford, 1992).



Cross-country skiing is a full-body workout that combines endurance, coordination, and strengthening of the respiratory and cardiovascular systems. This sport can become not only an effective health promotion tool, but also a motivational education tool for adolescents, encouraging them to know the joy of movement, experience togetherness, and develop responsibility for their health.

Scientific problem. Although the importance of physical activity for the health of adolescents is well known, recently their lack of physical activity, which negatively affects both physical and mental health, has been increasingly noted. Despite the fact that physical activity education among adolescents is widely recognised as an important health promotion tool, the level of physical activity significantly decreases during the winter season due to limited opportunities to engage in outdoor sports (Ostermeier et al., 2024). Thus, especially in the winter period, when opportunities for active activities in the natural environment decrease, adolescents too become less active.

Cross-country skiing is a complex form of physical activity that can effectively promote the physical and mental health of adolescents, but there is a lack of theoretical and empirical research that comprehensively examines the benefits of this sport and the possibilities of integrating it into the educational process (Hoffman & Clifford, 1992; Babaei-Zarch et al., 2024). Therefore, there is a need to analyse the impact of cross-country skiing on the strengthening of physical activity and motivation of adolescents more thoroughly, as well as to assess the possibilities of its application in the educational system.

Research object. The processes of physical activity and health strengthening of adolescents (14–16-year-olds) related to the practice of cross-country skiing.

The aim of the article is to reveal the importance of cross-country skiing for the health and physical activity of adolescents aged 14–16. The physiological, psychological, and educational aspects shall be analysed, and the importance of integrating this activity into the general education process emphasised.

Methods. 1. Analysis and research of scientific literature; 2. Data analysis and processing.

RESEARCH RESULTS

Cross-country skiing: concept and benefits. Cross-country skiing is a winter sport that involves prolonged movement on skis over flat or slightly hilly terrain. Unlike downhill skiing, this form of sport involves continuous active movement involving both upper and lower body muscles. This sport developed in Scandinavian countries as a natural form of movement through snow and later became not only a recreational activity, but also a high-performance sport discipline (Table 1).

Table 1. **Seasonal physical activity and the role of cross-country skiing** (based on Laukkanen et al., 2019)

Season	Typical physical activity level	Factors	Role of skiing
Spring	High	Warm weather, outdoor sports	Less relevant
Summer	High	Vacation, swimming, cycling	Not practiced
Autumn	Medium	Shorter days, school pressure	Minimal engagement
Winter	Low → Moderate (if skiing involved)	Cold, limited daylight, indoor confinement	Boosts activity level, encourages outdoor time

Table 1 shows that cross-country skiing becomes an important factor in maintaining physical activity and providing an alternative to passivity in adolescents during the winter.

In the literature, cross-country skiing is often described as a comprehensive form of physical activity that develops endurance, coordination, speed, and strength. In addition to physical benefits, this sport also provides psychological benefits: movement in fresh air, repetitive rhythm, reduced stress, and improved mood and internal balance due to being in nature. For adolescents, it can be a great alternative to passive leisure, which often prevails in the winter months.

The basics of cross-country skiing are easy to learn. No special skills or abilities are required to start skiing. The main requirement is that the movements are natural and smooth. Under the guidance of an instructor, in just a few hours, the basics of skiing can be mastered, which will be useful for a lifetime. Skiing is suitable for the whole family (i.e., for people of all ages) because the intensity and skiing styles can be varied. In conclusion, skiing is simply a great winter activity for all, as its smooth movements and the environment of fresh air offer a welcome escape from the everyday life.

Facts about skiing:

- 42% of skiers are women;
- 30.5% of skiers are aged 25–44;
- 16% of skiers are children aged 7–17;
- 2.4 million people ski every year (Kustību Prieks, n.d.).

There are two main skiing techniques for slopes – classic and skating. Although it is often thought to be easy, skiing is actually a complex and difficult sport, which requires training led by a ski instructor. Compared to other types of skiing, cross-country skiing is less traumatic, but incorrect skiing technique and improperly selected equipment can cause overload of the musculoskeletal system, in result the muscles will become strained, tendons will become inflamed, and joints and head will become cold (Osovskis, 2019).

Cross-country skiing is a versatile and physiologically valuable winter physical activity that simultaneously develops the cardiovascular system, strengthens most muscle groups, and improves balance and coordination. Cyclic movements, during which several joints work simultaneously, make this sport particularly effective for improving endurance and health. In addition, due to the even distribution of the load and low risk of injuries, cross-country skiing is suitable for all age groups and can be practiced both outdoors and on specially prepared tracks, with the intensity adjusted to the physical fitness of each skier. Despite the fact that the basics of skiing are relatively easy to learn and suitable for the general public, this sport requires correct technique and properly selected equipment in order to avoid injuries and overloads. Although skiing is a natural movement, practicing it without professional training can damage the musculoskeletal system, especially for 14–16-year-olds, whose development is still ongoing. Therefore, integrating skiing into school sport programmes requires a professional approach and adherence to safety principles, while promoting the physical and mental well-being of students through an active winter sports environment.

