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Sedentary Lifestyle and Academic Stress as Risk Factors for Health Disorders in Young Adults – Implications for Health Education and Prevention

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ABSTRACT

Introduction and purpose. Young adults—especially students—are increasingly exposed to the combined impact of a sedentary lifestyle and chronic academic stress. Screen-based learning and computer-mediated work promote prolonged sitting, while high academic demands limit time and energy for recovery and movement. The aim of this narrative review is to summarize current knowledge on links between sedentary behaviour, academic stress and health in young adults, and to indicate implications for health education and prevention at universities.

Description of the state of knowledge. Studies show that sedentary behaviour in this age group is associated with musculoskeletal pain, early metabolic disturbances, poorer sleep and reduced psychological well-being, whereas academic stress correlates with anxiety and depressive symptoms, sleep problems, risky health behaviours and burnout. Both factors share biological and psychosocial mechanisms, including dysregulation of the stress axis and consolidation of passive, screen-based coping. The academic environment—through timetables, assessment methods and access to sports infrastructure—shapes students' movement patterns and stress load. Interventions that combine promotion of everyday physical activity with training in stress self-regulation and sleep hygiene, supported by environmental changes that facilitate movement breaks, appear promising but are still evaluated mainly in cross-sectional or short-term studies.

Summary (conclusions). Sedentary lifestyle and academic stress form a mutually reinforcing cluster of risk factors that may contribute to early health problems in young adults, supporting the need for integrated, university-based programmes that address both daily movement patterns and stress management skills.

Keywords: sedentary lifestyle, academic stress, young adults, mental health, health education, prevention

Introduction

Technological developments of the past two decades have shifted much of young adults' daily functioning into the digital sphere.[1,5,19,23] Learning, part-time work, communication, and leisure frequently occur in a sitting position.[1,5,19] At the same time, education has become a key determinant of future career prospects, intensifying pressure to achieve high academic

performance.[2,13,14,25] As a result, many students function in an environment where basic needs for movement and recovery are gradually displaced by academic demands and expectations.[1–4,19] Students often report planning physical activity or rest but abandoning these intentions in favour of urgent academic tasks. Over time, this pattern, initially perceived as temporary, becomes a stable element of everyday functioning.[18,19] Reduced physical activity contributes to poorer well-being, sleep disturbance and diminished stress resilience,[6,7,9,10,17,30] while chronic psychological tension encourages passive forms of rest—typically screen-based—which further increases sedentary time.[6,7,9,10] In this way, a self-reinforcing cycle of physical and mental overload emerges, shaping habits that influence long-term health trajectories.[5,18,27]

The academic environment, although oriented toward intellectual development, contains numerous health-related risks. Strong selection mechanisms, frequent assessment and competition, combined with limited time and financial resources, may lead to heightened anxiety, sleep problems, substance use and withdrawal from physical activity.[13–15,21,22,24,25] Understanding how sedentary lifestyle and academic stress interact is therefore essential for designing effective health education approaches within universities.[18,29]

Aim of the study

The aim of this article is to systematize available knowledge on the role of a sedentary lifestyle and academic stress as co-occurring risk factors for health disorders in young adults and to indicate how the findings of these studies can be translated into health education and preventive practice at universities.[5,18] The article seeks to answer several specific research questions. First, to what extent are sedentary lifestyle and academic stress prevalent in the student population, and what are their consequences for somatic and mental health.[1–4,13–15,19,21,25,30] Second, which biological, psychological and environmental mechanisms link these factors with observed symptoms and complaints.[6,7,9,10,12,17,18,21,27,28] Third, which intervention strategies at the individual, group and institutional level are currently proposed, and which have the greatest potential for implementation under real academic life conditions.[8,11,16–18,20,26,29] Finally, which gaps in the literature hinder the formulation of strong recommendations and in what direction further research should proceed.[5,15,18,19,23,29] Adopting such an aim makes it possible not only to summarize available data but also to outline a practical roadmap for those responsible for shaping the educational environment.

