



CANADA VIRTUAL OFFICE

FUTURE TRENDS

Report

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 **TRENDS**
RESEARCH & ADVISORY



Future Trends Report

Future Trends Report, published in English and Arabic by TRENDS Virtual Office in Montreal, stands out as a distinctive publication dedicated to highlighting:

1. the most important forward-looking studies that aim to identify future trends, analyze various variables that may influence these trends, and determine the best future scenarios.
2. the most important applied studies that explore the application of knowledge, scientific theories, and information to solve current problems and overcome future challenges.
3. the most important illustrative and graphic forms that visually summarize significant studies, helping readers understand the trends and challenges of the future world.

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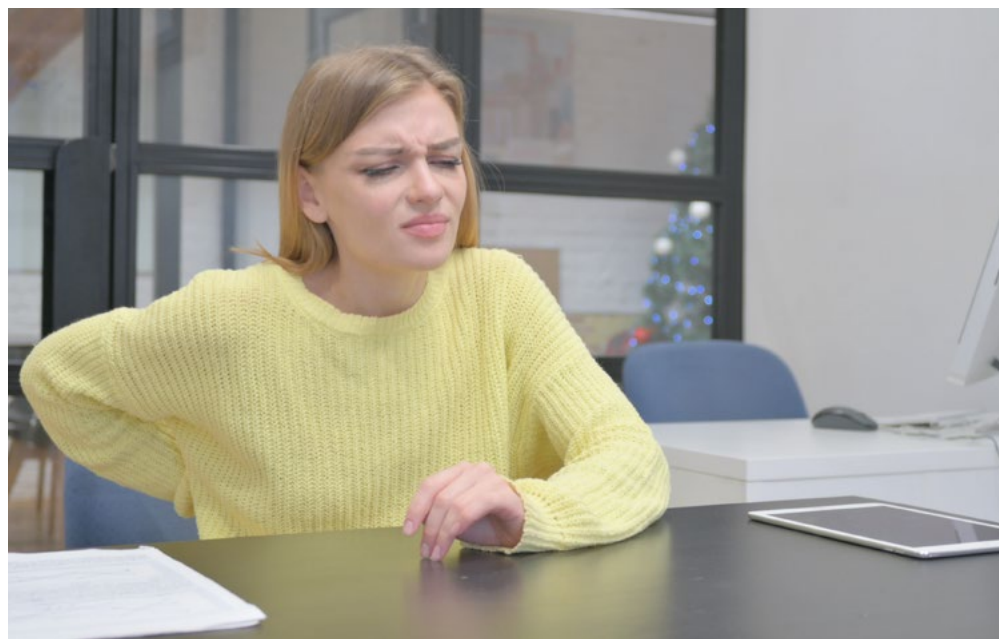
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1 Prospective research

Low Back Pain amongst Health Students

Abbas, J., Alhamdan, A., & colleagues. (2026). Low back pain characteristics among health science students: A 2-year prospective cohort study. *Journal of Clinical Medicine*, 15(2), 684.

Low back pain is one of the most common musculoskeletal problems worldwide and is increasingly affecting younger adults, including university students. This article examines low back pain among health science undergraduates at Zefat Academic College in Israel through a prospective two-year follow-up study.



The authors aimed to determine how common low back pain was in this population and whether factors such as program of study, sex, stress, physical activity, or previous pain history influenced outcomes. The issue is especially important because these students are future healthcare workers whose physical health may affect both their studies and later professional performance. The study originally involved 197 third-year students enrolled in nursing, physiotherapy, medical laboratory science, and emergency medical services. At the end of the two-year follow-up, 172 students completed the questionnaire, giving a strong response rate of 87.3%. Researchers used a modified Standardized Nordic Questionnaire and collected information on sedentary behavior, physical activity, stress, and episodes of low back pain. The findings showed that low back pain was highly prevalent. Almost half of the participants, 48.8%, reported one-month low back pain at follow-up, while about 20% experienced related functional disability. In addition, 70.3% reported having low back pain during the previous year. Some students reported that pain reduced their daily activities, while others sought professional care or used medication. These figures suggest that back pain is not only

