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Sustainability Trends in Physical Activities and Lifestyle among Individuals Aged 18 to 25

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Abstract: *A significant portion of the population experiences a rapid decline in physical activity levels during their youth. Sedentary habits are becoming increasingly prevalent, a trend that begins as early as school age. To address this issue, the authors of the study, within the framework of the project "Sustainability Trends of Physical Activities and Lifestyle", sought to investigate various health-related components. The project aims to emphasize the importance of maintaining a healthy lifestyle, which encompasses a balanced diet and regular physical activity, in order to support quality development and achieve a higher quality of life throughout one's lifespan. Notably, the project involved respondents from two age groups (a) 18-20, b) 21-25) with the following selection criteria: practically healthy and not limited in physical performance, which allows to identify problematic life stages where the decline in physical activity is most pronounced. Methods used: an empirical case study was carried out involving young people from secondary schools and universities, using a questionnaire method and obtaining anthropometric measurements. The collected data were processed and summarised using a statistical analysis tool for data – SPSS. The presented results indicate a tendency for adolescents to have worse eating habits compared to the student group respondents. One of the most significant correlations in the study showed that men in the 21-25 age group had higher mean visceral fat compared to the 18-20 age group, with a wider range of values indicating greater variability.*

Keywords: *health, youth, well-being, habits, physical exercise.*

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Introduction

The decline in physical activity levels among youth has emerged as a critical public health issue, supported by an expanding body of research that identifies sedentary lifestyle patterns as originating during childhood and becoming more pronounced throughout adolescence (Dumith et al., 2011. This trend poses significant implications for both individual health outcomes and broader societal well-being, given the well-documented associations between physical inactivity and the development of chronic conditions such as obesity, cardiovascular disease, and diabetes. Understanding the underlying factors contributing to reduced physical activity in younger populations is therefore essential for the formulation of effective interventions and policy measures aimed at reversing this concerning trajectory. This decline is associated with long-term health risks, including obesity, cardiovascular diseases, and metabolic disorders. Studies suggest that physical activity levels are typically highest during childhood but gradually decrease during adolescence, often continuing into adulthood (Dumith et al., 2011). Research by Farooq et al. (2017) found that physical activity levels among individuals aged 9 to 15 can decrease by up to 40%, highlighting a critical issue during these formative years when lifelong health habits are established.

One of the primary factors contributing to this decline is the increase in sedentary behaviours, particularly linked to the daily use of technology - a trend that has significantly intensified in recent years (Hallal et al., 2012; Moreno-Llamas et al., 2020). Researchers emphasize that beginning in school-age years, time spent on digital devices (such as televisions, computers, and smartphones) often replaces time that could otherwise be devoted to physical activity. This tendency continues into adolescence, where the combined pressures of academic responsibilities and the social allure of digital interactions further drive the shift from active to sedentary lifestyles.

The long-term health implications of these trends are profound. Epidemiological studies indicate that reduced levels of physical activity during youth are associated with an increased risk of obesity, type 2 diabetes, and cardiovascular diseases later in life (Boreham & Riddoch, 2001; Hallal et al., 2012). Furthermore, a report issued in April 2024 by the United States government outlined the key benefits of physical activity (Physical Activity Basics and Your Health, 2024). This report highlighted both immediate and long-term advantages of regular physical activity, including improved and healthier sleep patterns; better weight management; reduced risk of type 2

diabetes and metabolic syndrome; lower risk of hypertension; and an overall decreased likelihood of mortality from illnesses such as influenza or pneumonia in more active individuals (Physical Activity Basics and Your Health, 2024).

The issue of sedentary lifestyles and their associated consequences is evident in a global context. The World Health Organization (WHO) reports that over 340 million young people aged 5 to 19 worldwide currently face overweight issues, while the prevalence of overweight among adults is even more pronounced, with 39% of the global population categorized as having excessive body weight (Obesity and Overweight, 2024).