Methods of literature selection

This narrative review focused on issues relevant to health promotion in academic environments. The literature search covered 2005–November 2025 and was conducted in PubMed, Scopus and Google Scholar using combinations of terms related to *sedentary behaviour*, *physical inactivity*, *screen time*, *academic stress*, *burnout*, *young adults*, *college students*, *health education* and *prevention*. Publications in English or Polish involving young adults (approximately 18–30 years) were prioritised. Included materials comprised cross-sectional and longitudinal studies, selected systematic reviews and reports from university-based intervention programmes.

Due to heterogeneity in research methods, stress assessment tools and definitions of sedentary behaviour, no formal meta-analysis was undertaken. Instead, a qualitative synthesis of recurrent themes across studies was conducted. Particular attention was given to research simultaneously assessing physical activity or sedentary patterns, academic stress and indicators of mental or somatic health. Qualitative studies describing students' experiences of overload, fatigue and coping were also incorporated.

Sedentary lifestyle in young adults – scale of the phenomenon and health consequences

A sedentary lifestyle is defined as engagement in activities that involve minimal energy expenditure, most often performed in a sitting or reclining position.[18,27] In the context of contemporary academic life – including lectures, seminars, computer-based classes, self-directed study and commuting – the time spent sitting may exceed several hours a day.[1,5,11,19,27] Studies conducted in various countries indicate that a substantial proportion of students do not meet the recommended levels of moderate or vigorous physical activity and, at the same time, spend many hours a day in front of a computer or phone screen, both for academic and leisure purposes.[1–3,5,19,23,30]

The health consequences of a sedentary lifestyle are increasingly well documented. Among young adults, there is a growing prevalence of spinal pain, especially in the lumbar and cervical regions, more frequent headaches, muscle stiffness and early symptoms of overuse syndromes.[1,6,7,19,27] Despite their young age, the risk of adverse metabolic changes increases, including greater waist circumference, disturbances in lipid and glucose metabolism and reduced insulin sensitivity.[5,23,27] Over the course of several decades, this translates into a higher risk of cardiovascular disease and type 2 diabetes.[5,18,27]

Somatic burden, however, does not exhaust the picture. Prolonged sitting, particularly when combined with exposure to screen-based stimuli, promotes fragmented attention, disturbances of circadian rhythms and poorer sleep quality.[6,7,9,10] Sleep deprivation, in turn, increases vulnerability to stress and emotional disorders, creating another loop that reinforces maladaptive

habits.[7,9,10,21,30] In clinical practice, young adults often report not so much “a lack of time for physical activity” as a sense of chronic fatigue and “no energy”, which result from both psychological overload and reduced physical fitness.[12,18,25] This picture has been further complicated by experiences in recent years, including the widespread introduction of remote and hybrid learning and remote work, which in many students have consolidated the habit of spending most of the day in a single room, at the same desk.[1,2,19,22–24] In survey studies, some young adults report that after a period of intensive remote work, returning to a more varied, “walking-based” pattern of functioning requires conscious effort rather than occurring spontaneously.[22–24] Uneven distribution of movement-related demands is also evident between fields of study and socioeconomic groups: students who must combine studying with long-hour computer-based or call-center work report particularly high levels of fatigue and limited possibilities of compensating for a sedentary lifestyle.[1,19,23] These observations show that analysis of the phenomenon must take into account not only the total number of hours spent sitting but also the context in which this occurs and the available resources that make it possible to break the cycle of physical inactivity.[8,11,18–20,27]

Many studies emphasize that even among individuals who formally meet weekly physical activity recommendations, very long daily sitting time may nullify part of the health benefits.[5,18,20,27] This means that encouraging students to engage only in occasional high-intensity exercise is not sufficient for prevention; it is also necessary to reduce continuous sitting and introduce short, regular movement breaks during study.[8,11,20] From the perspective of health education, it is therefore important to promote not only “training” understood as structured sports activities but also small everyday forms of movement that interrupt prolonged periods of physical inactivity.[18,20,29]