Skiing contributes to injury prevention by strengthening various muscle groups. A stronger and more balanced body is less prone to injuries, as the likelihood of incorrect movements and falls is reduced (Stöggl & Holmberg, 2022). In order to maximise the benefits of this sport, it is important to follow the correct technique, use the right equipment, and ensure adequate warm-up and rest. Schools and sports clubs that include skiing in their programmes have the opportunity to promote not only physical fitness, but also long-term injury prevention among young people.

Physical, mental, and social health links with skiing. The concept of physical, mental, and social health links is particularly relevant during adolescence, when the maturing organism experiences intense physical, emotional, and social changes (Immere & Jansone, 2005). Physical activity, as one of the most important factors of health, contributes to the strengthening of all these components. Cross-country skiing, as a complex movement activity, has the potential to affect all three dimensions of health. Health is a complex concept that encompasses several aspects that generally determine the well-being of an individual. According to the preamble to the Constitution of the World Health Organization (n.d., p. 1), “Health is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity”. It is emphasised that health is much more than just the absence of disease, it includes full physical and mental functioning, as well as positive social relationships and injury prevention.

Physical health is directly related to the state of the body, the ability to avoid diseases, as well as the rapid and effective recovery from various possible injuries through exercise, including maintaining physical condition and strength through regular physical activity, healthy nutrition, and sufficient sleep. It also influences physiological processes such as normal blood pressure, blood sugar levels, and healthy body weight.

Mental health, in turn, refers to emotional and psychological well-being, including emotional stability – the ability to manage stress, cope with everyday problems, and maintain a positive self-esteem. Psychological resilience is the ability to adapt to life’s changes and overcome difficulties. Cognitive functions describe the ability to concentrate, learn, and make decisions (Irwin-Rogers, 2019). Skiing not only improves physical health, but also has a positive effect on mental well-being. Outdoor activities can reduce stress, anxiety, and symptoms of depression (Pretty et al., 2005). Skiing in nature provides emotional relaxation, reduces the level of stress hormones in the body, and improves mood. The experience of self-improvement is especially important for adolescents – after overcoming a slope, a hill, or the cold, self-confidence increases. Studies show that physical activity has a positive effect on adolescents’ self-esteem and helps to overcome symptoms of anxiety and depression (Ekeland et al., 2005).

Social health refers to an individual’s ability to establish and maintain positive relationships with other people. It is related to social integration – a sense of belonging to a community or a group, the presence of a support network. Skiing can be both an individual and a team activity (Salmon & Timperio, 2007). It also involves communication skills – the ability to effectively communicate and cooperate with others. The ability to adapt and function in different social situations is a key determinant of social health.

Health is a holistic concept in which all these aspects are interconnected. For example, physical activity (physical health) can improve mood and reduce stress (mental health), as well as promote social relationships if the activity takes place in a group (social health).

To understand how important proper gear and training is in skiing, we can give an example of purchasing a powerful sports car – just like when skiing with professional skis, if you are just a beginner, you are likely to have an accident around the first turn. There are two main skiing techniques – classic and skating style. Although it is often thought that it is easy, in fact skiing is a complex and difficult sport, therefore training is required, which is carried out by a person who knows about skiing or has experience in this activity.

If you want to improve your physical performance while skiing and reduce excess weight (skiing burns fat; depending on the intensity of skiing, you can burn 400–1 200 kcal per hour), then your heart rate should change while skiing. For skiing to be healthy, the load should be increased gradually. After physical activity, you should feel satisfaction in performing daily tasks, sleep better, have an improved appetite. If the wrong load is chosen and overload occurs, then the feelings of unwellness, insomnia, nervousness, poor appetite and nausea, pain in the musculoskeletal system may be present, and work capacity may decrease (Osovskis, 2019).

Analysing the scientific literature, it was found that the effect of skiing on physical, mental, and social health, especially in a school environment, where effective ways to motivate students to participate in physical activity are often needed, is positive. Studies have shown that skiing significantly improves cardiovascular health, as it is an intense physical activity (Hoffman & Clifford, 1992). Regular training can contribute to improving endurance and reduce the risk of heart disease. Skiing activates several muscle groups, especially the muscles of the legs, arms, and back (Stöggl & Müller, 2009; Pretty et al., 2005).

Skiing, as a full-fledged winter sport, has become an important sport in people's everyday lives. For young people, who often face emotional and social problems, regular physical activity in the fresh air can be an important means of improving mental health. Thus, cross-country skiing is more than just a means of physical education – it is a form of comprehensive health education, suitable for integration into school or non-formal education programmes.

Physiological effects of skiing on adolescents. Adolescence is a period of intense biological development, during which the body undergoes significant changes – the skeletal and muscular system grows rapidly, internal organs mature, the cardiovascular system strengthens, but at the same time temporary balance and coordination disorders may occur (Janssen & LeBlanc, 2010). The physiological effects are obvious, affecting a person's behaviour, emotions, evaluation, and actions (Figure 1).