common but also disruptive to students' quality of life and academic functioning. An important result was that the specific health science program studied was not significantly associated with low back pain. In other words, students in nursing, physiotherapy, laboratory science, and emergency medical services showed similar risks. However, sex differences were found. Male students had a significantly lower likelihood of experiencing low back pain over time, meaning female students were more vulnerable. A previous history of frequent pain was also associated with continued or new pain episodes. These findings suggest that individual rather than program-based factors may be more important predictors. The authors concluded that low back pain among health science students is a serious and widespread issue requiring preventive action. They recommended ergonomic education and awareness strategies to help students manage posture, study habits, and physical strain. The study was limited by being conducted in one institution, relying on self-reported questionnaires, and using only one follow-up point. Future research should include larger multi-site samples, objective physical assessments, and repeated long-term tracking to better understand causes and effective prevention strategies.



Back pain is not only common but also disruptive to students' quality of life and academic functioning.



Back pain is highly prevalent, affecting 48.8% of participants at follow-up and 70.3% over the previous year.

Prospective research

Professional Dancers and Psychological Well-Being

Maruschi, M. C., et al. (2026). Psychosocial and body image variations in professional dancers across a performance season: A prospective longitudinal study. *Sports*, 14(3), 99.

This article investigates how a full professional dance season influences dancers' psychological well-being, body image, and related health indicators. Professional dancers work in highly demanding environments where artistic performance.



physical appearance, and constant evaluation may create stress. Because dancers often face pressure to maintain a lean physique while performing at high intensity, the authors wanted to understand how these demands evolve during a season rather than at only one moment. The study focused on changes over time in psychosocial health, body perception, and emotional responses among professional dancers.

The researchers followed a group of professional dancers across an active performance season using a prospective longitudinal design. Participants completed repeated assessments during the season, allowing the authors to compare early-season and later-season conditions. Measures explored body image satisfaction, psychological well-being, stress-related responses, and attitudes linked to physical appearance. This design was important because dancers' experiences can fluctuate depending on rehearsal intensity, performance schedules, fatigue, injuries, and

career pressures.

The results suggested that professional dance seasons can generate noticeable psychosocial variation. During periods of heavier workload and performance pressure, some dancers reported more negative feelings about body image and increased psychological strain. Concerns about appearance may intensify when dancers are more visible on stage, wearing fitted costumes, or being frequently assessed by directors and peers. At the same time, some participants maintained stable well-being, showing that responses were not identical for everyone. This indicates that resilience, coping skills, support systems, and previous experience may help buffer stress.

Another important finding was that dance performance environments combine physical and psychological demands in ways that can reinforce each other. Fatigue, pain, and training load may affect mood, confidence, and self-perception, while anxiety or dissatisfaction with body image

may also influence motivation and recovery. Nutrition support, mental health care, realistic body standards, and healthy coaching climates are likely just as important as technical training.