Academic stress – definitions, determinants and impact on health

Academic stress arises from educational demands, grading pressure, time constraints and uncertainty about future prospects.[13,14,21,25] For many students, it coexists with financial difficulties, employment, family responsibilities or adjustment to new environments.[13,22,24,25,28]

Stress stems not only from objective workload but also from internalised beliefs about performance, fear of failure and competitive academic cultures.[13–15,21,25,28] Persistent stress may lead to anxiety, irritability, low mood and burnout,[13–15,21,25] and in some cases to substance use intended to maintain performance.[13,22,25] Somatic manifestations include headaches, gastrointestinal symptoms, palpitations, sleep disturbances and reduced immunity.[12–14,21,25,28]

Academic stress is rarely limited to exam periods; instead, it accumulates across semesters, with insufficient opportunities for recovery.[13–15,21,22,25] Certain disciplines—such as medicine, law or engineering—are characterised by continuous high-stakes evaluations, normalising chronic overload.[13,15,25] This pattern may later influence how graduates approach their own health and professional responsibilities.[13,18,25]

Table 1. Key health consequences of sedentary lifestyle and academic stress in young adults

Factor	Short-term effects in students	Long-term health risks
Sedentary lifestyle	Spinal and neck pain, muscle stiffness, fatigue, reduced concentration	Metabolic disturbances, increased cardiometabolic risk
Academic stress	Anxiety, irritability, sleep problems, overload	Burnout, persistent emotional problems
Interaction of both factors	Passive screen-based coping, chronic tiredness	Accumulated physical and mental burden
Regular physical activity (protective factor)	Lower stress perception, improved sleep and concentration	Reduced long-term cardiometabolic and mental health risk
Supportive academic environment (protective factor)	More opportunities for movement and recovery	Sustained health-promoting habits into adulthood

Co-occurrence of sedentary lifestyle and academic stress

Although sedentary lifestyle and academic stress are usually analyzed separately, in the lives of young adults they often form a single, interconnected system.[1–4,12,18,19,23,30] Heavy academic workload favors reduced physical activity, especially when this is perceived as an additional, "non-obligatory" part of the day. Fatigue resulting from a lack of movement and sleep then slows down cognitive processes, prolonging the time needed for study and increasing the sense of falling behind.[12,18,21,28] Stress intensifies, and spontaneous activity is gradually replaced by passive rest in front of a screen.[6,7,9,10,22,30]

Research indicates that low physical activity correlates with higher levels of anxiety and depressive symptoms in students, and individuals with the highest levels of academic stress more often report

a lack of time or motivation to exercise.[2,4,12,14,16,17,26,30] In practice, this means that in this group it is particularly difficult to initiate lifestyle changes by simply encouraging exercise. Interventions are needed that simultaneously reduce stress burden and introduce physical activity as a means of tension regulation, rather than as yet another task to complete.[8,16,17,18,20,26]

It is also important that both factors share common biological "entry points". Chronic stress and lack of movement both promote dysregulation of the stress axis, disturbances in glucose–insulin metabolism and low-grade systemic inflammation.[6,7,12,17,18,27] As a result, there is an accumulation of risk for cardiovascular disease, metabolic disorders and mental health problems.[5–7,17,18,23,27,30] From a preventive standpoint, it therefore seems more reasonable to address the entire cluster of behaviours and burdens rather than focusing on single elements in isolation.[18,20,27,29]

The importance of physical activity and collegiate sport as protective factors

Within university settings, physical activity—whether through compulsory physical education, collegiate sport or informal exercise—serves both health and psychological functions.[1–4,16–18,26,29] For many students, university-organised activity is the primary opportunity for regular exercise and helps build competence and agency.[4,16–18,26]