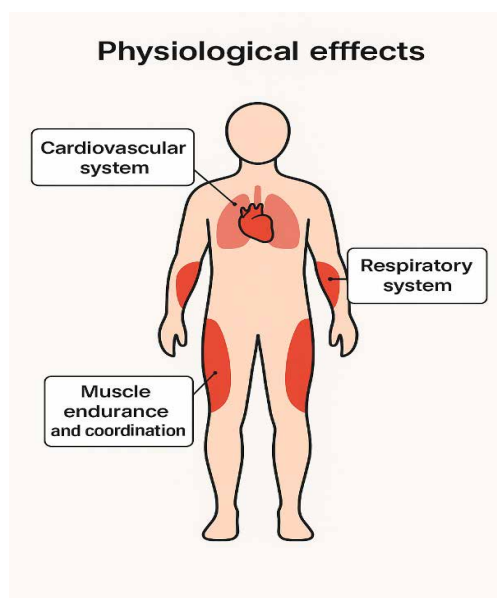


Figure 1. **Physiological impact** (adapted from Mitchell & Larry, 2021)

At this stage, it is especially important to ensure physical activity that is not only safe, but also contributes to harmonious development. Cross-country skiing is particularly well suited for this due to its comprehensive physiological effects.

Endurance development. Cross-country skiing requires long-term constant movement, which is why the cardiovascular and respiratory systems are trained. Over time, blood circulation improves, oxygen absorption capacity increases, and the heart muscle strengthens – this forms the basis for good aerobic endurance, which is important for overall health maintenance and disease prevention.

Musculoskeletal system. Almost all major muscles – both upper and lower body – are actively working when skiing. This not only helps to build muscle strength and endurance, but also strengthens bone tissue, which is extremely important for a growing body. Back muscles are also strengthened, which protects against posture disorders – a common health problem in adolescents, especially when spending a lot of time sitting in front of screens or carrying heavy backpacks (Tagliaferri et al., 2015).

Coordination and balance. Skiing is a dynamic activity in which constantly changing conditions require the development of balance, movement control, and precision. Studies show that physical activity that develops motor skills has a positive effect on the quality of movement as well as on the cognitive functions (Best, 2010).

Stabilisation of physical development. Skiing strengthens muscle tone, improves overall body flexibility and range of motion. Due to rhythmic breathing and constant movement, skiing also stimulates the internal rhythm and calms the nervous system, which is very important for a maturing teenager.

Taking into account physiological characteristics, cross-country skiing can be a safe and effective way not only to develop physical abilities, but also to ensure the harmonious development of a growing organism. Properly adjusted training load and a supportive school environment help to achieve good health results and promote long-term activity habits. Skiing is an outdoor winter sport that works ~90% of muscle groups, strengthens the cardiovascular system, joints, and immune system. Although it is a winter sport, active preparation takes place in all seasons, developing both endurance and strength, balance and reaction. Cross-country skiers are often able to achieve significant results in running disciplines as well (Grants, 2007). According to Hoffman and Clifford (1992), for 14–16-year-olds whose cardiovascular system is still developing, regular skiing lessons can contribute to improving endurance and overall health.

According to Stöggel and Müller (2009), skiing can help young people strengthen their muscular system, which is essential for healthy growth and development. The literature highlights that regular skiing can increase maximal oxygen consumption (CO₂ max), which is an important indicator of cardiovascular health and general physical endurance (Boushel et al., 2011). Skiing requires high levels of muscular strength and endurance, especially in the legs, arms, and trunk muscles. Regular training increases muscle mass and strength, as well as improves muscle capacity (Shinkle et al., 2012). Skiing significantly affects metabolic processes in the body, especially fat and carbohydrate metabolism.

During physical activity, energy consumption increases and metabolism improves (Vesterinen et al., 2009) and the central nervous system, including the cerebral cortex, receives a huge number of signals from the muscles, joints, and ligaments used. Therefore, skiing also improves metabolism (Kravalis, 2009). Additionally, being in nature causes positive emotions in people.

Developmental characteristics of adolescents (14–16 years) and the importance of physical activity. The age period between 14 and 16 years is one of the most complex and dynamic stages of human development. During this period, not only physical, but also psychological and social human characteristics develop intensively. Adolescents face challenges related to body chang-

es, emotional instability, identity, and the need to belong in a group (Erikson, 1968). Therefore, the importance of physical activity at this age becomes multifaceted – it is a means of health as well as a tool of developing personal maturity and social competences.

Physical development. During adolescence, the body changes extremely rapidly – height and body mass increase, muscle and bone structures develop. However, these changes are often disproportionate; due to growth spurts, coordination difficulties or posture problems may occur (Malina et al., 2004). Regular physical activity, such as cross-country skiing, can help stabilise these processes, strengthen the musculoskeletal system, and maintain physical balance.

Psychological development. Adolescent thinking moves to a higher level of abstract logical thinking. However, at the same time, the feelings of self-criticism, emotional vulnerability, and a strong need to be recognised by peers increase (Table 2).