In Latvia, the Public Health Guidelines for 2021–2027 aim to increase the number of healthy life years among the population. These guidelines include measures to promote physical activity and reduce the prevalence of chronic non-communicable disease risk factors (e.g., obesity, sedentary lifestyle) in Latvian society (Sabiedrības Veselības Pamatnostādnes 2021.–2027. gadam, 2022). Similarly, the Sports Policy Guidelines 2021–2027 highlight insufficient physical activity and limited awareness of its importance for health preservation and improvement as critical challenges (Par Sporta Politikas Pamatnostādnēm 2022.–2027. gadam, 2022).

Furthermore, sedentary habits formed during adolescence often predict lower levels of physical activity in adulthood, thereby increasing the likelihood of chronic health issues. This relationship underscores the need to prioritize improving physical activity levels from an early age to mitigate the risk of chronic diseases and promote healthier aging. Parallel efforts should include monitoring waist circumference and visceral fat levels among young people, as these are key contributors to the development of cardiovascular diseases, type 2 diabetes, cancer, and Alzheimer's disease (Gadekar et al., 2018).

The authors of the study highlight that similar research have been conducted in various regions at different times, reflecting the issue's international relevance and sustained meaning over decades. Additionally, the authors of the current study emphasize its significance within the international context by focusing on the data collected from individuals of the respective age group representing the situation in Latvia. This unique perspective contributes to the global body of knowledge on the particular field by enabling other researchers to analyze and compare these findings with equivalent datasets from other populations.

There is no doubt that sedentary lifestyles and the resultant health issues represent a global phenomenon affecting Western societies. This is influenced by social and political changes in recent decades, such as the

COVID-19 pandemic, unrest in Europe and globally, and advances in technology (Marcos-Pardo et al., 2020).

Based on these findings, the authors propose the following research aim and hypothesis:

Research Aim:

To investigate the influence of physical activity and healthy lifestyle practices among young individuals on key health indicators and the long-term sustainability of these effects.

Hypothesis:

Engaging in regular physical activity and adhering to healthy dietary practices during youth are significantly associated with a lower body mass index (BMI), reduced waist circumference, and decreased levels of visceral adiposity.

This study provides a detailed analysis of lifestyle sustainability trends among various age groups of youth in Latvia, offering a unique perspective compared to global research, which often focuses on general statistics. The specific approach, such as using waist fat measurements as a central indicator of obesity, differentiates this study by clearly linking anthropometric parameters with cardiometabolic risks. Inclusion and exclusion criteria, alongside a detailed sampling structure (age and education level), ensure the study's relevance to the Latvian context.

Material and method

A mixed-method research design, incorporating data collection through surveys and experimental testing, was developed to explore lifestyle-influencing factors among youth of various ages. The participants were recruited from secondary schools, universities, and community groups. The sampling criteria included the following inclusion criteria: (a) age; 18–20 years old (N=75; females 54, males 21) and 21–25 years old (N=86; males 43, females 43), and (b) physical capability to perform the tests. Exclusion criteria included any musculoskeletal injuries or physical limitations that could affect test outcomes.

The respondents were divided into particular age groups because 18–19-year-olds are predominantly secondary school students, whereas those aged 20–25 are typically enrolled in higher education institutions. This age group also often marks the transition to independent living, making it important for researchers to distinguish between these life stages.

A notable limitation of this study is the relatively small sample size, which may restrict the capacity to derive objective and generalizable conclusions.

Measurements

During the study, the following measurements were conducted: demographic data (gender, age, education level); anthropometric data (height, body weight, waist circumference, body mass index), parameters characterizing body composition (fat mass, visceral fat), and two types of surveys related to physical activity. Mental health and dietary habits were assessed using a survey developed based on the E-KINDEX (Electronic Kids Dietary Index) (Lazarou et al., 2011). The study employed survey – a quantitative research method, as it ensures resource efficiency, anonymity, and the ability to include a large number of respondents (Martinsone & Pipere, 2021).

Procedure

The same participants took part in all parts of the study, with prior agreements made with both the participants and the institution they represented. The participants were provided with electronic access to the test website containing survey statements. The survey was created using the Microsoft Forms template, allowing access via a link or QR code while maintaining anonymity. Completing the survey took up to 20 minutes. The survey consisted of 70 statements divided into thematic sections: nutrition, physical activity, and mental preparation. The response options were developed using the Likert scale or were categorized according to the essence of each statement.

