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Which is more effective for increasing cardiovascular fitness?Hideyuki Tanaka¹, Takeshi Matsubara¹, Hiroshi Morit-subo²¹Laboratory of physical science, ²Health. section, Chikuzen, Town, Fukuoka, Japan

[Background] Our exercise support program for health promotion encourages participants to engage in daily physical activity at a moderate intensity level or higher ($\geq$ MPA). Until now, we had never examined whether it is better to increase $\geq$ MPA by replacing low-intensity physical activity or by replacing sedentary behavior. [Purpose] To examine the effects of replacement versus addition on the increase in $\geq$ MPA on cardiovascular fitness. [Method] The subjects were participants in exercise classes, where an increase in $\geq$ MPA was promote. Based on changes in $\geq$ MPA levels measured by accelerometers before and during the study period, participants were classified into three groups: 15 individuals (Group I) showing replacement increases in $\geq$ MPA compared to pre-intervention levels, 21 individuals (Group II) showing additive increases, and 7 individuals (Group III) showing no change. We compared the groups regarding changes in 50% $\dot{V}O_{2\max}$ walking speed (50% WS), an indicator of cardiovascular fitness. [Results] A significant main effect of group ($p < 0.01$) and period ($p < 0.05$) was observed in the comparison of 50% WS before and after intervention; however, no significant interaction between group and period was found. On the other hand, a significant difference in the change in 50% WS was observed between groups, with Group I showing a significantly greater increase than Group II ($p < 0.01$) and Group III ($p < 0.05$). [Discussion] It suggested that there was no difference in the effect on cardiovascular fitness between substitution and addition in the increase in $\geq$ MPA.

Keywords : intervention study, exercise effect, accelerometer

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Impact of Solar Radiation on Exercise-Induced Fatigue and the Mitigating Effects of Sunscreen ApplicationYuichiro Goto¹, Anna Hiranuma¹, Mitsuru Yoshida¹, Miki Nakanishi¹, Osamu Sakata¹, Tsuyoshi Hata¹¹KOSE Corporation

[Background and Objective] Exercise-induced fatigue is affected not only by exercise intensity but also by environmental factors, including temperature, humidity and solar radiation. Among these, since solar radiation is a modifiable factor, we investigated the impact of solar radiation on exercise-induced fatigue and evaluated whether sunscreen application can attenuate this effect. [Methods] Twenty healthy participants underwent a 2-hour cycling test under three conditions: (1) indoors without sunscreen, (2) outdoors without sunscreen, and (3) outdoors with sunscreen. Subjective fatigue was assessed using a VAS, and physiological fatigue markers (d-ROMs, BAP) were measured before exercise, immediately after, and up to 3 hours post-exercise. Fatigue responses were evaluated based on changes from baseline. [Results] Outdoor exercise without sunscreen resulted in significantly higher increases in d-ROMs and BAP levels compared to indoor exercise ($P < 0.05$). In the comparison between sunscreen and non-sunscreen conditions during outdoor exercise, the sunscreen group showed a tendency toward lower BAP levels and a significantly lower subjective fatigue score (VAS) ($P < 0.05$) compared to the non-sunscreen group. [Conclusion] These findings suggest that solar radiation exacerbates fatigue during outdoor exercise and the use of sunscreen has the potential to alleviate both subjective and physiological exercise-induced fatigue during outdoor physical activity. Accordingly, the use of sunscreen can be considered a useful strategy for mitigating exercise-induced fatigue.

Keywords : fatigue, sunscreen, solar radiation

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Dynamic cerebral autoregulation under cognitive fatigueHayato Tsukamoto¹, Naoyuki Hayashi¹¹Faculty of Sport Sciences, Waseda University

[Background] Dynamic cerebral autoregulation (dCA) buffers blood pressure fluctuations to maintain stable cerebral blood flow. An effect of prolonged cognitive activity on dCA remains unclear whereas short-duration cognitive activity impairs dCA. Prolonged cognitive activity leads to cognitive fatigue, reducing cognitive performance. [Aim] This study assessed dCA during prolonged cognitive activity accompanied by cognitive fatigue, compared with dCA during short-duration cognitive activity. [Methods] Fourteen young adults participated in two trials (cognitive fatigue and short-duration control trials) in a randomized crossover design. In the cognitive fatigue trial, participants performed a 50-min Go/No-go task (GNGT), and data from the final 5 min were analyzed. Either a Go or No-go stimulus was randomly presented every 2 s. In the control trial, participants performed a 5-min GNGT after watching a video for the same duration as the fatigue trial. Middle cerebral artery blood velocity and arterial blood pressure were continuously recorded at 1 kHz. The dCA during the 5-min GNGT was assessed using transfer function analysis. Generalized linear mixed models with baseline values as random effects were used for statistical analysis. [Results] Compared with the control trial, the fatigue trial showed slower mean reaction time, greater reaction time variability, and more errors in GNGT (all $p < 0.01$). The low-frequency phase, dCA, was smaller during GNGT in the fatigue trial than in the control trial ($p < 0.05$). [Conclusion] Prolonged cognitive activity accompanied by fatigue impaired dCA, compared with short-duration cognitive activity.

Keywords : cerebral blood flow, executive function

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The relationship between mental health and both subjective and objective sleep qualityJin Sakamoto¹, Chihiro Tomiishi¹, Saaya Taniguchi¹, Ryo Saeki¹, Chihiro Hiratsuka¹, Sae Kamiuchi¹, Hiroki Furukawa¹, Masaru Kusano², Ken Ichikawa², Kazushige Goto¹¹Ritsumeikan University, ²Asics Corporation

[Aims] The relationship between declining mental health and sleep quality in middle-aged people is unclear. Therefore, we investigated the relationship between mental stress and subjective (assessed by questionnaire) and objective (assessed by sleep EEG) sleep quality in middle-aged people. [Methods] 35 healthy middle-aged people (13 men, 53 $\pm$ 5 yrs; 22 women, 53 $\pm$ 4 yrs) were recruited. Mental health (evaluated by CES-D, DASS-21, SF-8), and sleep quality (Subjective assessment by PSQI; Objective assessment by Sleep EEG) were evaluated. Sleep EEG was measured for three consecutive days at participant's home. The relationship between each indicator was examined. [Results] Scores of the CES-D (higher for depression) and the DASS-21 (higher for depression, anxiety, and stress) showed a positive correlation with the PSQI (higher for sleep disorders) ($r_s = 0.35\sim 0.63$; $P < 0.05$). On the other hand, scores of objective sleep quality (e.g., sleep efficiency; sleep latency; non-REM sleep time [stages 1~3]) did not show significant correlations with any of the mental health variables. [Conclusions] Mental health in middle-aged people was associated with subjective sleep quality. However, it was not associated with objective sleep quality.

Keywords : middle-age, mental health, sleep

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The relationship between daytime napping habits and conditions in collegiate athletesToshihiro Kitada^{1,2}, Tatsuya Hashitomi³, Koichi Watanabe³¹University of Tsukuba, Graduate School of Comprehensive Human Sciences, Ibaraki, Japan, ²Takekawa Hospital, Department of Rehabilitation, Tokyo, Japan, ³University of Tsukuba, Institute of Health and Sport Sciences, Ibaraki, Japan

[Background] Daytime napping offsets insufficient nighttime sleep; however, its current status and relationship with condition among collegiate athletes remain unclear. [Aims] To examine the relationship between napping and physical condition in collegiate athletes. [Methods] Participants were 96 collegiate athletes (mean age: 19.8 years, SD: 1.5). Data were collected via web-based survey on demographics, subjective athletic performance, condition (fatigue, episodes of URTI, and pain from sports injuries), nighttime sleep, and napping. [Results] A total of 63 athletes (65.6%) reported regular napping, with an average duration of 48 minutes (SD: 29 min), and 49 (77.8%) were satisfied. Nighttime sleep of at least 7 hours was reported by 39 athletes (40.6%), with 25 (26.0%) expressing satisfaction. Subjective performance was lower in the groups with less than 7 hours of sleep, sleep dissatisfaction, and napping dissatisfaction. Fatigue was lower in the sleep satisfaction group. Episodes of URTI were more frequent in the groups with 7 hours or less of sleep, sleep dissatisfaction, and no napping. Pain was lower in the groups with at least 7 hours of sleep and napping satisfaction. [Conclusions] Napping was associated with physical condition, suggesting a role in condition management among collegiate athletes. Napping habits may be important for collegiate athlete condition, and further qualitative evaluation is warranted.