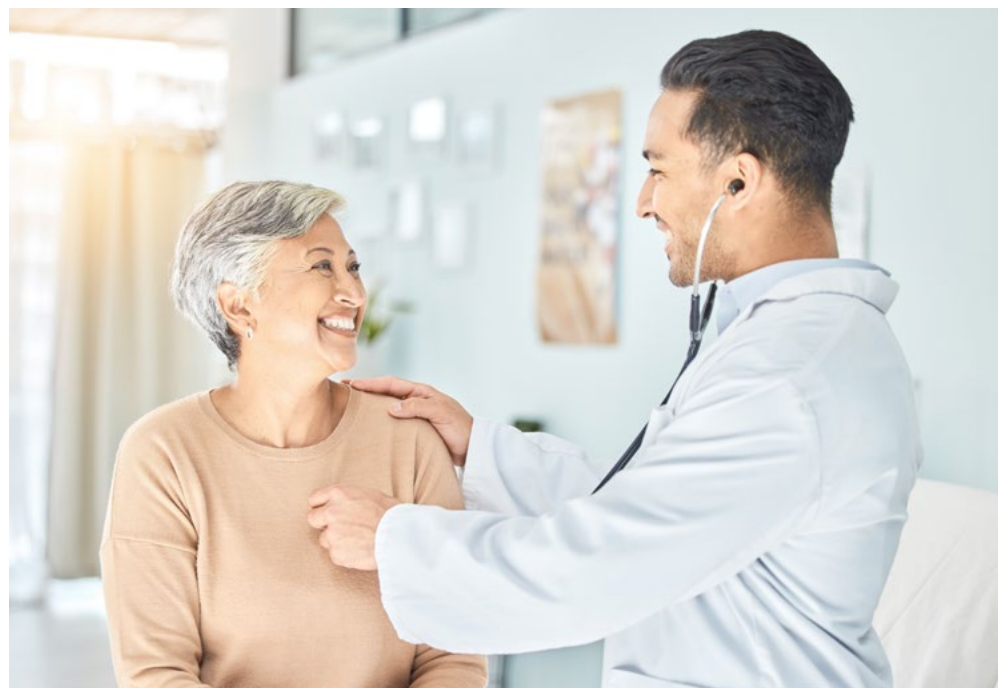
The authors concluded that monitoring dancers throughout the season is valuable for preventing psychological distress and promoting sustainable careers. Rather than intervening only when serious problems appear, companies and schools could use regular screening, counseling access, recovery planning, and education around body image. Supportive leadership may help reduce harmful comparison and perfectionism. The study was limited by sample size and the specific company context, meaning results may not apply to all dance genres or countries. Future research should include larger international samples, compare male and female dancers, and examine how coaching culture, injuries, nutrition, and social media influence mental health across longer career timelines.

Prospective research

Impact of Early-Life Environmental Exposures

Obrycka, P., et al. (2026). Impact of early-life environmental exposures and cardiovascular disease risk: Prospective implications and future directions. *Cells*, 15(3), 222.

This article examines how environmental conditions during early life may shape the future risk of coronary artery disease and heart failure, two major causes of illness and death worldwide.



Rather than viewing cardiovascular disease only as a consequence of adult lifestyle choices, the authors explore evidence showing that health risks can begin before birth or during infancy. They focus on the Developmental Origins of Health and Disease framework, which proposes that prenatal and early childhood environments can program biological systems in ways that influence disease many years later. The review also considers whether some effects may extend across generations through epigenetic mechanisms.

The article describes several harmful exposures during pregnancy and childhood that may increase later cardiovascular risk. These include maternal malnutrition, obesity, diabetes, hypertension, severe stress, smoking, air pollution, infections, and chemical contaminants. According to the authors, these exposures may interfere with fetal development at sensitive stages when organs and regulatory systems are forming. If the heart, blood vessels, kidneys,

metabolism, or hormonal stress systems develop under adverse conditions, the child may later face a higher probability of hypertension, atherosclerosis, coronary disease, or heart failure in adulthood.

A central theme of the paper is epigenetics, meaning biological changes that alter gene expression without changing the DNA sequence itself. The review explains that early-life adversity may influence DNA methylation, histone modification, inflammatory pathways, oxidative stress, and mitochondrial function. These changes can affect how genes related to metabolism, blood pressure control, and cardiovascular repair are activated throughout life. In practical terms, a person may appear healthy in youth but carry a higher hidden susceptibility to later disease because of developmental programming that occurred decades earlier. The authors also discuss the possibility of transgenerational influence. Some studies suggest that parental or even

grandparental nutrition, stress, or toxic exposures may affect descendants through inherited epigenetic marks or altered reproductive biology. Although this field remains debated and more complex in humans than in animal models, the article argues that health risks may sometimes extend beyond one generation. Protecting maternal and child environments today could improve health outcomes for future generations as well. The article concludes that the prevention of cardiovascular diseases should begin long before adulthood. Policies supporting maternal nutrition, clean air, prenatal care, stress reduction, healthy pregnancies, and safe childhood environments may have lifelong cardiovascular benefits. The authors call for stronger collaboration between cardiology, obstetrics, pediatrics, genetics, and public health. Overall, the paper shifts the discussion of heart disease from treatment in later life toward prevention starting at the earliest stages of human development.