Regular activity is associated with lower stress perception and fewer anxiety and depressive symptoms.[2,4,16,17,26,29,30] Biologically, exercise supports autonomic balance and stress-axis regulation.[12,17,18,26] Psychologically, it offers a break from evaluative roles, social interaction and a sense of mastery.[16–18,26]

Collegiate sport helps build peer networks that buffer stress,[18,24,26] yet organisational barriers—scheduling conflicts, limited availability of sports sections, insufficient promotion—often reduce participation.[1,2,19] Presenting physical activity not as a competing demand but as a prerequisite for academic performance may shift students' perceptions.[16–18,26,28]

Diversifying activity options and offering flexible schedules increase accessibility for students with varied preferences and workloads.[18,20,29] More research is needed on how specific organisational solutions influence reductions in sedentary time and stress.[8,11,16–18,19,20,29]

The role of the academic environment in shaping health behaviors

The university is not only a place where knowledge is transmitted but also a powerful factor shaping students' daily routines.[11,18,20] Class schedules, assessment methods, access to sports infrastructure and messages communicated by teaching staff all influence how young adults allocate their time and energy.[11,18,20]

If a curriculum includes numerous compulsory classes in the afternoon and evening hours, practical placements and scattered assessments, the space for regular physical activity becomes significantly restricted.[1,2,19,20] If project-based tasks requiring prolonged computer work dominate, an increase in sitting time is a natural consequence.[8,11,19,20] On the other hand, universities possess tools to counter these trends. They can expand physical education offerings, make sports infrastructure more accessible, introduce movement breaks during long teaching blocks and promote active transport, for example by providing safe bicycle facilities.[8,11,18,20]

It is also important to consider what health-related messages appear in the formal and informal academic discourse. If the prevailing narrative is that "a real student sleeps little and studies at night", even the best-designed health education programmes may remain an accessory that does not change the culture of the environment.[13,15,25] Conversely, if academic teachers themselves emphasize the importance of sleep, movement and balance between study and recovery, students receive a clear signal that caring for one's health is an integral aspect of both professional and personal responsibility.[13,18,25]

Models of intervention programs in academic settings

In response to the growing scale of health problems among students, many countries have developed intervention programmes that combine elements of physical activity promotion, prevention of mental disorders and support in time management.[8,11,16–18,20,29] Analysis of these initiatives allows several models of action to be outlined that can be adapted to local university conditions.[18,20,29]

The first model is based on integrating health education content into compulsory courses, especially in the early years of study. In this approach, students receive not only information on recommendations regarding physical activity, sleep and nutrition but also learn how to plan their week, recognize signs of overload and use available psychological support services.[18,20,25,29] The advantage of this solution is its universal reach – it encompasses the entire student population, regardless of their initial motivation to change lifestyle.[18,29]

The second model involves creating elective programmes in which physical activity sessions are directly combined with training in stress-management skills.[8,16,17,18,26,29] These classes are conducted in small groups, often by interdisciplinary teams including specialists in physiotherapy, psychology and education. Participants not only exercise but also discuss their experiences related to studying, fatigue and time pressure. Although such programmes require greater organizational resources, they may be particularly well suited to the needs of the most burdened students at risk of withdrawal.[16–18,25,26,29]

The third model focuses on modifying the university environment to support spontaneous activity and brief recovery periods. This includes designing movement-friendly spaces, introducing stretching breaks during long lectures, creating active pathways between buildings and facilitating access to sports infrastructure outside organized classes.[8,11,18,20] In this approach, less emphasis is placed on formal educational programmes and more on creating conditions in which health-promoting behaviours become the natural choice.[18,20]

Existing findings on the effectiveness of intervention programmes are encouraging but not entirely consistent. They indicate that even small changes in daily organization and the physical environment can lead to noticeable reductions in stress symptoms and improvements in students' well-being.[8,19,20,29] At the same time, they underline that continuity of activities and their adaptation to the specific context of a given university, field of study and participants' real time constraints are of key importance.[18,20,29]