Anthropometric measurements were conducted in a separate room under comfortable temperature conditions, ensuring privacy. The thickness of the skinfold was measured using the Harpenden Skinfold Caliper (Harpenden, UK), focusing on the waist. While most studies measure multiple body parts (biceps, triceps, subscapular, and waist) (Rios-Escalante et al., 2023), the researchers chose to measure only the waist skinfold due to its direct association with visceral fat accumulation and related health risks. This makes such measurements particularly relevant for research on obesity and its health impacts. Conversely, skinfold measurements from other body parts are less specific to these risks. Indicators of central obesity, such as waist circumference or skinfold thickness, are more closely associated with cardiometabolic risks than general body fat indicators (Després, 2021).

Height (in centimetres) was measured using a stadiometer, with readings recorded to the nearest millimeter to ensure precision (Tanita HR001, Illinois, MA, USA). "Weight was measured twice with an accuracy of 0.1 kg using calibrated electronic scales. Body Mass Index (BMI) was then calculated as weight (kg) divided by height (m) squared. BMI was classified as underweight (16.0–18.4 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²), moderate obesity (30.0–34.9 kg/m²), severe obesity (35.0–39.9 kg/m²),

and very severe obesity (≥40.0 kg/m²)" (Zierle-Ghosh & Jan, 2023). Circumferences were measured using a medical-grade, non-stretchable tape. Waist circumference was assessed at the midpoint between the lower margin of the rib cage and the superior border of the iliac crest. The mean value for each anthropometric parameter was utilized in all subsequent data analyses.

Visceral fat percentage was assessed utilizing the bioelectrical impedance analysis (BIA) technique, employing a "foot-to-foot" body composition analyser to ensure accurate measurement. (TANITA BC-545N). Based on available data, a score of 1–12 was considered normal, while 13–59 indicated excessive visceral fat levels (Understanding Measurements, n.d.). A completely harmless and imperceptible electrical impulse with a current of 500 μA and a frequency of approximately 50 Hz was sent through the body. Muscle tissue conducts electricity freely due to its fluid content, while fat tissue has poorer conductivity. The electrical resistance of fat tissue is precisely what the analyser determines (Understanding Measurements, n.d.; Cruz-Jentoft et al., 2018). TANITA BC-545N provides a sufficiently reliable method for assessing body composition in both men and women. Although a significant interaction exists between the gender and the evaluation method, this does not constitute a clinical limitation for its use. Additionally, its ease of use and minimally invasive nature make it suitable for assessing body composition in vulnerable populations, such as children and individuals with obesity (Kelly & Metcalfe, 2012). However, other researchers note that TANITA is not suitable for assessing athletes' body composition as it does not account for protein and mineral variability (Domingos et al., 2019).

In this study, TANITA was used to identify lifestyle sustainability trends among young people, correlating these findings with survey data, as confirmed by other studies involving children (Kreissl et al., 2019). The study was conducted in compliance with the ethical approval of the University of Latvia Life and Medical Sciences Research Ethics Committee (Opinion No. 71-35/127).

Quantitative data reliability and analysis were carried out using IBM SPSS Statistics 28 software.

Findings

As outlined earlier, this study examined participants' perspectives on the significance of physical activity and dietary habits in the daily lives of young individuals. Additionally, the research analysed anthropometric measurements and body composition parameters, including visceral fat levels. Tables 1 and 2 present the average results from the measurements obtained during the study.