Keywords : napping, sleep, condition

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The effect of fast walking on sleep qualityChihiro Tomiishi¹, Jin Sakamoto¹, Saaya Taniguchi¹, Ryo Saeki¹, Chihiro Hiratsuka¹, Sae Kamiuchi¹, Hiroki Furukawa¹, Ken Kusano², Masaru Ichikawa², Kazushige Goto¹¹Univ. Ritsumeikan, Shiga Japan, ²ASICS Corporation

[Aims] The aims of this study was to determine the effect of fast walking (FW) on sleep quality. [Methods] Twelve middle-aged adults were recruited. They carried out 8 wk (4 times/wk) of FW program. The average walking velocity was 6.8 ± 0.5 km/h. During training period, sleep quality was assessed using actigraphy to determine sleep efficiency, total sleep time, sleep latency and wake after sleep onset. Based on the day-by-day data, the sleep quality was compared between “on the days with FW (FW days)” and “on the days without FW (non-FW days)”. [Results] The analyses covered a total of 343 days of FW days and 266 days of non-FW days. For comparisons between FW days and non-FW was, no significant differences were observed in sleep efficiency, sleep latency, or wake after sleep onset ($p > 0.05$). However, sleep efficiency was significantly improved and wake after sleep onset was significantly reduced when the FW was implemented in the morning than in the afternoon time ($p < 0.05$). [Conclusion] While the implementation of FW did not affect sleep quality on that night, FW in the morning improved sleep quality compared to the FW in the afternoon.

Keywords : sleep, fast walking, middle-aged adults

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Effect of fast-walking on autonomic nervous activity before sleepSae Kamiuchi¹, Chihiro Tomiishi¹, Jin Sakamoto¹, Saaya Taniguchi¹, Ryo Saeki¹, Chihiro Hiratsuka¹, Hiroki Furukawa¹, Ken Kusano², Masaru Ichikawa², Kazushige Goto¹¹Univ. Ritsumeikan, Shiga Japan, ²ASICS Corporation

[Aims] The purpose of this study was to compare autonomic nervous activity immediately before sleep between “the day with fast-walking (FW, FW days)” and “the days without FW (non-FW days)”. [Methods] Fifteen middle-aged men and woman (53.1 ± 0.8 years) performed FW at speed of 6.7 ± 0.2 km/h, 4 times/wk (20-30 min/session) for a month. During training period, daily autonomic nervous activity was evaluated immediately before sleep using fingertip pulse wave to determine low-frequency/high-frequency ratio (LF/HF) and high-frequency power (HF). [Results] In total, data of 15.5 ± 1.2 days for FW days and 11.7 ± 1.2 days for non-FW days were analyzed. For both LF/HF and HF, no significant difference was found between FW and non-FW days. [Conclusions] The findings suggest that fast-walking does not affect autonomic nervous activity immediately before sleep on the days.

Keywords : fast-walking, low-frequency/high-frequency ratio, high-frequency power

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Carbon dioxide exposure effect on daytime sleepinessRuinian Jin^{1,2}, Hitoshi Inada³, Haruki Momma⁴, Dongmei Ma^{1,2}, Keqing Yuan², Ryoichi Nagatomi⁵¹Fac. Sports Science., Univ. Sendai, Sendai, Japan, ²Dept. Medicine and Science in Sports and Exercise, ³Headquarters for Co-Creation Strategy, National Institutes of Natural Sciences, ⁴Center for Physical Activity Research, National Institutes of Biomedical Innovation, Health and Nutrition, ⁵Tohoku University, Designing Future Health Initiative

The aim of this paired crossover study was to examine whether carbon dioxide (CO₂) exposure induces daytime sleepiness, as measured by the multiple sleep latency test (MSLT). Eleven healthy participants completed a four-nap MSLT in the environmentally controlled chamber under two groups: the CO₂ group (4851 ± 229 ppm) and the Control group (1102 ± 204 ppm). The subjective sleepiness level and cognitive performances were also evaluated using the Stanford Sleepiness Scale questionnaire, Psychomotor Vigilance Test, and Stroop test after each nap session. A significant reduction in sleep latency was observed in the CO₂ group (Control vs. CO₂ = 13.1 ± 3.3 min vs. 9.7 ± 3.2 min). The subjective sleepiness scores were also significantly higher in the CO₂ group than in the Control group (Control vs. CO₂ = 2.7 ± 0.5 vs. 4.7 ± 0.8). Cognitive responses after naps showed no significant difference across conditions. Exposure to environmental CO₂ at a concentration as high as the upper safety limit at work sites significantly shortened the sleep latency and enhanced subjective sleepiness during naps in the MSLT without affecting cognitive responses after each exposure. Our results demonstrated that exposure to high environmental CO₂ induces daytime sleepiness that potentially compromises work efficiency and safety.

Keywords : environmental carbon dioxide, cognitive performance, work efficiency and safety

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The relationship between health literacy and physical function and exercise habits in young people

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[Aims] The aim of this study was to clarify the relationship between HL and physical function and exercise habits in young people. [Methods] A questionnaire survey was conducted on communicative and critical health literacy (CCHL) and exercise habits in 316 students (15.7±0.7 years old) in the first and second years, and physical function was evaluated by administering the new physical fitness test of the Ministry of Education, of using students of Hachinohe National College of Technology. [Results] A positive relationship was observed between CCHL and the total score of the new physical fitness test, long sitting forward bending, repeated side jumps, and endurance running ($p < 0.05$). A positive relationship was observed between CCHL and exercise habits and walking speed ($p < 0.01$). [Discussion] A relationship was observed between CCHL and physical function and exercise habits in young people. It has been reported that individuals with high HL tend to be active by establishing exercise habits. Therefore, it is thought that active habits affect physical function and walking speed in individuals with high CCHL. [Conclusion] These results suggest that the relationship between HL and physical function and exercise habits in young people.

Keywords : health literacy, physical function, young people

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Web-based intervention for metabolic syndrome among workers: effects and one-year follow-up

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[Background] High-intensity interval training (JHIAT) combined with calorie restriction (CR) has been reported as an efficient approach to manage metabolic syndrome (MetS) among workers. However, evidence on the effectiveness and long-term impact of web-based remote interventions remains limited. [Purpose] This study examined the effects of a web-based remote lifestyle program and its one-year follow-up on MetS components, cardiorespiratory fitness (CRF), and physical activity among employees. [Methods] 36 workers eligible for specific health guidance participated in an 11-week online lifestyle improvement program. The program consisted of JHIAT, CR seminars, and biweekly online counseling. MetS components, CRF, and physical activity were measured before, after, and one year following the intervention. [Results] Body weight, blood pressure, and triglycerides significantly improved after the intervention and remained improved at one year ($p < 0.01$). However, CRF showed no significant change immediately after the intervention (31.0±6.8 mL/kg/min) and significantly declined at one year (27.5±7.0 mL/kg/min). Moderate-to-vigorous physical activity and step counts increased significantly after the intervention but returned to baseline levels at one year. [Conclusion] The web-based remote intervention effectively improved and maintained MetS-related outcomes among workers. However, sustaining CRF improvements remains a challenge, suggesting the need for enhanced strategies to monitor exercise intensity and promote long-term physical activity adherence.