The individual perspective – coping strategies and barriers to change

While institutional programmes create a framework for health-promoting efforts, the ultimate shape of lifestyle is determined by decisions made by individuals. Qualitative studies based on interviews and student diaries show that many people understand the theoretical importance of physical activity and sleep hygiene yet still find it difficult to translate this knowledge into practice under real conditions of time overload.[12,14,18,21,25,30] The most frequently cited barriers include chronic lack of time, guilt about devoting energy to anything other than studying, fatigue and lack of support from their environment.[12,14,18,25] In student narratives, a recurring description is that of a situation in which a seemingly available opportunity for a short walk or simple exercises is replaced by passive media use, which over time consolidates a sedentary lifestyle.[7,9,10,22,30]

At the same time, students spontaneously develop various strategies for coping with burden. Some introduce short movement rituals, such as a daily walk after classes or a few simple exercises performed between study blocks.[18,20] Others use breathing techniques, brief forms of meditation or write down tasks in planners to reduce mental overload.[18,20] Some individuals combine physical activity with social functions by arranging joint training sessions with friends, which strengthens motivation and gives movement a relational dimension.[18,24,26]

A significant barrier is the perfectionistic belief that activity only "counts" if it takes the form of a full "training session" meeting all textbook standards. When the realities of daily life do not allow for such ideal scenarios, students become discouraged and give up any form of movement.[14,18] From a health education perspective, it is therefore important to emphasize the value of even short, irregular interventions and to teach flexible thinking rather than an "all-or-nothing"

approach.[18,20,29]

Awareness of these individual strategies and barriers is crucial when designing university programmes. Interventions that ignore students' experiences and beliefs are less likely to become a stable part of their daily lives, whereas initiatives that reinforce existing, albeit fragile, attempts at self-regulation can significantly improve the effectiveness of preventive efforts.[18,20,29]

Implications for health education and prevention

Health education in academic settings should take into account the specific characteristics of the population in question. Young adults are usually aware of general recommendations regarding physical activity and sleep hygiene but often struggle to apply this knowledge in practice under real conditions of time overload.[12,18,25] Therefore, interventions should focus less on delivering additional information and more on developing competencies that allow integration of health care with academic demands.[18,29] This entails abandoning the assumption that a student, once equipped with a set of universal tips, will independently "organize" a healthy lifestyle regardless of the conditions in which they function.[18,25] In practice, decisions about movement, sleep and diet are made in close interaction with class schedules, instructors' expectations and assessment structures, that is, within a field over which the individual has only partial control.[11,18,20,25] Such an approach reduces the risk of shifting full responsibility for well-being onto an individual who is already functioning at the limits of their resources.[18,25]

With regard to sedentary lifestyle, the key issue is promoting small, realistic changes: short movement breaks during study, taking the stairs instead of the elevator, active commuting to campus and introducing simple stretching and strengthening exercises after prolonged sitting.[8,11,18,20] Educational activities may include practical workshops in which students learn how to plan their day so that it includes even several-minute "movement windows" instead of postponing activity until a "free time" that in practice rarely materializes during exam sessions.[18,20,29] In the area of academic stress, it is important to teach strategies for emotion regulation, working with catastrophic thoughts, task planning and breaking down major projects into smaller steps.[14,15,21,25,28] Psychoeducational programmes that combine training in stress-management skills, mindfulness and cognitive-behavioral techniques may be particularly useful.[14,17,21,25,28] It is essential that they be incorporated into the academic timetable rather than offered solely as optional workshops attended by a small, already motivated minority.[18,25,29]

Effective prevention should combine both themes: movement and stress regulation. Physical activity can be presented not only as a means of preventing somatic disease in the distant future but also as a tool for immediate improvement in concentration, sleep quality and mood.[16–18,20,26,29]

Conversely, the ability to reduce psychological tension facilitates making health-promoting decisions, such as going for a walk instead of spending yet another hour in front of a screen.[16–18,20,26]