Table 2. **Psychosocial skills developed through cross-country skiing**

Skill	How it is developed
Responsibility	Managing equipment, following training schedules
Teamwork	Participating in group skiing activities and relay races
Persistence	Repeating movement patterns, overcoming cold or fatigue
Confidence	Improving personal performance, receiving encouragement
Focus & patience	Navigating varied terrain, maintaining rhythm

From Table 2 it can be seen that skiing activities promote not only physical development, but also personal growth – this is especially important in adolescence. Sports activities, especially in nature, reduce stress, help regulate emotions, and provide a sense of achievement and self-confidence (Weiss & Wiese-Bjornstal, 2009). Through physical activity, a teenager can realise himself, learn to achieve goals, experience healthy competition and team relations.

Social development. Adolescents aged 14–16 are particularly sensitive to the social environment – it is important for them to belong to a peer group, to be accepted, heard and valued. Participation in sports activities promotes cooperation, responsibility, empathy, and respect for others. Group skiing activities can become a natural platform for the formation of positive social skills – while preparing to ski, skiing, or overcoming challenges together.

Physical activity as protection against risky behaviour. Adolescence is characterised by an increased tendency to experiment with psychoactive substances, engage in risky behaviour and social isolation. Studies show that physically active adolescents are more likely to have higher self-esteem, experience fewer depressive episodes, and engage in meaningful activities (Biddle & Asare, 2011). Cross-country skiing can therefore be an effective preventive measure, especially if it is integrated into formal or informal education programmes. In summary, this age period requires targeted, tailored activities that not only address physical education goals but also support the adolescent's psychological and social stability. Cross-country skiing is one way to ensure the holistic development of an adolescent, integrating health, self-esteem, and social connections.

Possibilities for integrating cross-country skiing at school. School is one of the most important institutions that can influence the physical activity habits of children and adolescents. According to the recommendations of the World Health Organization (2021), school education should promote daily physical activity that is not only regularly applied, but also attractive and accessible to all students. However, in many countries, the offer of physical activity becomes limited during the

winter season. Cross-country skiing, as a natural, seasonal, and comprehensive health-promoting activity, can be successfully integrated into physical education programmes (Figure 2).

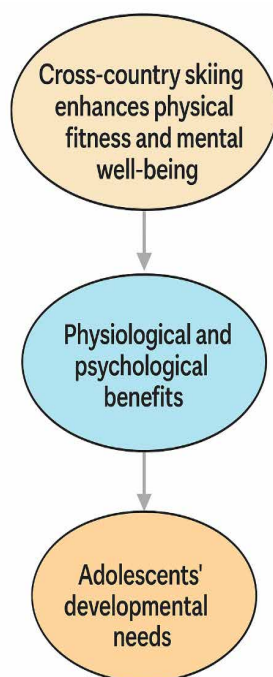


Figure 2. **Educational integration**

Use of available resources. Many regions in Lithuania and Latvia have favourable climatic conditions for skiing in nature or on school grounds during the winter. Properly prepared slopes, basic equipment, and the initiative of teachers create the prerequisites for including skiing in lessons or informal activities. Studies show that even simple solutions – for example, purchased school skis or cooperation with local sports clubs – promote student engagement and improve their overall physical condition.

Teacher training. The role of the teacher is essential. Student engagement depends on the teacher’s ability to organise activities, motivate, and create safe conditions. Cross-country skiing can be included in the physical education curriculum not only as a lesson, but also as a thematic week, field trip, or integrated project involving other educational areas (e.g., natural sciences, geography, ethics).

Barriers to integration. Although the inclusion of skiing has many advantages, in practice there are often obstacles – lack of equipment, absence of infrastructure, shortage of experienced teachers, or even climate variability. These obstacles can be addressed through municipal support, school cooperation, short-term projects, and teacher training.

Increasing involvement and motivation. It is especially important for adolescents that physical activity is meaningful, interesting, and provides an opportunity for self-expression. Cross-country skiing as a seasonal activity can become a moment of “discovery” for those students who do not express themselves in traditional sports. As a result, this activity contributes to the development of equal opportunities and comprehensive health promotion (Dobbins et al., 2013). In conclusion, cross-country skiing has a real potential to become a valuable part of physical education. Its integration into

school activities strengthens health, motivation, and connection with nature, and when properly organised, the process can be an inclusive, interesting, and sustainable solution in the education system.

Table 3. Supporting factors that encourage adolescents' participation in skiing (based on Lazauskas, 2018)

Support source	Contribution to participation
Parents	Motivation, transportation, financial support
School environment	Integration into physical education, organised trips or events
Local community clubs	Providing access to equipment, coaching, and trails
Peer influence	Encouragement through friends, group belonging

Table 3 shows that social environment and support from family members are key factors determining a teenager's willingness to participate in the activity.

Although skiing has many benefits, its popularisation among students may face challenges, such as limited access to ski slopes and the necessary equipment. Of course, it is possible to use existing environment, such as a stadium near the school or any other location where it is possible to install a slope closer to the school.