Table 1. Summary Statistics of Anthropometric and Health Indicators for Individuals Aged 18–20 Years (n-75)

	Mean	Median	Moda	Min	Max
Age (years)	18,63	18	18	18	20
Weight (kg)	72,59	76	76	47,9	95,4
Height (m)	172,59	172	180	159	185
Body mass index (kg/m2)	24,1	24,4	23,5	18,2	30,3
Amount of visceral fat (level)	2,47	2	1	1	8
Waist circumference (cm)	75,84	76,5	87	58	95,5
Waist fat fold (cm)	1,62	1,72	2,1	0,12	2,7

Table 2. Summary Statistics of Anthropometric and Health Indicators for Individuals Aged 21–25 Years (n = 86)

	Mean	Median	Moda	Min	Max
Age (years)	22,26	22	21	21	25
Weight (kg)	72,48	69,35		51	100,2
Height (m)	178,89	180,5	186	153	202
Body mass index (kg/m2)	22,61	22,1	21,5	16,5	28
Amount of visceral fat (level)	2,52	2	1,5	1	5
Waist circumference (cm)	74,54	71,57	66	63	91
Waist fat fold (cm)	1,06	0,97	1,15	0,14	2,1

The results are summarized with mean values, medians, modes, and, for general insight, the minimum and maximum values. Comparing the mean values between the two study groups, the authors conclude that there is no significant difference in height and weight parameters. However, based on the results, it can be observed that in the group of 18-20-year-olds (Group A), BMI (A: 24.1; B: 22.26 kg/m^2), visceral fat level (A: 2.47; B: 2.0), waist circumference (A: 75.84; B: 74.54 cm), and skinfold thickness at the waist (A: 1.62; B: 1.06 cm) are higher compared to the 21-25-year-old group (Group B). These findings contradict the initial hypothesis proposed at the start of the study. It is worth noting that the 21-25 age group included (N = 21) students from a sports science program, which could theoretically have influenced the objectivity of the results, leading to better overall indicators for older participants.

Comparing the results separately by gender and across age groups, the authors found that men have a higher risk of obesity. In the comparison

within the 18–20-year-old group, men (M) had a higher BMI (M-25.64; F-22.92 kg/m²) and visceral fat level (M-3.07; F-2.0) compared to women (F). However, the subcutaneous fat fold (cm) at the waist was larger in women (M-1.52; F-1.70). Comparing the results of the older group of young adults, it was concluded that all the previously mentioned indicators - BMI (M-24.39; F-20.23 kg/m²), visceral fat level (M-3.16; F-1.67), and subcutaneous fat fold at the waist (M-1.29; F-0.74 cm) - were higher in men than in women. These measurements tentatively suggest that males, even during youth, exhibit a greater predisposition to obesity and an elevated risk of developing cardiovascular diseases.

To make the collected data more comprehensible, a correlation analysis between body mass index (BMI) and visceral fat levels was conducted. Analysing Figure 1, the authors highlight that the most frequently observed correlation ranges are between visceral fat levels and BMI within the range of 1–5, whereas the acceptable norm for humans is up to 11 (TANITA EUROPE B.V., n.d.). A larger range was observed in the male respondent group, where some individuals deviated from the norm (20 and 11). There is a clear positive relationship between BMI and visceral fat levels for both genders, indicating that as BMI increases, visceral fat levels also rise.

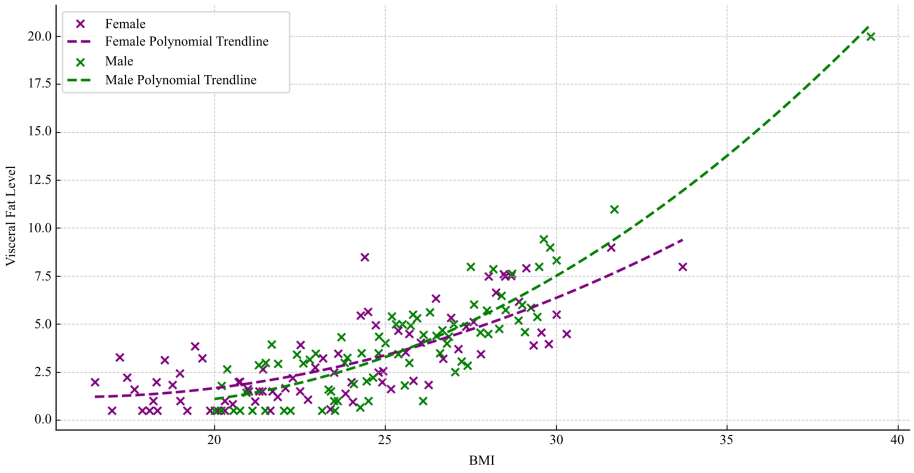


Figure 1. The correlation between body mass index (BMI) and visceral fat levels.