Keywords : metabolic syndrome, web-based Intervention, occupational health

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Effects of introducing gamification in improving the retention rate of a preventive healthcare application for caregivers

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[Aim] We have developed a self-monitoring health promotion application for the purpose of preventing long-term care in 2020. However, as with many health care applications, there were challenges with user retention rates. For this reason, gamification was introduced as one means to promote the improvement of the retention rate in 2022. Therefore, this study aimed to assess whether incorporating a gamification component successfully enhanced the retention rate of the healthcare application. [Methods] The study included 1,392 participants who downloaded the application within three months before and after the introduction of gamification. The hazard ratios (HR) associated with retention were calculated using Cox proportional hazards models. The application was defined as dropped out when the application was not launched for more than 7 consecutive days within 30 days after installation. [Results] The retention rate was 11.5% ($n = 80$) before implementation and 15.8% ($n = 110$) after ($p = 0.02$). The Cox proportional hazards model showed that gamification implementation was associated with longer retention rates (HR: 0.86, 95% confidence interval: 0.77-0.97, $p = 0.012$). [Conclusions] The results of this study showed that the introduction of gamification elements significantly increased the retention rate of the Online Kayoinoba App. These results suggest that gamification is also useful for increasing the retention rates among older adults using healthcare applications.

Keywords : retention rate, gamification, mHealth

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Association Between Diet, Physical Activity, and Fecal Incontinence Severity in Colorectal Cancer Patients Following Minimally Invasive Surgery: A Cross-Sectional Study

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[Aims] This study examined associations between dietary intake, physical activity (PA), and fecal incontinence (FI) severity in colorectal cancer (CRC) patients after minimally invasive surgery. [Methods] A cross-sectional study was conducted at university hospital. Dietary intake (red meat, fiber, sugary drinks, alcohol) was assessed via questionnaire and classified per American Cancer Society guidelines. PA and sedentary behavior (SB) were assessed via the Global Physical Activity Questionnaire. FI severity was rated using the Wexner score. Multivariable regression examined associations between diet/behavior factors and FI severity, adjusting for age, sex, chemotherapy, laxatives, tumor site, and time since surgery. [Results] Of 136 participants, 131 (96.3%) reported postoperative FI. Intake of ≥500 g/week red meat was associated with lower FI severity ($\beta = -1.42$; 95% CI: -2.71 to -0.12). Sedentary time ≥8 h/day was linked to higher severity ($\beta = 1.26$; 95% CI: 0.08 to 2.44). No significant associations were found for fiber, sugary drinks, or alcohol. [Conclusion] Greater red meat intake was linked to less severe FI, while prolonged SB was associated with worse symptoms. Findings support the relevance of diet and lifestyle in FI management after CRC surgery.

Keywords : colorectal cancer, fecal incontinence, sedentary behavior

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Effect of exercise program using sock jointed cat toy for human and cat's healthNoriko Hozumi¹¹Japan Fitness Association

[Background] In Japan, cats are mainly fed indoors with balanced diets, so their life span is increasing. But since they don't need to be walked, both cats and their owners tend to be sedentary. Therefore, to prevent a lack of exercise for them, we developed an exercise program using cat toys attached to a sock (Nekoxercise). [Object] The effect of Nekoxercise on human motor function and the cat's activity was examined. [Method] Female cat owners over 40y were recruited. Online physical fitness tests and Locomo25 test were done before and after the 12w exercise period. During the intervention, both humans and cats put on an activity meter and their daily activity were recorded. Exercise content and cat's reaction during exercise were recorded in a diary. 10 subjects who done the exercise at least 42days were included in the aggregation of data. [Results] Time reduction in the 5 times stand-up test before and after the intervention was significant. During the exercise, younger cats tended to engage more in the play, but there was no increase in daily activity. [consideration] Even though Nekoxercise is sedentary exercise, improvement of stand-up motion was observed; some of the exercises that recruited the quadriceps and gluteus maximus muscles might have had a positive effect on the stand-up motion. At times, movement of the cat's toy was monotonous and might have been boring to the cats. [Conclusion] Nekoxercise is an effective exercise and communication tool with cats and might lead people who are indifferent to exercise to acquire exercise habits. Furthermore, every exercise can be done on a chair, which is safe for elderly people with a high risk of falls.

Keywords : cat toy, chair exercise, locomotive syndrome

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Effects of daily psychological state on physical activity and sedentary timeAkari Horita^{1,3}, Yukiya Tanoue^{2,3}, Yuma Yamashita³, Haruto Ebisawa³, Miu Abe³, Mahiro Maeda³, Takashi Murakami^{3,4}, Yasushi Shinohara³, Motoyuki Iemitsu³, Haruka Murakami³¹Fukuoka University, Fukuoka, Japan, ²National Institute of Health and Nutrition, Osaka, Japan, ³Ritsumeikan University, Shiga, Japan, ⁴Kyoto Prefectural University of Medicine Education Center, Kyoto, Japan

[Aims] Depressive symptoms have been reported to be associated with physical activity (PA). However, it remains unclear whether daily psychological states in healthy adults influence PA. This study aimed to examine whether daily morning psychological states affect PA. [Methods] We assessed daily morning psychological states and PA in 18 adult men and women over an 8-week period. Urinary concentrations of GABA (gamma-aminobutyric acid), an inhibitory neurotransmitter, were measured every other week to examine their associations with psychological states and PA. [Results] At the between-person level, positive affective states showed significant correlations with sedentary time ($\rho = -0.693$) and moderate-to-vigorous PA ($\rho = 0.754$). GABA concentrations also showed a significant correlation with sedentary time ($r = 0.518$). However, within-person level analyses revealed that morning positive affect was associated with subsequent daytime sedentary time ($\beta = 0.029$) and light-intensity PA ($\beta = -0.031$). GABA concentrations, however, showed no significant association with either variable. [Conclusions] Although an association between psychological states and PA was suggested, the relationship differed at the within-person and between-person levels.

Keywords : psychological state, physical activity, positive affective state

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Association of physical activity-related outcomes with occupational stress among Japanese remote workersJihoon Kim¹, Yutong Shi¹, Chang Zou², Yoshio Nakata¹¹Institute of Health and Sport Sciences, University of Tsukuba, Tsukuba, ²Graduate School of Comprehensive Human Sciences, University of Tsukuba, Tsukuba

[Aims] Remote working alters the distribution of time spent on work, commuting, and leisure activities. These changes are associated with reduced physical activity (PA) and increased sedentary behavior (SB), potentially increasing occupational stress. This cross-sectional study examined the association between PA-related outcomes and occupational stress among Japanese remote workers. [Methods] Participants were employees who engaged in remote work at least once a week. Measurements included PA-related outcomes obtained from a triaxial accelerometer (steps, moderate-to-vigorous PA (MVPA), and SB) as well as occupational stress score, age, sex, BMI, job position, and wear time. Multiple regression analysis was conducted using SPSS 30.0, with occupational stress score as the dependent variable, PA-related outcomes as independent variables, and other variables as covariates. [Results] A total of 94 participants were included in the analysis. The mean (SD) age was 44.3 (11.0) years, the mean occupational stress score was 50 (12), and the mean daily step count was 5573 (3294) steps. Multiple regression analysis showed a negative association between step count and occupational stress (per 1,000 steps: $\beta = -1.06$, $p = 0.007$). In contrast, neither SB ($p = 0.385$) nor MVPA ($p = 0.077$) showed a statistically significant association with occupational stress. [Conclusion] These findings suggest that increasing daily steps among remote workers may contribute to reducing occupational stress.

Keywords : occupational health, teleworking, exercise

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Occupational Mental Fitness Questionnaire: Validation Based on the COSMIN GuidelinesTomoaki Matsuo¹, Rina So¹, Fumiko Murai¹, Yuki Nishimura¹, Shunsuke Hino², Katsuyoshi Mizukami³¹National Institute of Occupational Safety and Health, Japan, ²Re-nnaissance, ³University of Tsukuba

Background: Physical fitness (PF) is often considered a key component to enhance human vitality, but actual vitality includes both physical and mental aspects. While PF has been widely studied, research on mental fitness (MF) is limited. Our previous study developed a theoretical model of MF among workers through qualitative research. Objective: To validate the Occupational Mental Fitness Questionnaire (OMFQ), developed from the MF model, using Boxes 1-10 (B1-B10) of the COSMIN guidelines. Methods: The OMFQ consists of 30 items rated on a 4-point Likert scale (range: 0-90). Data from 248 workers aged 30-60 were analyzed. Internal consistency (B4) was assessed via Cronbach's α ; reliability (B6) via ICC; measurement error (B7) via limits of agreement (LoA); construct validity (B9) via correlations with other indicators; and responsiveness (B10) via changes in OMFQ scores and related indicators. Results: The mean total score (TS) was 53.5 $\pm$ 14.0. Cronbach's α was 0.91, ICC 0.92 (95% CI: 0.89-0.94), and LoA ranged from -11.3 to 11.7. TS correlated significantly with CES-D (-0.31), work engagement (0.59-0.76), resilience (0.51), and presenteeism-based performance level (0.38). Participants with increased TS over 1-2 years showed improved engagement and performance level. Conclusion: Five COSMIN boxes were evaluated with favorable results. Questionnaire development (B1) and content validity (B3) were conducted previously. B2 and B8 were not applicable. Cross-cultural validity (B5) remains a future task.