Prospective research

The Russian-Ukrainian War and the European Security

Al Taie, T. (2026). *The Future of the Russian-Ukrainian War and its Impact on European Security Strategy*. *Journal of International and Prospective Studies*, 1(2), 18-18.

This article examines the possible future trajectories of the Russian-Ukrainian war and analyzes how the conflict may reshape European security strategy. Since Russia's full-scale invasion of Ukraine in 2022, Europe has faced its most serious military crisis in decades.



The author approaches the war not only as a regional conflict but as a transformative event likely to influence military planning, diplomacy, and strategic autonomy across Europe for years to come.

A central argument is that the outcome of the war remains uncertain and may follow several scenarios rather than one predictable path. These possibilities likely include prolonged stalemate, negotiated settlement, Ukrainian territorial recovery, or continued escalation. Each scenario carries different consequences for Europe. A long war of attrition would require sustained military and economic support for Ukraine, while a frozen conflict could institutionalize instability on Europe's eastern frontier.

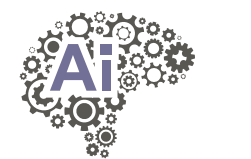
The article emphasizes that the war has already changed European defense behavior. Many European states have increased military spending, accelerated arms production, and reconsidered force readiness after years of lower investment. NATO has regained strategic relevance, with eastern members demanding stronger guarantees and troop deployments. The conflict has also encouraged closer security coordination between the European Union and NATO. Another major theme concerns energy and economic security. Before the invasion, several European countries depended heavily on Russian gas and other

imports. The war exposed how economic interdependence can become a strategic vulnerability when weaponized. In response, Europe has sought diversification of energy sources, stronger sanctions mechanisms, and protection of critical infrastructure. This broader concept of security now includes cyber defense, supply chains, food security, and technological sovereignty. The war, therefore, expanded the meaning of European security beyond purely military terms.

The conflict also raises questions about European strategic autonomy. While the United States remains central to NATO defense, uncertainty in global politics may encourage European states to develop more independent capabilities. The article presents the war as both a warning and an opportunity for Europe to become more coherent strategically.

The author concludes that regardless of the battlefield outcome, the Russian-Ukrainian war has permanently altered Europe's strategic landscape. Europe can no longer assume that security is automatic or externalized. Future research should examine post-war reconstruction, long-term NATO-EU relations, hybrid warfare, and whether Europe can translate temporary unity into lasting strategic capacity.

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Global Risks to the EU

Anghel, V. (2026). *Global Risks to the EU 2026*. European University Institute.

This report presents the 2026 edition of Global Risks to the EU, a large-scale expert survey designed to identify the most serious conflict-related threats facing the European Union. Conducted by the European University Institute in partnership with several security-policy institutions, the project gathered responses from 501 qualified experts who evaluated 30 predefined risks according to likelihood and expected impact.



The initiative aims to provide strategic foresight for European policymakers by systematically measuring perceptions of future threats.

The strongest conclusion is that the EU's main danger in 2026 does not come from one single conventional war, but from overlapping shocks affecting infrastructure, neighborhood stability, and alliance reliability. The top-ranked risk was a major hybrid attack on EU critical infrastructure such as subsea cables, electricity grids, pipelines, or digital networks. Experts considered this both highly likely and highly damaging. The report therefore suggests that modern security depends not only on armies, but also on resilience, redundancy, repair capacity, and protection of civilian systems.

Russia-related threats remain central. Experts ranked a ceasefire in Ukraine favorable to Russia among the most serious scenarios, arguing that such an outcome could reward aggression, weaken Ukrainian sovereignty, and undermine European deterrence. New Russian military action against non-NATO neighboring states was also placed among the highest risks. Interestingly, a direct NATO-Russia war and Russian nuclear weapon use were rated extremely high in impact but relatively lower in likelihood.