The role of schools and local authorities is essential in providing accessible resources and support. Local authorities should present schools with the opportunity to purchase skiing equipment or, in larger municipalities, offer the schools the opportunity to rent said equipment so that students can learn this physical activity (Saeima, 2022).

In order to effectively integrate skiing into the school sport programmes, knowledgeable sport teachers and well-planned classes that meet the needs and interests of young people are needed. Skiing can be a very effective tool to promote physical activity in 14–16-year-olds, but to make the most of this activity, the right environment is also required. Additionally, students could be more engaged in such physical activity if group lessons and team competitions that promote the development of cooperation and social skills are incorporated. Students could learn to work in a team, support each other, and enjoy achieving common goals. Furthermore, skiing outdoors is manifested in psychological relaxation, which is essential for students' emotional well-being (Pate & O'Neill, 2008). Skiing could be included in school sport programmes as part of health and sport lessons. These lessons could include both practical activity and theoretical explanations of skiing techniques and equipment. In order to promote this physical activity in schools, the conditions for students to engage in this activity after school should be created, encouraging regular physical activity and increasing students' interest in sport and health.

Integrating skiing into school sport programmes can significantly improve the overall physical fitness, health, and quality of life of students by developing endurance, muscle strength, coordination, and balance. Appropriate lessons can have a positive effect on students both physically and psychologically. Given today's weight problems and physical inactivity among children, skiing could be a great way to promote a healthy lifestyle and good physical fitness. A big advantage of skiing lessons is that they take place outdoors. However, this brings into light a noticeable problem – the lack of suitable premises. This is especially problematic in winter or during the cold season, when lessons are held indoors, as well as in schools where sports classes are organised for several classes at the same time, which is a quite common practice in Latvian schools. Small and cramped spaces affect the quality of sports lessons and their full-fledged conduct. This is most often manifested in the fact that not

all students can fully participate in sport at the same time, they have to spend some time in downtime during lessons, waiting for other students to complete tasks, as a result of which the physical load of students in the classroom is relatively lower, and the risk of trauma is higher due to the large number of people and the differences in the level of physical development. It is proven that during the winter months, most students devote less time to physical activity than in the summer or other seasons. This situation may be related to shorter daylight hours and worse weather conditions in winter. In addition, some students prefer to spend most of their free time at home in front of the computer or TV, thus reducing their overall level of physical activity. In winter, it is necessary to encourage students' physical activity in order to improve their health and well-being (Veselības ministrija, 2020). A possible solution could be longer lessons in health and sports classes, organised sports activities, or other ways to encourage student mobility in the winter months, including skiing as a way to spend free time in the fresh air and exercise. This would allow students to gain more positive experiences and benefits associated with regular physical activity not only in the summer but also in winter.

Motivational factors for active participation in sports. One of the most important factors for the success of physical activity in adolescence is motivation. At this age, when personality is maturing and social and emotional needs become particularly intense, internal and external motivational factors have a direct impact on students' involvement in physical activity. In order to encourage adolescents to actively participate in sports, it is necessary to understand what inspires, engages, and encourages them to return to movement regularly (Figure 3).



Figure 3. **Motivational factors** (based on Targamadžė & Rakauskienė, 2007)

Motivational factors. Based on Spranger's (1928) value theory, young people are motivated differently, depending on what they consider the most important in life: cognition, aesthetics, community, or power. Cross-country skiing as an activity encompasses all these dimensions – it allows you to explore, be with others, achieve goals, and experience a spiritual connection with nature, therefore it can be very motivating in many ways (Spranger, 1928).

Motivation is internal interests, driving forces, desires, attitudes that encourage human activity and direct actions. The motivation process can be modelled as follows: needs – goal setting – action – goal achievement – new needs. Motivation is an impulse that causes the activity of the organism and determines its direction (Reņģe, 2007).

Motivation consists of needs, motives, and goals that constitute the driving force of behaviour. There are two main types of motivation – intrinsic motivation and extrinsic motivation. Intrinsic motivation arises from the student's own interest and pleasure, which is created by the activity itself. For example, the desire to improve overall physical fitness or to get satisfaction from skiing skills. This is an activity that a person chooses for the pleasure of the action itself or for its internal meaning.

Sources of intrinsic motivation for adolescents can be self-improvement, a sense of achievement, learning new skills, or simply being in nature. Cross-country skiing, especially when it takes place in an open space and there is no competitive pressure, creates the conditions for the spread of such motivation (Deci & Ryan, 2000). In turn, extrinsic motivation is based on external stimuli – recognition, assessments, competitions, or awards (Ryan & La Guardia, 2000). Extrinsic motivational factors, such as teacher encouragement, peer influence, grading systems, or even social media images, also strongly influence adolescent behaviour. Properly presented cross-country skiing, as a unique, active, and different form of sport, can become the centre of attraction even for those who do not usually participate in sports.

Sense of belonging and community. Social engagement factors – participation with friends, belonging to a group or team – often determine whether a teenager will want to be active. The shared skiing experience – sharing impressions, physical challenge, and helping each other – strengthens interpersonal relationships and helps create a safe and inclusive environment.