Keywords : occupational health, mental health, psychological assessment

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Effects of Walking Speed on Body Composition and Physical Activity in Healthy Male University Students

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Walking speed is widely used as a health indicator and predictor of prognosis in older adults, but its relevance in younger populations remains underexplored. This study aimed to examine the relationship between walking speed, body composition, and physical activity in healthy male university students. Thirty-one participants were assessed for optimal and maximal walking speed, body composition, and physical activity. Based on the average values of walking speed, participants were divided into two groups: Group A (above average) and Group B (below average) for each walking condition. For optimal walking speed, 14 were in Group A and 17 in Group B. For maximal walking speed, 10 were in Group A and 21 in Group B. The maximal speed Group A showed significantly lower body fat percentage and fat mass compared to Group B. In terms of physical activity, Group A also exhibited significantly higher levels of daily living activity and spent more time in activities with an intensity of 2 METs or higher. These results suggest that individuals with higher maximal walking speed tend to have better body composition and more active lifestyles. Even in young adults, walking speed may serve as a useful indicator for assessing health and physical activity, potentially contributing to health management and exercise guidance.

Keywords : optimal walking speed, maximal walking speed, physical activity

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Muscle activity levels in the lower limbs due to posture changes

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[Aims] Prolonged sitting increases the risk of various diseases due to reduced lower limb muscle activity. The objective was to clarify the level of lower limb muscle activity during simple postural change interventions (standing, walking, squatting, heel raises, bamboo mat stepping) compared to sitting. [Methods] Muscle activity levels were measured in 11 healthy male and female university students using surface electromyography (TS-MYO, Trunk Solution Co., Ltd.). Electromyographic potentials were recorded for 2 minutes in each posture. Average, peak, and integrated values were calculated for each posture and movement. [Results] Average gastrocnemius muscle activity was: Sitting: 0.003±0.001mV, Standing: 0.008±0.006mV, Walking: 0.030±0.010mV, Squatting: 0.012±0.006mV, Heel Raising: 0.031±0.010mV, Bamboo Mat Stepping: 0.016±0.007mV. Peak values were: Sitting: 0.046±0.038 mV, Standing: 0.060±0.030 mV, Walking: 0.251±0.086 mV, Squatting: 0.169±0.090 mV, Heel raise: 0.443±0.144 mV, and Bamboo Mat Stepping: 0.164±0.070 mV. The integrated values were: Sitting: 0.410±0.130 mV, Standing: 1.088±0.802 mV, Walking: 3.707±1.212 mV, Squatting: 1.516±0.789 mV, Heel raise: 3.798±1.276 mV, and Bamboo Mat Stepping: 2.020±0.818 mV. [Conclusions] Simple postural change interventions resulted in higher gastrocnemius muscle activity compared to sitting. Furthermore, since muscle activity levels were higher during walking, squatting, heel raises, and bamboo mat stepping than during standing, incorporating activities that promote lower limb muscle contraction when interrupting prolonged sitting may increase muscle activity levels and potentially help reduce disease risk.

Keywords : electromyography, muscle contractile activity, health

286.

Effect of an activity monitor-based intervention aimed at increasing physical activity above the lactate threshold on daily energy expenditure in young adult women: a randomized controlled trial

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[Aims] To investigate the effect of a physical activity (PA) intervention designed to increase PA above the lactate threshold intensity (LTPA), using an activity monitor (AM), on daily energy expenditure in young adult women. [Methods] Twenty young adult women were randomly assigned to either an intervention group (IG) or a control group for 10 weeks. The IG wore an AM and were instructed to increase their LTPA to 180 min/wk, whereas the control group were instructed to maintain their usual lifestyle. Total energy expenditure (TEE) was estimated using the doubly labeled water method. [Results] The LTPA significantly increased compared with baseline values in the IG (188.4±19.1 min/wk). Two-way ANOVA revealed significant group×period interactions for PA-related energy expenditure (PAEE) and TEE, both of which were significantly higher than baseline in the IG. Conversely, no significant interaction was observed for basal metabolic rate. [Conclusions] These results suggest that the AM-based intervention effectively increased LTPA, accompanied by concomitant increases in PAEE and TEE, without inducing a compensatory reduction in daily PA.

Keywords : accelerometer, anaerobic threshold, DLW

288.

Association between subjective postural assessment and chronic low back and neck pain in middle-aged Japanese men and women

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Posture management is a common intervention for musculoskeletal pain; however, this association has not been sufficiently validated. [Aims] To examine the association between subjective posture assessment and chronic low back and neck pain in middle-aged men and women. [Methods] This cross-sectional internet-based survey included 300 men and 300 women aged 40-64 years. Chronic low back and neck pain were defined as pain persisting for ≥ 3 months, assessed using a body chart. Subjective posture was evaluated with the Kendall classification and a verbal questionnaire, and associations were analyzed. [Results] Among 289 men and 296 women, the prevalence of chronic low back pain was 18.7% and 23.0%, while chronic neck pain was 22.1% and 33.1%, respectively. In the Kendall classification, "Kyphosis-Lordosis posture" showed significantly higher odds ratios than "ideal alignment" for all pain sites except low back pain in men. Those reporting "forward head posture" had higher odds ratios, whereas "none apply" regarding poor postural habits was linked to lower odds ratios. [Conclusion] Subjective posture assessments of "Kyphosis-Lordosis" or "forward head posture" were associated with higher prevalence of chronic low back and neck pain.

Keywords : posture, musculoskeletal pain

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Effects of sleep quality and duration on next-day physical activity

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[Aims] Although the effects of sleep quality and quantity on physical activity (PA) have been examined, most prior research has relied on subjective assessments or cross-sectional designs, with clear conclusions remaining elusive. Thus, this study aimed to objectively evaluate sleep quality, sleep quantity, and PA, with a particular focus on within-individual variability. [Methods] Thirty-five adults (43.8 ± 8.4 years) wore a triaxial accelerometer (GT9X, ActiGraph, USA) on the wrist for eight consecutive weeks. Associations between sleep and PA were analyzed using linear mixed models. [Results] Mean sleep efficiency was 81.8 ± 5.4%, sleep duration was 329.1 ± 41.9 minutes/day, daily step count was 11,619 ± 1,656 steps/day, and moderate-to-vigorous PA (MVPA) was 132.5 ± 41.5 minutes/day. Higher sleep efficiency was associated with lower sedentary behavior (%SB) and higher light PA (%LPA) the next day; however, no association with moderate PA (%MPA) was observed. Conversely, more frequent waking after sleep onset was associated with higher %SB and lower %LPA and %MPA. Longer sleep duration was also associated with higher %SB and lower %LPA and %MPA the following day. [Conclusions] Both sleep quality and quantity influence next-day PA. However, their effects are not uniform. Reducing frequent waking after sleep onset may help promote greater next-day PA.

Keywords : sleep quality, sleep quantity, physical activity

291.