Another major theme is the uncertainty of the transatlantic relationship. A potential withdrawal of US security guarantees to European allies was ranked as one of the top strategic threats. According to the report, many experts now see the weakening of American commitments as more probable than all-out war with Russia. This exposes a structural vulnerability in Europe's security architecture, which still relies heavily on US military backing. The Indo-Pacific also rose on the EU risk agenda. A China-Taiwan military conflict was classified as a high-impact risk, while aggressive Chinese actions in the South China Sea were seen as more likely but somewhat less damaging. For Europe, such crises are viewed mainly through trade disruption, supply-chain shock, and alliance credibility rather than direct military exposure. The report concludes that the EU in 2026 will likely remain in constant crisis-management mode while concentrating anxiety on three areas: its eastern border, the resilience of its infrastructure, and the future reliability of the United States. Future policy responses should strengthen deterrence, critical infrastructure security, and internal political unity if Europe wishes to manage a more fragmented and competitive world order.



The EU's main danger in 2026 lies not in a single conventional war, but in overlapping shocks to infrastructure, neighborhood stability, and alliance reliability.



A possible withdrawal of U.S. security guarantees was ranked among the top strategic threats.

2 Applied research

Mental Health Burden in Low-Resource Communities: A New Type of Intervention

Sigdel, K., et al. (2026). A type II hybrid implementation-effectiveness study of the behavioral community-based combined intervention for mental health and noncommunicable diseases (BECOME). *Trials*, 27, Article 94.

This article presents the protocol for the BECOME study, a type II hybrid implementation-effectiveness trial designed to address the growing burden of mental health disorders and noncommunicable diseases in low-resource communities. The researchers recognized that depression, anxiety, diabetes, hypertension, and similar chronic conditions often occur together, yet health systems frequently treat them separately.



This creates gaps in care, especially in underserved settings where specialist services are limited. The BECOME intervention was developed as a community-based strategy combining behavioral support with practical healthcare delivery in order to improve both mental and physical health outcomes simultaneously.

The study uses a hybrid design, meaning it evaluates not only whether the intervention works, but also how it can be implemented in real-world systems. This is important because many effective health programs fail when transferred from research settings into everyday practice. The authors therefore focused on two goals: clinical effectiveness and implementation feasibility. The intervention is delivered through community structures and non-specialist workers, aiming to expand access while reducing pressure on formal healthcare institutions.

BECOME combines behavioral strategies such as lifestyle coaching, psychoeducation, self-management support, and community follow-up. Participants receive assistance in areas like stress reduction, healthy routines, treatment adherence, physical activity, and coping skills. By integrating these components, the program seeks to improve symptoms of common mental disorders while also reducing risk factors for chronic disease.

This integrated model reflects evidence that psychological distress and physical illness often reinforce each other.

Another key contribution of the article is its implementation framework. The researchers plan to assess recruitment success, retention, acceptability, fidelity, sustainability, and barriers to adoption. They also consider contextual factors such as training quality, local infrastructure, organizational readiness, and participant engagement. This moves beyond a narrow clinical trial perspective and recognizes that health interventions succeed only when they fit the social realities in which they are introduced.

The authors argue that if successful, BECOME could provide a practical model for addressing two of the world's largest health challenges together rather than separately. It may be especially useful in countries where healthcare resources are stretched and specialist mental health services are scarce. The study also highlights the value of task-sharing, where trained community workers support care under professional supervision. Because this article is a protocol, final outcome results were not yet available. Future studies will need to examine long-term effectiveness, cost-efficiency, adaptation across cultures, and whether similar integrated programs can be scaled nationally while maintaining quality and community trust.



Depression, anxiety, diabetes, and hypertension often co-occur, yet health systems frequently treat them separately.



BECOME combines behavioral strategies, including lifestyle coaching, psychoeducation, self-management support, and community follow-up.