The authors of the study aim to emphasize the connection between the data and the survey results. The respondents were asked to provide their daily opinions on daily dietary habits and regularity. The survey also explored whether respondents considered their daily diet to be healthy. The results

show that more than half of the respondents (58.8%) indicated responses suggesting that they frequently or very frequently include sweets and fast food in their daily diet. These findings highlight young people's understanding of the importance of nutrition. By analysing the trend curve of correlations, it can be concluded that it is increasing, which supports the hypothesis proposed in the study.

The authors of the study conducted an in-depth analysis of the respondents' visceral fat levels, evaluating them by age groups categorized as 18–20 and 21–25 years. The obtained data can be seen in Figure 2.

It should be noted that in the male respondent group aged 18–20, a wide range of visceral fat levels was observed, ranging from 1 to 3.5. In the 21–25 age group, the range of results was halved, from 2.2 to 3. Gender differences were analysed, showing that men tend to have a higher median visceral fat level compared to women in both age groups. The distribution of visceral fat levels in men exhibits greater variability, with a wider range and more outlier data points compared to women.

Comparison of age categories: Age group 18–20 years (green section): Both men and women in this age group have relatively lower visceral fat levels compared to the older age group.

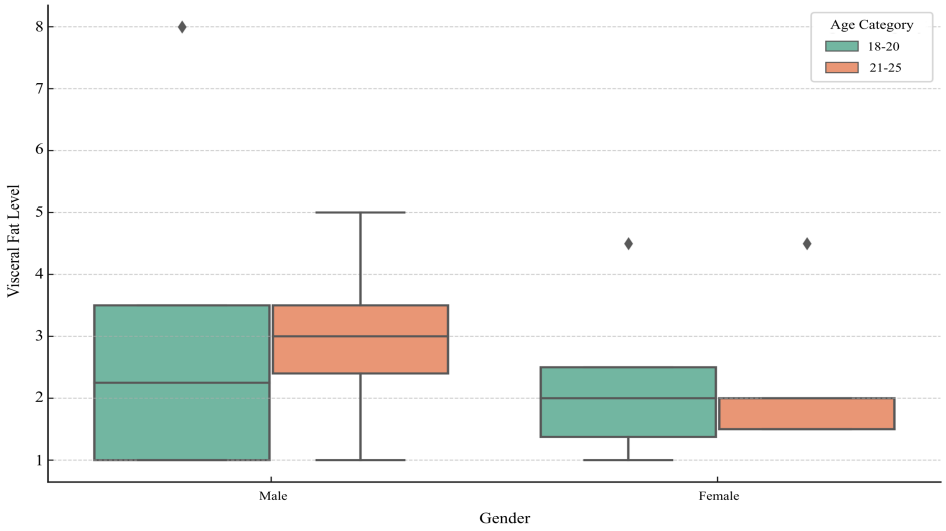


Figure 2. Visceral fat level category – age and gender

Age group 21–25 years (the orange section): This group shows an increase in visceral fat levels for both genders. Men in this age category demonstrate a higher median visceral fat level compared to the 18–20 age group, with a broader range of values, indicating greater variability.

External data (exceptions): Both men and women have some exceptions, particularly men. These exceptions represent individuals with a higher visceral fat level than the average for their respective age and gender group. Based on the data shown in Figure 2, the authors conclude that visceral fat levels increase slightly with age within this range, especially in men. This may indicate a trend where men accumulate visceral fat more quickly as they age. Overall, the distribution suggests that men have higher and more variable visceral fat levels than women, with a slight increase in visceral fat observed as they grow older.

To better understand young people's physical activity and healthy eating habits, a survey was conducted as part of the study. This survey was a crucial component of the research, enabling the authors to gain deeper insights into the respondents' habits related to a healthy lifestyle. The main survey results are illustrated in Figure 3.