Twenty-Year Change in the Cardio-Ankle Vascular Index and its Relationship to Grit

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[Aims] The objective of this study was to examine the relationship between 20-year changes in atherosclerosis severity and grit. [Methods] The participants were 20 individuals (mean age 77.8 years). These individuals attended health promotion classes in 2005 and 2006 and were available for follow-up measurements in 2025. Cardio-Ankle Vascular Index (CAVI), an arteriosclerosis index, was measured using the Vasera blood pressure pulse wave analysis device. Using the mean CAVI change of 1.32 over 20 years as the baseline, we compared two groups: 8 participants with low increase (low group) and 12 participants with high increase (high group). Grit was assessed at follow-up using the Japanese version of the Grit-S scale, where the Grit score was calculated as the mean of eight items. Statistical analysis involved covariance analysis, controlling for medication use as a confounding factor. [Results] The mean change in CAVI over 20 years was +0.36 in the low group and +1.95 in the high group ($p < 0.001$). Grit scores were 3.6 in the low group and 2.9 in the high group ($p = 0.029$). [Conclusion] Previous studies reported an age-related increase in CAVI of approximately +1.0 over 20 years. In comparison, the low group exhibited significantly lower values and the high group showed correspondingly higher values. Furthermore, reports indicate that high Grit is associated with greater persistence in physical activity and better mental health. Thus, Grit appears to influence atherosclerosis indirectly through sustained health behaviors. High Grit was found to be associated with suppressed increase in CAVI over 20 years.

Keywords : CAVI, arteriosclerosis, Grit

290.

The effects of walking with two special poles practiced by elderly people on the mind and body: Case report of improved cognitive function

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[Background and Purpose] Gait is increasingly seen as a predictor of daily function and healthy life expectancy, often called the sixth vital sign. Walking promotes health and, unlike medication, has no side effects. It is also used clinically to support cognition. This report examines the cognitive effects of pole-assisted walking (SW), a full-body exercise using two poles to engage upper and lower limbs, in an older adult. [Methods] To assess SW as a cognitive intervention, three tests were done before and after a 30-minute session: the Trail Making Test (TMT) for attention and working memory, and two reaction time tests using falling rods and light stimuli. These tools were chosen to detect changes in executive function and speed. Improvement was defined as reduced reaction or completion time. [Results] After SW, the participant showed a shorter TMT time and faster reactions in both reflex tests. All assessments showed significant improvement ($p < 0.01$), suggesting temporary cognitive enhancement. [Discussion and Conclusion] SW involves rhythmic, alternating limb movement that may stimulate the central nervous system through bilateral coordination. These findings suggest SW is a practical, low-risk way to support cognition in older adults. Further research should confirm TMT's responsiveness and explore long-term effects.

Keywords : fitness walking using special poles, cognitive function in the elderly, trail making test

292.

Effects of regular intake of Ishizuchi dark tea on blood glucose levels and arterial stiffness in young participants

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[Aims] Ishizuchi dark tea is produced in Saijo City, Ehime Prefecture, and is considered one of only four post-fermented teas in Japan, often referred to as a "legendary tea". The objective of this study was to examine the effects of regular Ishizuchi dark tea intake on blood glucose levels and arterial stiffness in young adults. [Methods] Sixteen healthy young adults (10 males and 6 females, 21.5 ± 0.3 years) participated in this randomized crossover trial with a one-week washout period. First, fasting glucose levels and brachial-ankle pulse wave velocity (baPWV) were assessed (Pre), and then the participants ingested either green (G tea) or Ishizuchi dark teas (I tea) of 200 mL/day for 9 consecutive days. On day 10, baseline repeated measurements, the 10th tea intake, and a 75 g oral glucose tolerance test (OGTT) were conducted. [Results] Nine days of G or I tea intake reduced blood glucose levels compared to Pre, but not baPWV. During the OGTT on day 10, a tendency toward a slight attenuation in the increase of baPWV was observed in the I tea condition compared to the G tea condition. [Conclusions] These results suggest that regular Ishizuchi dark tea intake, similar to green tea, may lead to a slight reduction in fasting blood glucose levels in young adults. Although glucose elevation following the OGTT is not affected, regular Ishizuchi dark tea intake tends to suppress increases in arterial stiffness.

Keywords : post-fermented tea, blood glucose level, cardio ankle vascular index

293.

Effects of long-term shigin practice on arterial function, autonomic nervous activity, and respiratory function: a cross-sectional study on the health benefits of traditional breathing techniques

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[Aim] Shigin, a traditional Japanese vocal art, involves reciting classical poetry using deep, sustained diaphragmatic breathing. This cross-sectional study investigated the potential correlation between long-term shigin practice and reduced arterial stiffness. [Methods] The study comprised 35 individuals in the shigin group (≥ 10 years of experience) and 19 control participants from the same community who did not exercise regularly. Arterial stiffness was assessed using the Arterial Velocity Pulse Index (AVI) and the Arterial Pressure-Volume Index (API). Additionally, systolic blood pressure (SBP), mean blood pressure (MBP), diastolic blood pressure (DBP), pulse pressure (PP), heart rate (HR), heart rate variability, salivary α -amylase activity, and peak expiratory flow (PEF) were measured. [Results] The shigin group exhibited significantly lower AVI, API, SBP, MBP, DBP, and salivary α -amylase activity, along with significantly higher parasympathetic nerves, and PEF, compared to the non-shigin group ($p < 0.05$). Furthermore, a negative correlation was found between AVI and API and PEF ($r = -0.6$, $r = -0.5$, $p < 0.05$, respectively). [Conclusion] These findings suggest that regular shigin practice may enhance respiratory function, reduce stress markers, and improve vascular health through vocal training grounded in sustained breathing.

Keywords : shigin, arterial stiffness, peak expiratory flow

295.

Health issues in young males; Comparison between high school athletes and retired university students

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[Objective] To clarify the differences in health issues in young males by comparing the results of health checkups between high school athletes (HSA) and university students (US) who have retired from sports clubs. [Method] Blood samples were taken, and body composition and bone mass were measured for HSA ($n=46$, 16.5 years) and first-year US who had previously belonged to sports clubs ($n=52$, 18.5 years). [Results/Discussion] The HSA mostly exercised for more than 3 hours a day (39%) and 7 days a week (59%), while 42% of US had no exercise habits. There was no significant difference in BMI between the two groups, but HSA had a significantly lower body fat percentage. There was no significant difference in hemoglobin levels between the two groups, but the ferritin levels were significantly lower in HSA. CPK, uric acid, and AST/ALT were significantly higher in HSA, suggesting muscle fatigue and hemolysis. US showed significantly lower HDLC, higher LDLC/HDLC, and lower bone mass. The majority of US (52%) retired from sports club activities due to entrance exam preparation, which may decrease their physical activity. [Conclusion] This study suggests the existence of health problems associated with relative energy deficiency (REDs) during sports club activities, and the possibility that health problems associated with relative energy surplus may quickly appear after retirement from sports club activities.

Keywords : male, high school athletes, university students

294.

Survey on high school students' awareness of Tobacco

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Background; Kanagawa Prefecture has long been actively engaged in anti-smoking. While the harmful effects of tobacco are now widely known and the number of smokers is declining, a certain number of smokers remain, and smokers can be seen in various places. When high school students reach the legal smoking age, they may start smoking out of curiosity or because smokers are familiar figures in their lives. Prevention education is crucial to prevent them from becoming smokers in the future. Objective; The objective was to prevent high school students from becoming smokers even after reaching the legal smoking age. Method; A lecture was given to first-year high school boys, followed by a questionnaire survey about tobacco. Results; Most students held negative impressions of tobacco. Regarding smoking's impact on physical health, most students responded that it has harmful effects. However, some students felt smoking could be beneficial for mental health (emotional stability, stress relief). They also demonstrated insufficient understanding of the meaning of secondhand smoke. Discussion; Students sufficiently understand that smoking, tobacco smoke, and tobacco odor have detrimental effects on the human body. That is, they understand it can cause illness. However, a small number of students did feel that smoking might help with mental stability. While it is a steady effort, it is important to continue smoking prevention education for them and to persist in activities aimed at preventing them from becoming smokers.

Keywords : smoking, tobacco, health

296.