Applied research

Trajectories of Meaning in Life Among Spanish University Students

Folgado, J. E. L., Peiró, A. C., Marco, J. H., & Rodríguez, S. P. (2026). Trajectories of meaning in life among Spanish university students: a six-month ecological momentary assessment study. *Current Psychology*, 45(3), 218.

This article explores how meaning in life develops over time among Spanish university students and how psychological well-being influences that process.



University years often involve academic pressure, identity formation, emotional stress, and uncertainty about the future. Because of these challenges, meaning in life is considered an important protective factor that can support resilience, motivation, and emotional adjustment. The authors noted that while many studies link meaning in life to better mental health, little is known about how it changes naturally over longer periods in student populations. The study involved 646 Spanish university students enrolled in fields such as psychology, medicine, nursing, nutrition, occupational therapy, and speech therapy. Participants first completed baseline questionnaires measuring depression, positive and negative emotions, emotion regulation strategies, social belonging, and perceived burdensomeness. They then took part in a six-month follow-up using the MEmind digital platform, where they responded to repeated short

assessments of meaning in life across 14 waves. The results identified four distinct trajectories. The largest group, representing 74.1% of students, maintained consistently high and stable meaning in life across six months. A second group, 20.5%, began relatively high but showed a gradual decline. A third group, 3.5%, experienced a sharper decline over time. The smallest group, 1.9%, reported chronically low meaning in life throughout the study. These findings suggest that while most students remain psychologically stable, a meaningful minority may lose direction or struggle with persistent low purpose during university life. Psychological profiles differed strongly across these groups. Students with high and stable meaning in life reported more positive affect, lower depressive symptoms, and greater use of cognitive reappraisal, an adaptive strategy where people reinterpret stressful situations in healthier ways. In

contrast, those with declining or low meaning in life showed more negative affect, higher depression scores, emotional suppression, perceived burdensomeness, and feelings of social disconnection. The authors concluded that meaning in life is not fixed but follows different pathways depending on emotional and interpersonal resources. Universities should therefore not focus only on academic success but also on psychological well-being, purpose development, and emotional coping. Interventions such as mentoring, counseling, self-reflection programs, and training in healthy emotion regulation may help students maintain meaning and resilience. Limitations included the Spanish-only sample and six-month duration. Future studies should examine other cultures, longer timeframes, and whether targeted interventions can actively increase meaning in life and improve student mental health.

The APPROACH Trial: Post Breast Cancer Treatment

Kennedy, F., et al. (2026). An app-based behavioral support intervention promoting physical activity and weight management after breast cancer treatment: Study protocol. JMIR Research Protocols, 15.

This article presents the protocol for the APPROACH trial, a randomized controlled study testing an app-based behavioral intervention designed to increase physical activity among people diagnosed with breast, prostate, or colorectal cancer.



The authors note that regular physical activity after cancer diagnosis is linked to many benefits, including improved quality of life, reduced fatigue, better mental health, stronger physical functioning, and possibly improved long-term survival. However, many cancer patients do not achieve recommended activity levels, often because of fatigue, treatment side effects, low motivation, lack of support, or uncertainty about safe exercise. The intervention combines the NHS Active 10 smartphone app with additional behavioral support. Active 10 encourages brisk walking by helping users track movement, set goals, and monitor progress. The researchers based the program on behavior change theory, particularly habit formation. Instead of relying only on motivation, the intervention aims to make walking a regular part of daily routines through repetition, reminders, planning, and self-monitoring. This is important because habits are more likely to last over time than short bursts of motivation. The study includes adults diagnosed with breast, prostate, or colorectal cancer. Participants are randomly assigned either to the intervention group or to a comparison group receiving usual care and general information. Researchers will assess changes in physical activity