It is important to emphasize that the majority of respondents (90%) are aware of the benefits of physical activity, while only a small portion (10%) disagree with this statement. The authors of the study suggest that this data could serve as a strong foundation for promoting a culture of healthy living among young people.

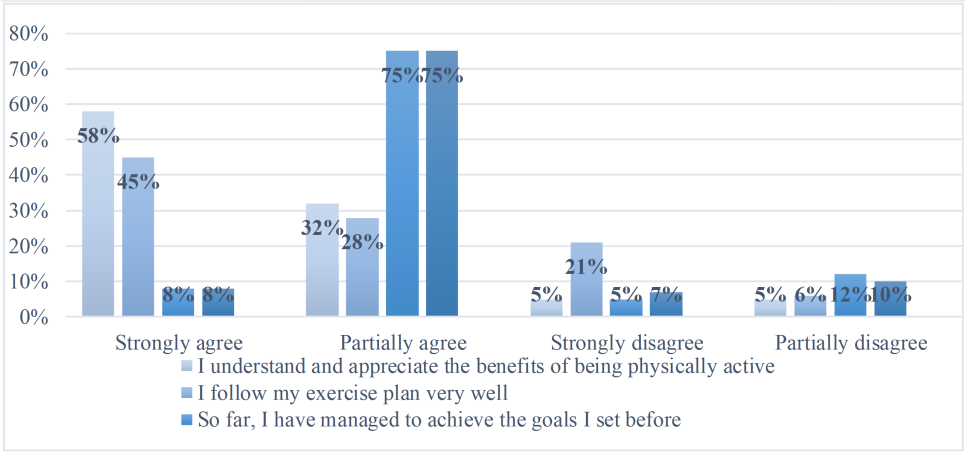


Figure 3. Survey data - key statements

Unfortunately, the results of other statements are not as positive. As shown in Figure 3, 73% of respondents agree that they can successfully follow their workout plan; however, it is important to note that 27% have difficulty doing so. This highlights the need for educational efforts to help young people not only recognize the benefits of physical exercise but also integrate it into their daily lives. Additionally, 25% of respondents indicate that they are uncertain whether their workout plan fully meets their needs, while 30% disagree with the statement that they execute their physical activity plans effectively. This suggests a need to strengthen knowledge about how to create appropriate workout plans and foster motivation to carry them out. Another survey result worth noting is the ability to achieve set goals. Only a small proportion (8%) of respondents report being able to reach their goals, while a significant number (75%) partially agree. The authors emphasize that goal setting and achievement are closely tied to the implementation of physical activity plans, and both indicators point to concerning trends. In addition to the insights provided in Figure 3, 83% of respondents reported feeling exhausted by the end of the day, revealing poorly structured daily routines. Emotional quality of life is further reflected in the fact that 64.7% of respondents partially or fully agree that they feel tired at the end of the day, and 49.2% partially or fully agree that they wake up tired in the morning. This alarming trend suggests the need to address emotional burnout. Furthermore, only 9.8% of young people report having found healthy and socially accepted stress management techniques, underscoring the importance of raising awareness about suitable stress reduction methods, where physical activity plays a significant role.

Discussions

Skinfold thickness measurements serve as a critical tool for predicting metabolic risks and evaluating health conditions associated with obesity. Numerous researchers, including Rios-Escalante et al. (2023), underscore the importance of integrating these assessments into routine clinical practice to improve obesity monitoring and facilitate the screening of related comorbidities. Nevertheless, further research is required to enhance the applicability and generalizability of these methods, with particular emphasis on their use among pediatric and adolescent populations.

Given the impact of obesity on public health, it is crucial to focus on its prevention from an early age. Després (2021) argues that obesity is not merely an issue of excess weight but rather the accumulation of dysfunctional fat in undesirable areas of the body. The authors observed similar findings in their study, highlighting that certain individuals exhibit elevated levels of visceral fat

(5-8) compared to other young people. To more effectively identify and characterize high-risk obesity phenotypes, such as excessive visceral fat, research in this field should be prioritized (Després, 2021).