The Impact of Participating in an Experiential Disaster Preparedness Camp on Health Crisis Awareness Among Physical Education University Students

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[Aims] This study aimed to clarify the effect of an experiential disaster prevention camp on improving health crisis response awareness in physical education university students. [Methods] The subjects were 16 university students enrolled in physical education programs. A two-day, one-night disaster prevention camp was conducted at the Japan Ground Self-Defense Force's Nihonbara Garrison in September 2024, where participants experienced practical programs including marching drills, emergency first aid training, and tent setup. Changes in awareness were measured before and after participation using the Disaster Awareness Scale (five factors: disaster situation imagination, sense of crisis, other-directedness, etc.). [Results] Significant improvements were observed in two of the five factors: Imagination of Disaster Situations and Other-Orientedness ($p < 0.05$). Furthermore, over 95% of participants reported satisfaction with the program content, with all participants evaluating the emergency first aid training as beneficial. [Conclusion] Experiential disaster prevention camps are an effective method for health crisis response education for physical education university students. Future efforts should focus on developing educational programs that promote behavioral change and implementing them through multi-professional and multi-organizational collaboration.

Keywords : disaster preparedness, experiential learning, physical education students

297.

Relationships between physical activity vs psychological state and social evaluation in persons with disabilities

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[Aim] There is a need for a society where persons with disabilities (PWDs) can live actively and work with motivation. However, PWDs reportedly have low physical activity due to limited environment for exercise, which may lower psychological state and social evaluation, and heighten risks for lifestyle-related diseases (LSDs). Here, we examined whether the physical activity level was related to psychological state, social evaluation, and LSD score in PWDs. [Methods] We studied individuals ($n=69$, 49 ± 17 (SD)yr, 48 ambulatory (AMB) and 21 wheelchair users (WC)) who had a disability certificate and worked in a regular job or in a social welfare workshop. We measured physical activity with a pedometer for 7 consecutive days, and evaluated psychological state by POMS[®]2, social evaluation by wages, and health status by LSD score. [Results] Physical activity was 8835 ± 4475 and 748 ± 676 steps in AMB and WC, respectively. When subjects were divided into high and low groups according to the average step in AMB and WC, respectively, the high group for AMB and WC had higher T-scores in the POMS[®]2 subscales of vigor-activity ($P=0.002$) and friendliness ($P=0.006$) and higher rating in the wage evaluation than those in the low group for AMB and WC ($P<0.001$), whereas LSD score was not different between the groups ($P=0.29$). [Conclusion] More physically active PWDs are more vigorous and friendly and receive higher social evaluation.

Keywords : persons with disabilities, physical activity, psychological state

299.

Association between smoking behavior and Stages of Change in dietary behaviors among male collegiate baseball players

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[Aims] High rates of smoking have been reported among some athletes. However, the actual prevalence of smoking among university baseball players remains unclear, and its association with the stages of change in dietary behavior are yet to be sufficiently determined. We examined the association between smoking habits and the stages of change in dietary behavior among university baseball players. [Methods] Participants were 37 male athletes aged ≥ 20 and among whom a questionnaire survey was conducted in January 2025, assessing basic demographics, smoking habits, smoking cessation status, and stages of change in dietary behavior. [Results] The prevalence of smoking among participants was 27.1%, with all smokers residing in dormitories or private lodgings. With respect to the cessation of smoking, 90% of smokers were in the pre-contemplation stage, whereas with regards to dietary change, smokers were more likely than non-smokers to be in earlier stages and less likely to be in later stages ($p<0.01$). In contrast, all former smokers were in the later stages of a change in dietary behavior. [Conclusions] Smokers were characterized by a lower awareness of both smoking cessation and dietary behavior, thereby indicating a potential association between the two. Our findings in this study indicate an association between smoking habits and stages of change in dietary behavior among collegiate baseball players.

Keywords : smoking, stages of change, collegiate athletes

298.

Examination of factors contributing to directional and spatial orientation abilities aimed at preventing dementia

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[Backgrounds] The primary symptom of Alzheimer's disease is impaired spatial orientation and directional awareness. [Aims] This study aims to determine whether spot-the-difference help enhancing cognitive function test scores and directional and spatial orientation abilities. [Methods] A cognitive function test called the Maze Test, measures directional and spatial orientation abilities, was conducted to 206 male and female university students. After completing a spot-the-difference quiz, they took the same test again. Lifestyle were also surveyed, and analyses were done based on various factors like gender. Also, for 14 male and female university students, experiments were done following the same procedure as described above while measuring electroencephalography and autonomic nervous function to check brain activity during the experiment. [Results] Significant differences were observed in the number of correct answers on the Maze Test by gender. Besides, as for Maze Test, no significant differences were found in the ratio of electroencephalography, autonomic nervous function values, and gender differences before and after vision training. [Conclusions] Gender is one factor influencing directional and spatial orientation abilities, and vision training contributes to improving these abilities. Furthermore, only transient vision training is insufficient to influence electroencephalography and the autonomic nervous function.

Keywords : directional and spatial orientation abilities, vision training, maze test

300.

Changes in physical activity and exercise motivation among older adults during the COVID-19 pandemic: a comparison between continuing and withdrawing participants in an exercise class

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[Purpose] This study compared changes in physical activity and exercise motivation between older adults who continued participation in an exercise class and those who withdrew after its reopening following pandemic-related suspension. [Methods] Participants were 34 older adults who had previously attended a community-based exercise class. The class was suspended during the pandemic and resumed thereafter. Twenty-three participants continued and 11 withdrew. Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ) before, during, and after the pandemic restrictions. Exercise motivation during the restriction period were retrospectively evaluated. [Results] Weekly physical activity (min/week) was 229 ± 132 , 187 ± 137 , and 190 ± 111 in the continuation group, and 152 ± 109 , 86 ± 40 , and 168 ± 104 in the withdrawal group before, during, and after restrictions, respectively. Two-way ANOVA (group $\times$ time) revealed no significant interaction. Regarding exercise motivation during restrictions, 26% of the continuation group and 73% of the withdrawal group reported a decline, while 17% and 9% reported an increase, respectively, indicating a significant group difference. [Conclusion] Older adults with decreased activity and exercise motivation during the COVID-19 pandemic were more likely to drop out after class reopening.

Keywords : stay-at-home order, frailty under pandemic conditions

301.

The effects of sedentary time on weekdays and weekends among university students on their vitality for campus life

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[Aims] In working adults, daily sedentary time has been shown to affect work engagement. However, the relationship between vitality for campus life and sitting time has not been sufficiently examined. The purpose of this study was to examine the effect of university students' sedentary time on weekdays and weekends on their vitality in campus life. [Methods] The study participants were Fifty-two university students who were not affiliated with any athletic clubs or circles. Physical activity levels were measured for one week, and participants also completed a questionnaire survey regarding their vitality levels in everyday campus life. For each of the nine questions asking about the frequency of feeling vigor and enthusiasm in daily campus life, participants were divided into two groups: those who answered below the median (low group) and those who answered above the median (high group). Then, differences in sedentary time between the groups were examined. [Results] Regarding weekday sitting time, the low group showed significantly longer sitting time than the high group only in one item related to vitality. On the other hand, regarding weekend sitting time, the low group showed significantly longer sitting time than the high group in four items related to vitality, enthusiasm, and absorption. [Conclusion] The results suggest that students who spend more time sitting on weekends feel less energetic and enthusiastic about their campus life, and that students who spend less time sitting feel more fulfilled with their campus life.

Keywords : sedentary time, vitality, student

303.

Effects of an online exercise intervention on physical and mental health in postpartum women

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Aims This study aimed to examine the effectiveness of a home-based, self-directed online exercise program for postpartum women. We investigated its impact on psychological well-being, physical awareness, subjective health status, and somatic symptoms through a 4-week intervention. **Methods** Thirty postpartum women (3 months to under 2 years after childbirth) participated in a program consisting of two weekly online lessons (e.g., stretching, strength training) and over 90 minutes of self-directed exercise (e.g., walking) per week. Pre- and post-intervention assessments included psychological indicators (WHO-5, positive/negative affect), physical awareness (Koji Awareness score), subjective health, and somatic symptoms. **Results** Psychological indicators improved, with increases in WHO-5 and positive affect, and a decrease in negative affect. The Koji Awareness score increased significantly from 39.9±5.4 to 44.4±4.3. The proportion reporting positive health change rose from 13.3% to 53.3%. Swelling, a common symptom, was also alleviated, with those concerned dropping from 70% to 23%. **Conclusion** These findings suggest that this program may be an effective way to support both the physical and psychological well-being of postpartum women.