using objective activity monitors and questionnaires. They will also measure body weight, waist circumference, fatigue, sleep quality, anxiety, depression, social support, self-efficacy, and overall quality of life. By measuring both physical and psychological outcomes, the researchers recognize that cancer recovery involves much more than medical treatment alone. A notable strength of the study is its focus on practicality and future implementation. Smartphone delivery can also reach patients at home, which is especially valuable for those experiencing fatigue, transport difficulties, or limited access to rehabilitation services. Because this article is a protocol, final results were not yet available at publication. The paper therefore focuses on how the trial will be conducted rather than whether the intervention succeeds. The authors conclude that scalable lifestyle support is urgently needed for the growing number of cancer survivors. Future research will need to determine long-term adherence, cost-effectiveness, differences across cancer types, and whether similar app-based models can reduce health inequalities among patients with varying ages, digital skills, or socioeconomic backgrounds.

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Physical Literacy and Physical Activity Among the Youth

Rajkovic Vuletic, P., et al. (2026). Effects of a physical-literacy-based educational intervention on physical activity and fitness in adolescents. *Sports*, 14(2), 77.

This article examines whether a school-based educational program focused on physical literacy could improve physical activity levels and body composition in preadolescent children.



Physical literacy includes motivation, confidence, movement skills, knowledge, and willingness to remain active throughout life. The authors argue that many children become less active as they grow older, increasing the risks of obesity, poor fitness, and long-term health problems. Because schools reach large numbers of children, they are considered an ideal setting for interventions that encourage healthier habits during formative years. The study involved 119 children aged 9 to 11 years from southern Croatia. Participants were divided into two groups: an intervention group and a control group. The intervention group received a three-month physical literacy-based program integrated into normal physical education classes, while the control group continued with the standard curriculum. Researchers used a pre-test, post-test, and retention design. Physical activity was measured objectively using accelerometers, which track movement rather than relying on self-report. Body

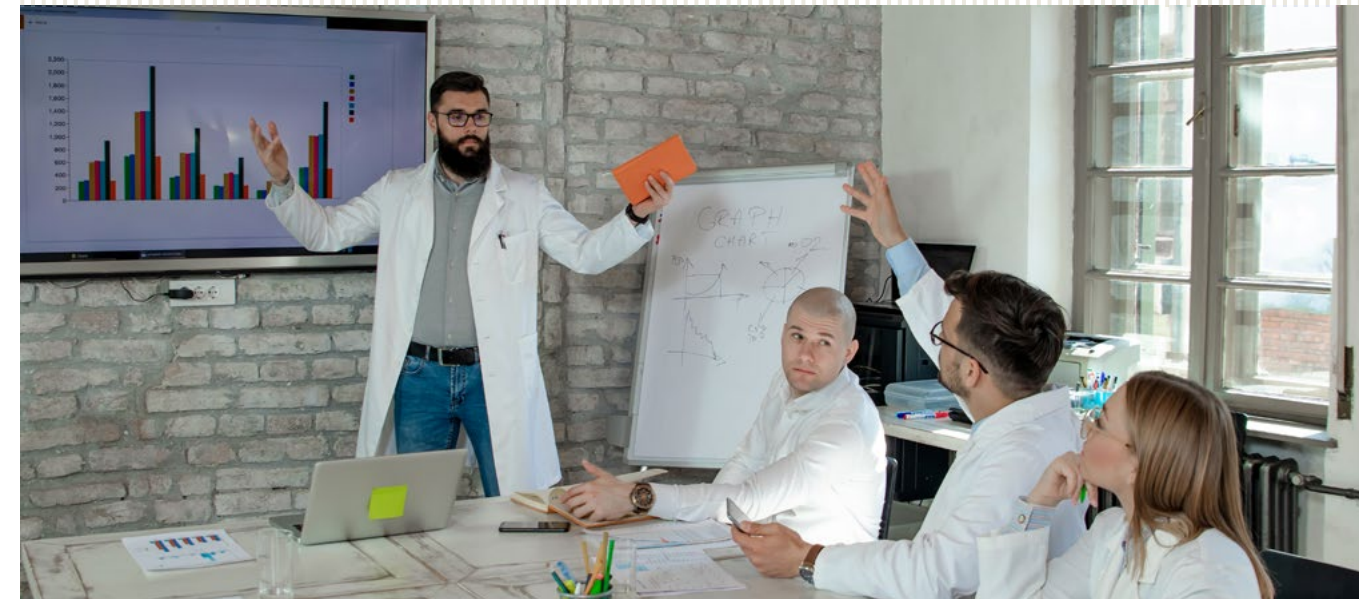
composition was assessed through bioimpedance analysis. The researchers examined step counts, sedentary time, vigorous physical activity, and indicators linked to body composition. This methodology strengthened the study because many earlier school activity studies relied heavily on questionnaires, which can be less accurate when children estimate their own activity levels. The results were encouraging. Children in the intervention group were less likely to show the usual decline in vigorous physical activity over the school year. They also maintained higher step counts and more stable sedentary time compared with the control group. In contrast, children following the regular curriculum tended to show decreases in activity. These findings suggest that a targeted physical literacy approach can protect children from becoming less active as the year progresses. However, the intervention did not significantly change body composition during