Analysing the study by Wang et al. (2022), it is noted that visceral fat accumulation begins in early childhood, highlighting the need for early intervention. Before puberty, differences in visceral fat levels exist among children, but these differences become more pronounced during puberty, with boys typically showing higher levels than girls. This finding is further supported by the study, where young men (18–20 years old) exhibited higher visceral fat levels (M-3.07; F-2.0) compared to young women of the same age. This emphasizes the need to understand gender differences in this process and explore ways to effectively prevent visceral fat accumulation.

Furthermore, eating habits and physical activity significantly impact the quality of life among young people. The interplay of these factors with obesity poses a major public health challenge in both developed and developing countries (Schneider et al., 2017). Survey data indicate that daily breakfast is an essential meal for 45.1% of respondents; however, 29.4% of young people skip breakfast, which is a deeply concerning trend.

Obesity is intrinsically linked to lifestyle changes, particularly food consumption, physical activity, and a tendency toward a sedentary lifestyle (Andegiorgish et al., 2011).

Survey data reveal that porridge, legumes, fish, and seafood are food groups that 25% of respondents never choose, while 45% consume them only occasionally. This indicates the exclusion of valuable food items from their diet.

Furthermore, studies have revealed two simultaneous trends: an increase in the consumption of high-calorie foods and beverages, and a decrease in the intake of healthy foods such as fruits, vegetables, and whole grains (Vilchis-Gil et al., 2015).

The survey confirms that this trend persists, with 36% of respondents frequently or very frequently choosing sugary drinks, while 58.8% of young people often or very often include sweets and fast food in their daily diet. This highlights an imbalance between nutrient-dense foods and calorie-rich but nutritionally poor options, a tendency particularly characteristic of 18-year-old males and females.

Studies indicate a correlation between BMI, physical activity or sedentary lifestyle habits, and perceptions of eating habits and the belief that living healthily is valuable (Chen et al., 2014).

One of the most effective means of addressing this issue is physical activity. Some studies by Wang et al. (2022) suggest that regular exercise can slow the rate of visceral fat accumulation in children, particularly in

overweight and obese youth aged 12–24. Furthermore, the effectiveness of exercise interventions is more pronounced in boys than in girls (Wang et al., 2022). These findings emphasize the need to promote access to physical activities and encourage regular participation from an early age.

In addition to physical activity, attention must also be given to overall lifestyle changes. Farooq et al. (2017) found that the body mass index (BMI) of children and adolescents increases proportionally with age, and girls tend to reduce their level of physical activity. This trend highlights the importance of preventive measures that should be implemented before adolescence to maintain high levels of activity and reduce future health risks.

Skinfold measurements can be used as a simple and effective method for assessing health risks, as they strongly correlate with visceral fat levels (Gadekar et al., 2018). This approach allows for the timely identification of individuals with elevated visceral fat without requiring complex medical tests. Additional evidence from Kelly and Metcalfe (2012) indicates that by the age of 30, a significant proportion of both men (42%) and women (49%) already exhibit elevated visceral fat levels. This underscores the necessity of targeted prevention and early intervention to reduce the prevalence of obesity and its associated diseases.

Within the context of international education, the authors of the study emphasize that this type of research contributes to a deeper understanding of individuals' health habits. This insight is particularly critical in the educational domain, as it underscores the importance of promoting a healthy lifestyle. The educational environment serves as a primary setting for fostering such habits, providing a foundation for the development and reinforcement of health-conscious behaviors.

Conclusions

Research evidence shows that a decline in physical activity levels during youth, coupled with an increasing tendency toward sedentary habits, poses a significant problem with long-term health implications. Studies confirm that a considerable proportion of young people do not adhere to healthy eating habits, avoid or limit nutritionally important foods, resulting in increased levels of visceral fat. Young people also struggle to manage stress and systematically plan their daily routines to achieve set goals. This evidence underscores the need for early interventions, emphasizing the inclusion of physical activity and healthy eating in school programs and creating a supportive environment that promotes movement and nutrition as essential components of healthy development. As a result, waist circumference and visceral fat levels will decrease, contributing to improved individual health.

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