Autonomy and freedom of choice. Teenagers value the opportunity to choose – both the sport, and the intensity or method of activity. Skiing allows for individualisation of tasks – some can focus on endurance, others on technique, or simply enjoy being in nature. Such freedom strengthens autonomy, and at the same time – long-term motivation.

A sense of meaning. When an activity is associated with goals that are important to the student himself – for example, health, emotional well-being, being with friends, or even preparing for a hike or competition – motivation is strengthened. Cross-country skiing has great potential for meaning: it is not only a physical activity, but also a challenge, a way out of the comfort zone, a path to self-knowledge.

Thus, by understanding the sources of motivation of adolescents and creating inclusive, flexible forms of activity, we can not only encourage movement today, but also form a long-term habit of an active lifestyle. Cross-country skiing, due to its properties, can be one of the most effective tools in this process.

When trying to promote student motivation in skiing lessons at school, the teacher should use both intrinsic and extrinsic elements. It is important to involve students and set goals by explaining why skiing is important for health, endurance, and coordination. Individual goals can be set, for example, to cover a certain distance or to improve technique. To make lessons emotionally rich and engaging, it is necessary to use a variety of tactics and game elements (to organise games or relays with skis). This helps to develop a positive attitude towards physical activity.

Social motivation is increased by, for example, encouraging cooperation and team spirit by completing tasks in pairs or groups. This helps students to feel involved and responsible. Positive feedback and assessment are also necessary – provide regular praise and objective feedback on students' progress. This promotes a sense of self-efficacy (Reņģe, 2007). Promoting autonomy – allowing students to choose some tasks or levels of activity themselves increases intrinsic motivation because students feel in control of their learning (Ryan & La Guardia, 2000). Motivated students tend to participate in the learning process more effectively and can use their potential to achieve higher levels. Motivation not only promotes positive emotions in students, but also contributes to a greater sense of well-being. Understanding how to promote children and young people's motivation to learn is crucial if we want to give them an optimal start and a successful future (Hawthorne & Lasonen-Aarnio, 2021).

Application of motivation theories in sport education. Different motivation theories help to understand why people engage in certain activities, how their interest is maintained and what determines the stability of behaviour in the long run. By applying classical motivation theories in sport education, it is possible to create a more purposeful and emotionally meaningful physical activity environment for students. This chapter briefly discusses three well-known theories – Maslow’s, Deci & Ryan’s, Herzberg’s – and their application in the context of cross-country skiing.

Several theories have been developed to understand how people acquire strong intrinsic motivation. Motivation research can be divided into those that look for the causes of behaviour and those that focus on the stages of behavioural development.

- Maslow’s hierarchy of needs (Maslow, 1943);
- McGregor’s theory of X and Y (McGregor, 1960);
- Herzberg’s hygiene theory (Herzberg, 1968);
- In terms of process research theories that influence motivation, we can distinguish:
- Vroom’s expectancy theory (Vroom, 1964);
- Adams’s equity theory (Adams, 1963);
- Locke’s goal-setting theory (Locke, 1968).

Process research views motivation as a dynamic and constantly evolving system that operates as a unified whole. At the theoretical level, attention is focused on those factors that influence the intensity and manifestation of motivation in different contexts. This aspect of research analyses what conditions contribute to an increase in motivation or, conversely, cause its decrease. Special attention is paid to the mechanisms that initiate, maintain, or terminate specific behavioural patterns. Theoretical analysis also seeks to understand the living conditions of individuals and their influence on the direction of actions, studying what goals become motivating forces for different personalities and situations. In parallel with this approach, the main emphasis of process research is placed on the process of behaviour itself – how a specific action is initiated, how it is maintained over time, and under what conditions it is terminated. These theories seek to answer the question “how?” and provide insights into the dynamics of behaviour. It is important to note that both theoretical and process research methods provide valuable insights into the mechanisms of motivation. Both can be effectively used by individuals and organisations to understand and promote motivation in different people with different personality traits, needs, and life experiences. Edeirs (2007) emphasises in his work the idea that “after satisfying basic needs, new needs arise, which later become motivation”.

CONCLUSIONS

1. In the literature, cross-country skiing is considered one of the most comprehensive endurance sports, effectively developing the cardiovascular system, respiratory function, muscle endurance, and coordination. It is a low-impact activity, reducing the risk of injuries, suitable for children of all ages and physical fitness levels. This is especially important for students aged 14–16, who are in a period of intensive growth and development. Scientific studies emphasise that cross-country skiing helps to strengthen the immune system, improve movement control, and develop general endurance, which is very important at this age.
2. Cross-country skiing has a positive effect on the physical health of adolescents, strengthening the cardiovascular system, muscle endurance, and coordination. Psychological motivational

factors, such as a sense of community, the joy of movement, and self-realisation, encourage adolescents to regularly participate in cross-country skiing activities.