the study period. This may be because three months is a relatively short time to observe measurable changes in weight, fat mass, or related indicators, especially in growing children. Body composition is also influenced by nutrition, home environment, sleep, and genetics, meaning school exercise programs alone may not produce rapid visible changes. The authors concluded that physical literacy can be an effective educational strategy for increasing movement and preventing inactivity in children. Rather than focusing only on exercise quantity, the approach develops competence, enjoyment, and confidence that may support lifelong habits. Limitations included the modest sample size, one regional setting, and relatively short intervention duration. Future research should examine larger populations, longer programs, links with nutrition, and whether early gains in motivation and activity continue into adolescence and adulthood.

Single-Case Intervention Research in the Health Sciences

Levin, J. R., & Kratochwill, T. R. (2026). *Single-case intervention research in the health sciences: Randomization + replication = respectability (almost)*. *Archives of Pharmacology and Therapeutics*, 8(1), 1-5.

This article discusses the value of single-case intervention research in the health sciences and argues that these designs deserve greater recognition when conducted rigorously. Single-case intervention designs study one participant or a very small number of participants over time, with repeated measurements before, during, and sometimes after treatment.



The authors explain that although randomized controlled trials are often considered the gold standard, they are not always practical when resources, participant numbers, funding, or time are limited. In such situations, carefully designed single-case methods can offer a scientifically useful alternative. The paper builds on the authors' earlier work introducing these methods to health researchers. They emphasize that single-case studies can be especially valuable in clinical settings where treatments need to be individualized. A central message of the article is that scientific credibility increases when researchers use randomization and replication. Randomization means introducing treatment phases according to a planned random schedule rather than researcher preference. This helps reduce bias and strengthens causal conclusions. If improvement happens repeatedly when treatment is introduced and weakens when it is removed or delayed, confidence grows that the intervention truly caused the change. The article also warns about threats to validity. Researcher expectations, patient expectations, poor measurement, inconsistent procedures, and inappropriate statistical tests can all distort conclusions. The authors stress

the importance of proper analytical methods designed for time-series and single-case data. They also note the need for transparency, careful operational definitions, and standardized reporting so that findings can be interpreted and replicated by others. Another strength of single-case intervention research is practicality. It can be conducted with scarce resources, small clinics, or pilot settings where launching a large, randomized trial would be unrealistic. It may also help researchers identify promising interventions before investing in expensive large-scale studies. In this sense, single-case methods can complement rather than replace traditional clinical trials. The authors conclude that single-case intervention research should be taken more seriously in the health sciences when designed with methodological rigor. They recommend stronger use of randomization, replication, valid statistics, and protection against bias. Future research should continue improving design standards, analytical tools, and reporting guidelines so these studies can contribute more fully to evidence-based practice. Overall, the paper defends a flexible and cost-effective research model that is particularly useful when conventional large trials are not feasible.



Scientific credibility increases when researchers use randomization and replication.



Rigorous single-case research can be a practical, low-cost complement to large clinical trials.

3 The future in numbers