From an organizational perspective, universities may consider including health education elements in compulsory modules, creating movement-friendly spaces and monitoring student workload.[1,11,18–20,25] Periodic surveys on well-being, stress and physical activity would make it possible to detect unfavorable trends in the health of the academic community at an early stage and to adjust activities to evolving needs.[1,2,19,20,25,29]

Limitations of available research and of this review

When analyzing the literature on sedentary lifestyle, academic stress and the health of young adults, caution is required in formulating causal conclusions. The vast majority of studies are cross-sectional and rely on self-report questionnaires, which limits the ability to determine the direction of relationships.[5–7,9,10,13–15,19,21,23,25,27,30] It is difficult to state clearly to what extent sedentary lifestyle and stress lead to health problems and to what extent pre-existing health difficulties promote passive leisure and intensified perceived stress.[6,7,12–14,17,18,30] In practice, available data provide cross-sectional snapshots rather than longitudinal trajectories of students' lives: characteristic constellations of symptoms and behaviours can be identified, but their sequence and dynamics remain only partially known. This further justifies combining quantitative approaches with qualitative descriptions of experience that make it possible to better capture how the phenomena under study are experienced subjectively.[18,24,28]

Another limitation is the heterogeneity of definitions of sedentary lifestyle and academic stress. Different studies use different time thresholds to classify activity levels as "insufficient" and employ diverse tools to assess stress, which makes comparisons more difficult.[5,7,15,18,19,21] There are few long-term studies following the same group of students throughout their entire course of study and analyzing changes in health behaviours and psychological functioning.[15,19,23,29]

This review, by virtue of its narrative design, does not include a formal assessment of risk of bias or a quantitative meta-analysis. Instead, it focuses on identifying recurring themes and practical implications for health education.[18] As a result, the conclusions presented are synthetic in nature and require further verification in intervention studies, especially those involving larger samples, longer follow-up and multidimensional assessment of both somatic and psychological indicators.[8,18,19,20,29]

Conclusions

Sedentary lifestyle and academic stress constitute two closely interconnected elements of the lifestyle of contemporary young adults. In academic environments characterized by high intellectual demands, intensive use of digital technologies and limited opportunities for spontaneous movement, these factors may lead to an accumulation of risk for somatic and mental health disorders.[1–7,9,10,13–15,19,21–23,25,27,30] Pain complaints, anxiety and depressive symptoms, sleep problems and early metabolic disturbances are increasingly observed among students, becoming a challenge both for the health-care system and for universities themselves.[1–4,6,7,9,10,13–15,19,21,23,25,27,30]

From the standpoint of health education, it is crucial to move away from an exclusively information-based model of prevention toward interventions that genuinely support the introduction of healthy habits into study-burdened daily life.[8,11,16–18,20,26,29] This includes promoting small forms of movement that can be incorporated into students' days, developing competencies in stress regulation and time management and modifying the organization of the educational process to better balance demands and recovery.[8,11,16–18,20,26,29] Universities can play a role in this process not only as institutions transmitting knowledge but also as environments that model healthy lifestyles.[11,13,18,25]

Future research should focus on assessing the effectiveness of integrated intervention programmes that combine promotion of physical activity, psychological support and organizational changes within universities.[8,16–18,19,20,23,24,29] Long-term projects would be particularly valuable, allowing evaluation of how lifestyle modifications introduced during the period of study affect the health and functioning of young adults in subsequent years.[15,19,23,29] Until such data are available, existing knowledge is nevertheless sufficient to justify systematically incorporating a health perspective into academic planning and building a culture in which care for physical and mental well-being is regarded as an integral component of professionalism rather than a luxury reserved for "after graduation".[18,25]

DISCLOSURE

The authors declare that the content of this article is original and has not been previously published, nor is it under consideration for publication elsewhere. The authors have no relevant financial or non-financial interests to disclose.

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Conceptualization: M.K.

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Formal analysis: M.K.

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