3. Cross-country skiing also provides opportunities to develop psychosocial skills, such as teamwork, responsibility, and motivation. By involving parents and the school community, it is possible to strengthen adolescents' involvement in skiing and their physical activity. In order to achieve efficiency, it is recommended to create structured programmes that include training, infrastructure, and motivation.
4. Seasonality has a significant impact on physical activity levels, thus winter sports, such as cross-country skiing, should be actively promoted as a preventive measure to reduce the lack of physical activity during the winter period. Winter season significantly reduces the level of physical activity among adolescents because opportunities for outdoor activities in the natural environment become limited. Cross-country skiing, as a winter sport, plays an important preventive role, allowing to maintain and promote the physical activity and health of adolescents during the winter months. By promoting this activity, the effects of winter inactivity, which can lead to a decrease in physical capacity, overweight, and psychological difficulties, are reduced. Therefore, promoting winter physical activity through cross-country skiing is an important factor to ensure consistent maintenance of physical activity throughout the year.

DISCUSSION

The theoretical review revealed that cross-country skiing is an effective form of physical activity that can strengthen the health of adolescents in both physiological and psychological aspects. Physical activity in the winter period often decreases due to limited access to outdoor sports opportunities, thus cross-country skiing can be an important preventive measure. Studies show that this sport promotes cardiovascular endurance, improves muscle function and coordination, and at the same time provides psychological satisfaction, increases motivation, and social engagement (Hoffman & Clifford, 1992; Babaei-Zarch et al., 2024).

The integration of cross-country skiing into the educational process provides an opportunity to systematically form health habits and responsibility for physical condition. In addition, community and parental support play an important role in promoting continued participation in physical activities. Nevertheless, there is a lack of empirical research in the literature that assesses the impact of cross-country skiing on adolescent physical activity in the specific social and educational context, especially in Lithuania. Therefore, further research is needed to substantiate practical recommendations and effectively include this sport in educational programmes.

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Cross-country skiing as a factor in adolescent physical activity and health education: a theoretical aspect

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ABSTRACT

Relevance and novelty. The rapidly changing social and technological environment has a significant impact on the lifestyle and physical activity of the younger generation. Scientific research shows that the lack of movement in adolescents is becoming an increasingly relevant public health problem, which is associated with declining physical capacity, overweight, psychological difficulties, and lack of motivation to participate in active activities (Ostermeier et al., 2024; World Health Organization, 2021). During the winter period, opportunities for physical activity in the natural environment are significantly reduced, therefore it is necessary to promote winter sports, such as cross-country skiing, which can help maintain and strengthen the health and motivation of young people to move (Babaei-Zarch et al., 2024). Although cross-country skiing has obvious physiological and psychological benefits, the impact of this sport on the health and physical activity of adolescents is still insufficiently studied, especially in Lithuania. Therefore, it is relevant to systematically analyse the role of cross-country skiing in the health promotion and development of adolescents (Hoffman & Clifford, 1992).

Cross-country skiing is a full-body workout that combines endurance, coordination, and strengthening of the respiratory and cardiovascular systems. This sport can become not only an effective health promotion tool, but also a motivational education tool for adolescents, encouraging them to know the joy of movement, experience togetherness, and develop responsibility for their health.

Scientific problem. Although the importance of physical activity for the health of adolescents is well known, recently their lack of physical activity, which negatively affects both physical and mental health, has been increasingly noted. Despite the fact that physical activity education among adolescents is widely recognised as an important health promotion tool, the level of physical activity significantly decreases during the winter season due to limited opportunities to engage in outdoor sports (Ostermeier et al., 2024). Especially in the winter period, when opportunities for active activities in the natural environment decrease, adolescents become less active.

Cross-country skiing is a complex form of physical activity that can effectively promote the physical and mental health of adolescents, but there is a lack of theoretical and empirical research that comprehensively examines the benefits of this sport and the possibilities of integrating it into the educational process (Hoffman & Clifford, 1992; Babaei-Zarch et al., 2024). Therefore, there is a need to analyse the impact of cross-country skiing on the strengthening of physical activity and motivation of adolescents more thoroughly, as well as to assess the possibilities of its application in the educational system.

Research object. The processes of physical activity and health strengthening of adolescents (14–16 years) related to the practice of cross-country skiing.

The aim of the article is to reveal the importance of cross-country skiing for the health and physical activity of adolescents aged 14–16. The physiological, psychological, and educational aspects shall be analysed, and the importance of integrating this activity into the general education process emphasised.

Methods. 1. Analysis and research of scientific literature; 2. Data analysis and processing.

Results. The winter season significantly reduces the level of physical activity among adolescents, as opportunities for outdoor activities in the natural environment become limited. Cross-country skiing, as a winter sport, plays an important preventive role, allowing to maintain and promote the physical activity and health of adolescents during the winter months. By promoting this activity, the effects of winter inactivity, which can lead to a decrease in physical capacity, overweight, and psychological difficulties, are reduced. Therefore, promoting winter physical activity through cross-country skiing is an important tool to ensure consistent maintenance of physical activity throughout the year.

Keywords: cross-country skiing, physical activity, health, adolescents, education, motivation, winter sports.