Keywords : postpartum women, online exercise program, well-being

302.

Associations of Sedentary Time and Exercise Habits with Arterial Function, Cognitive Function, and Physical Fitness in Middle-Aged and Older Adults

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[Aims] This study aimed to examine the associations of sitting time and exercise habits with arterial, cognitive, and physical functions in middle-aged and older adults. [Methods] A total of 742 community-dwelling adults aged 40 years and older who participated in physical fitness assessments were included. Measurements included brachial-ankle pulse wave velocity (baPWV), Trail Making Test (TMT-A, TMT-B), handgrip strength, 30-second chair stand (CS-30), 6-minute walk (6MWT), 8-foot up-and-go (8UG), and sit-and-reach. Participants were categorized into middle-aged (40-64 years; men: 53.8 ± 5.9, women: 52.9 ± 5.9) and older (65 years; men: 75.0 ± 5.8, women: 74.3 ± 6.0) groups, and further divided into four subgroups by sitting time (≥8 h/day or <8 h/day) and exercise habits (≥2 times/week for ≥30 min). [Results] Multivariate analysis revealed no significant differences among groups in older men (P = 0.097). In contrast, significant differences were observed among older women (P = 0.009). Post hoc analyses indicated significant group differences in CS-30, 8UG, and sit-and-reach performance. No significant differences were found among groups in middle-aged men (p = 0.096) or women (p = 0.244). [Conclusions] Older women with regular exercise habits showed better physical fitness performance regardless of sitting time. In contrast, no significant associations were observed between sitting time or exercise habits and arterial or cognitive function.

Keywords : sedentary behavior, exercise habits, middle-aged and older adults

304.

How much continuous sedentary time do older women spend per day?

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[Aims] This study sought to clarify the continuous daily sedentary time among older women.

[Methods] Ten older women (mean age: 80.0 ± 2.9 years) wore a physical activity monitor with a built-in triaxial accelerometer around their waists from the time they woke up until they went to bed for one week. The first and last non-zero intensities displayed on the accelerometer from 3:00 AM onward were defined as the wearing and removal times, respectively. The duration between them was defined as the measuring time; sedentary time was defined as the duration for which the intensity was 1.5 or less, and a bout was defined as the duration until the intensity exceeded 1.5.

[Results] The mean measuring time, sedentary time, and longest bout over the seven-day period were 821 ± 94 minutes, 470 ± 89 minutes (57 ± 10% of the wearing time), and 86 ± 29 minutes, respectively. The average wearing time was 6:07 AM, with a variation of 36 ± 20 minutes. The average removal time was 7:57 PM, with a variation of 96 ± 48 minutes.

[Conclusions] These results are consistent with those of previous studies, which found that sedentary time accounted for 60% of older adults' daily lives. In physical activity surveys using a monitor with only an acceleration sensor, no set method for determining measuring time exists. This suggests the possibility of using a simple algorithm using an acceleration of 0 to determine measuring time.

Keywords : older women, sedentary time, physical activity monitor

305.

Relationships between motor function health factors quality of life social attributes and related cognitive function in the community-dwelling Elderly

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[Aim] Few studies have linked motor ability, health factors, quality of life social attributes and related cognitive function in the community-dwelling Elderly. [Methods] The number of elderly over 65 participated in the study was 28 (average age:78.7 years). [Results] The Haga's Quesionaire-22 was used as an indicator of lifestyle, with 22 points or higher (perfect score) indicating health lifestyle. Information on 3 for motor ability 13 for functional capacity and 5 for social attribute was also obtained. Multiple regression was used to calculate the odds ratio for each factor on lifestyle. Subjects in higher lifestyle had a higher medium score for motor ability, functional capacity than those in poor lifestyle. lifestyle, motor ability and functional capacity, physiological situation are significantly correlated with each other. [Conclusions] Those results suggest that improvement of lifestyle in old age is considerably effective for preventing decline in functional capacity and motor ability, physiological situation and promoting successful aging.

Keywords : cognitive function, motor abilitie, successful aging

307.

A lifestyle review sheet for prevention and effective treatment of metabolic syndrome

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[Aims] We developed a lifestyle reflection sheet for preventing and treating metabolic syndrome. Our tool aimed to help local residents identify their risk factors for metabolic syndrome, recognize areas for improvement in their lifestyle habits, and proactively engage in health promotion. [Methods] We enrolled 1,146 patients, aged 18 to 92 years. Inclusion criteria were those who underwent health checkups at Mine City Hospital and answered a lifestyle questionnaire. We hypothesized that individuals with conditions related to metabolic syndrome have undesirable lifestyle habits. To test this hypothesis, we conducted logistic regression analysis to examine the probabilities of metabolic syndrome, hypertension, hyperglycemia, and dyslipidemia. [Results] The results were displayed as similarity percentages, reflecting how closely the daily behaviors of individuals with these conditions aligned with the behaviors of those who had these specific health issues. Eight specific behaviors were selected for preventing and improving metabolic syndrome: diet-related, physical activity-related, health-related, and alcohol-related. The scores for these factors were calculated using a validated factor analysis. Each item was visualized by displaying a graph showing the standard deviation for all survey subjects. The sheet served as a reference tool for health guidance. [Conclusions] By utilizing this sheet, individuals could be individually notified of their risk of developing metabolic syndrome and the benefits of healthy behaviors.

Keywords : health promotion, behavioral change, lifestyle changes

306.

Physical fitness, physical activity, and non-cognitive characteristics of university freshmen who completed high school during the COVID-19 pandemic

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[Aim] Few studies have examined the physical fitness, physical activity, and non-cognitive skills (GRIT) of university freshmen whose high school education was affected by the COVID-19 pandemic. This study aimed to examine differences in physical fitness, physical activity, and GRIT between university freshmen who attended high school during the pandemic (2021-2024 academic year) and those who enrolled before it (2020 academic year), providing insights for future physical education programs. [Methods] At the faculty of education at K University, university freshmen are assessed each April on their physical characteristics (height, weight, %body fat), physical fitness (grip strength, sit-and-reach flexibility, standing long jump, sit-ups, side-to-side jumps, and $\dot{V}O_{2max}$), physical activity (steps, sedentary time, screen time), exercise self-efficacy, interest in sports, and GRIT. These measurements and questionnaire responses are compared across different enrollment years. [Results] University freshmen admitted in the 2024 academic year showed lower scores in side-step and sit-up performance, as well as reduced GRIT, compared to previous years. Sedentary and screen time tended to be longer. Female students had longer sedentary time and lower exercise self-efficacy and interest in sports than males. [Conclusion] University freshmen who completed high school during the pandemic may have lower physical fitness and GRIT. University physical education programs should consider this trend and aim to improve both physical fitness and GRIT through targeted programming.

Keywords : university freshmen, physical fitness, non-cognitive skills (GRIT)

308.

Association between physical activity and quality of life among remote workers: a cross-sectional study

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[Aims] This study aimed to examine the association between physical activity and quality of life (QOL) among remote workers. [Methods] Participants were employees who engaged in remote work at least one day per week. Physical activity was measured using an accelerometer, including step count, sedentary time, moderate-intensity physical activity (MPA), and moderate-to-vigorous physical activity (MVPA). QOL was assessed using the MOS 36-Item Short-Form Health Survey (SF-36), which provides eight domain scores: physical functioning (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH). Participants were divided into tertiles based on physical activity, and QOL domain scores were compared across groups using nonparametric tests. [Results] A total of 94 participants (71 males, 44.7 ± 10.9 years) were included. The mean daily step count was 5152 steps, with 630 min of sedentary time, 36 min of MPA, and 37 min of MVPA. Step count was positively associated with RP, GH, and VT scores, while sedentary time was negatively associated with GH, VT, and MH scores. MPA and MVPA were positively associated with VT. [Conclusions] Among remote workers, maintaining sufficient physical activity is crucial for preserving and enhancing QOL. These findings highlight the importance of implementing physical activity promotion strategies within remote work environments.

Keywords : physical activity, remote work, quality of life

309.