Lygumų slidinėjimas kaip paauglių fizinio aktyvumo ir sveikatos ugdymo veiksnys: teorinis aspektas

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SANTRAUKA

Aktualumas ir naujumas. Sparčiai kintanti socialinė ir technologinė aplinka turi reikšmingą poveikį jaunosios kartos gyvensenai bei fiziniam aktyvumui. Moksliniai tyrimai rodo, kad paauglių judėjimo trūkumas tampa vis aktualesne visuomenės sveikatos problema, kuri susijusi su mažėjančiu fiziniu pajėgumu, antsvoriu, psichologiniais sunkumais bei motyvacijos dalyvauti aktyviose veiklose stoka (Ostermeier et al., 2024; World Health Organization, 2021). Žiemos laikotarpiu fizinio aktyvumo galimybių natūralioje aplinkoje gerokai sumažėja, todėl būtina skatinti žiemos sporto formas, tokias kaip lygumų slidinėjimas, kurios gali padėti išlaikyti ir stiprinti jaunimo sveikatą bei motyvaciją judėti (Babaei-Zarch et al., 2024). Nors lygumų slidinėjimas turi akivaizdžių fiziologinių ir psichologinių privalumų, šio sporto poveikis paauglių sveikatai ir fiziniam aktyvumui dar nepakankamai ištirtas, ypač Lietuvoje. Todėl aktualu sistemingai analizuoti lygumų slidinėjimo įtaką paauglių sveikatos stiprinimui ir ugdymui (Hoffman & Clifford, 1992).

Lygumų slidinėjimas – viso kūno treniruotė, kurioje derinama ištvermė, koordinacija, kvėpavimo ir širdies ir kraujagyslių sistemų stiprinimas. Šis sportas gali tapti ne tik veiksminga sveikatinimo priemone, bet ir motyvacijos ugdymo įrankiu paaugliams, skatinant juos pažinti judėjimo džiaugsmą, patirti bendrystę bei ugdyti atsakomybę už savo sveikatą.

Mokslinė problema. Nors fizinio aktyvumo svarba paauglių sveikatai gerai žinoma, pastaruoju metu vis dažniau konstatuojama jo stoka, kas neigiamai veikia tiek fizinę, tiek psichinę sveikatą. Nepaisant to, kad fizinio aktyvumo ugdymas tarp paauglių plačiai pripažintas kaip svarbi sveikatos stiprinimo priemonė, žiemos sezonu fizinio aktyvumo lygis žymiai sumažėja dėl ribotų galimybių lauke užsiimti sportu (Ostermeier et al., 2024). Todėl ypač žiemos laikotarpiu, kai galimybių užsiimti aktyvia veikla natūralioje aplinkoje sumažėja, paaugliai tampa mažiau aktyvūs.

Lygumų slidinėjimas yra kompleksinė fizinio aktyvumo forma, kuri gali veiksmingai skatinti paauglių fizinę ir psichinę sveikatą, tačiau trūksta teorinių ir empirinių tyrimų, išsamiai nagrinėjančių šios sporto šakos naudą ir integravimo į ugdymo procesą galimybes (Hoffman & Clifford, 1992; Babaei-Zarch et al., 2024). Dėl to kyla būtinybė išsamiau išanalizuoti lygumų slidinėjimo poveikį paauglių fizinio aktyvumo stiprinimui ir motyvacijai, taip pat įvertinti jo taikymo galimybes švietimo sistemoje.

Tyrimo objektas. Paauglių (14–16 metų) fizinio aktyvumo ir sveikatos stiprinimo procesai, susiję su lygumų slidinėjimo praktika.

Straipsnio tikslas – atskleisti lygumų slidinėjimo svarbą 14–16 metų paauglių sveikatai ir fiziniam aktyvumui. Analizuojami fiziologiniai, psichologiniai ir ugdymo aspektai, pabrėžiama šios veiklos įtraukimo į bendrąjį ugdymo procesą reikšmė.

Metodai: 1. mokslinės literatūros analizė ir tyrimas; 2. duomenų analizė, apdorojimas.

Rezultatai. Žiemos sezonas labai mažina paauglių fizinio aktyvumo lygį, nes galimybės užsiimti lauko veikla natūralioje aplinkoje tampa ribotos. Lygumų slidinėjimas, kaip žiemos sporto šaka, atlieka svarbų prevencinį vaidmenį, leidžiantį išlaikyti ir skatinti paauglių fizinį aktyvumą bei sveikatą žiemos mėnesiais. Skatinant šią veiklą, mažėja žiemos laikotarpio neaktyvumo poveikis, kuris gali sukelti fizinio pajėgumo mažėjimą, antsvorį ir psichologinius sunkumus. Todėl žiemos fizinio aktyvumo skatinimas per lygumų slidinėjimą yra svarbi priemonė siekiant užtikrinti nuoseklų fizinio aktyvumo palaikymą visus metus.

Raktiniai žodžiai: lygumų slidinėjimas, fizinis aktyvumas, sveikata, paaugliai, ugdymas, motyvacija, žiemos sportas.

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