The relationship between Physical Activity and healthcare costs among healthy individuals: A Scoping Review

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¹Teikyo University Graduate School of Public Health, ²Department of Preventive Medicine and Public Health, Tokyo Medical University [Aims] This scoping review examined epidemiological studies on the association between physical activity and healthcare costs among Japanese adults to identify research gaps. [Methods] Following scoping review guidelines, we searched PubMed and Ichushi-Web for Japanese or English peer-reviewed articles. Inclusion criteria were: (1) studies on physical activity and healthcare costs in Japanese populations, (2) original peer-reviewed articles, and (3) studies involving healthy adults. Eligible studies were screened by title, abstract, and full text, and data were extracted on design, participants, exposure and outcome measures, and key findings. [Results] Of 544 articles, 21 met the criteria. Sample sizes ranged from 27 to 51,213. The studies included 12 observational, 3 interventional, 3 quasi-experimental, and 3 simulation studies. Exposures included walking/physical activity (12 studies) and exercise habits or program participation (7 studies). Outcomes were healthcare costs (20 studies), long-term care costs (5), and QALYs (2). Fifteen studies (71%) reported that physical activity was associated with lower healthcare costs. [Conclusions] Many studies indicated potential cost-reduction effects of physical activity, though methodological differences require cautious interpretation.

Keywords : physical activity, healthcare costs, scoping review

311.

Factors influencing physical activity under the COVID-19 state of emergency: The JACSIS 2020 study

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[Aims] Since late 2019, the COVID-19 pandemic has limited daily activities, reducing physical activity and raising concerns about lifestyle-related diseases and psychological stress. Some individuals, however, maintained or increased activity during lockdowns. Clarifying changes in activity and their determinants after the first wave of COVID-19 is essential for balancing infection control with health. This study examined changes in physical activity after the state of emergency and identified related factors. [Methods] Data were drawn from the nationwide JACSIS study conducted in August 2020. Subjective changes in activity compared with before January 2020 were classified as increased, unchanged, or decreased. Associations with fear of COVID-19 and sociodemographic factors were analyzed using ordered logistic regression. [Results] Among 25,482 valid respondents, 9.6% reported increased activity, 61.5% no change, and 28.9% decreased. Decreased activity was associated with age, fear of COVID-19, education, and trust in government policies. Gender was related to increased activity. [Conclusions] Activity changes after the state of emergency were influenced by psychological factors such as fear and social norms, and by gender. These findings underscore the need for psychological support in future outbreaks and disasters when developing health policies.

Keywords : physical activity, COVID-19, psychological factors

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Association of social frailty with depressive symptoms and step count in community-dwelling older adults

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[Aims] To investigate the interaction between DS and step count in relation to SF in community-dwelling older adults. [Methods] This cross-sectional study included 147 community-dwelling older adults aged 65 and over. SF was assessed using the criteria proposed by Makizako et al. DS were identified using the Geriatric Depression Scale (GDS-15-J), and participants were categorized into two groups based on a step count of 4,000 steps/day or more vs. less than 4,000 steps/day using an accelerometer. A two-way ANCOVA was conducted with DS (yes/no) and step count (4,000 or more/less than 4,000) as independent variables and the total number of positive SF components (range: 0 to 5) as the dependent variable, adjusting for covariates. [Results] There was a significant interaction between DS and step count on the number of positive SF components ($P=0.006$). Significant main effects were observed for DS and step count, with higher SF scores in participants with DS and those walking less than 4,000 steps/day (both $P<0.001$). Post hoc analyses revealed that step count did not significantly influence SF among those without DS, whereas participants with DS and low step counts showed significantly higher SF scores than those with higher step counts ($P<0.001$). [Conclusion] The combination of DS and low step count synergistically increased the risk of SF in community-dwelling older adults.

Keywords : social frailty, depressive symptoms, physical activity

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Association between the timing of sustained activity patterns and cognitive function in older adults

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[Aims] The timing and pattern of physical activity have been reported to be associated with health outcomes. In particular, afternoon activity has been associated with a lower risk of disease. Although sustained activity patterns have been associated with cognitive decline, the association between their timing and cognitive function remains unclear. This study examined the association between the timing of sustained activity patterns and cognitive function in older adults. [Methods] A total of 749 adults aged ≥ 65 years wore a triaxial accelerometer for 10 days. Sustained activity was defined as continuous activity exceeding 1.0 MET. The probability of each activity duration and the correlation coefficient with the $P(\tau) = \tau^1$ model were calculated for three time windows (5:00-11:00, 11:00-17:00, and 17:00-24:00). Participants were classified into morning, afternoon, or evening groups according to the windows showing the highest similarity to the model. Cognitive function was assessed using the Mini-Mental State Examination (MMSE). [Results] Males with suspected mild cognitive impairment showing sustained activity during the afternoon had lower MMSE scores than those showing sustained activity during the morning ($P<0.05$). [Conclusions] A sustained afternoon activity pattern was associated with lower cognitive function.

Keywords : physical activity, cognitive functions

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Psychosocial factors associated with leisure-time moderate-to-vigorous physical activity among breast cancer survivors: analysis based on nationwide survey data

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[Aims] Moderate-to-vigorous physical activity (MVPA) improves quality of life and reduces recurrence risk among breast cancer survivors. However, psychosocial factors that promote MVPA remain insufficiently understood. This study examined the associations between MVPA and behavioral stage of change, self-efficacy, social support, and advice from healthcare providers. [Methods] A self-administered survey was conducted among breast cancer survivors (stage 0-IIIa), with 791 valid responses. Variables included leisure-time MVPA (minutes/week via the Global Physical Activity Questionnaire), behavioral stage, self-efficacy, social support, and provider advice. Correlation analysis, multiple regression, ordinal logistic regression, and mediation analysis were performed. [Results] MVPA was positively correlated with behavioral stage ($r = 0.404$, $p < 0.001$); participants at higher stages engaged in more weekly MVPA. Multiple regression identified stage ($\beta = +30.6$), self-efficacy ($\beta = +20.1$), and provider advice ($\beta = +17.9$) as significant predictors (all $p < 0.001$). Each one-stage increase in stage was associated with 31 additional minutes of MVPA per week. Those who received advice engaged in 18 more minutes than those who did not. [Conclusions] To promote and sustain MVPA, it is important to provide stage-matched advice from healthcare providers, strengthen self-efficacy, and ensure social support.

Keywords : breast cancer survivors, physical activity, The transtheoretical model

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Improved absolute presenteeism associated with more movement and less sedentary behaviour in remote workers: findings from a cross-sectional study

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[Background] Remote work has become increasingly common since COVID-19. Evidence on the association between daily movements and presenteeism among remote workers remains limited. [Aim] This study aimed to examine associations between daily movement behaviours and absolute presenteeism in remote workers. [Methods] A cross-sectional study was conducted among 94 remote workers who worked from home at least once per week. Movement behaviours were assessed using accelerometers. Absolute presenteeism was measured using self-reported work performance scores from the WHO Health and Work Performance Questionnaire. Linear regression analyses were conducted. All regression models were adjusted for age, sex, BMI, education level, years of service, and accelerometer wear time. [Results] In the unadjusted model, each 1000-step increase and 10-minute increase in moderate-to-vigorous physical activity were significantly associated with 0.99- and 1.12-point improvements in absolute presenteeism, respectively ($\beta = 0.220$ and 0.217 , $p < 0.05$), while each 30-minute decrease in sedentary time was associated with a 1.03-point increase ($\beta = -0.282$, $p < 0.05$). These associations became non-significant after adjustment for covariates, whereas the trends remained consistent. [Conclusion] The study suggests that more physical activity and reduced sedentary behaviour were positively associated with improved absolute presenteeism among remote workers.

Keywords : physical activity, presenteeism, remote workers

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Factors associated with somatic symptoms in a Japanese population: a cross-sectional study

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[Aims] Somatic symptoms refer to physical discomforts. Previous studies have identified risk factors, including age, educational attainment and childhood psychological abuse; however, most of these studies focused on clinical populations, and research targeting the general Japanese population remains lacking. This study aimed to examine factors associated with somatic symptoms using large-scale Japanese population survey data. [Methods] Data were obtained from the Japan COVID-19 and Society Internet Survey (JACSIS). The primary outcome was being in the top quartile of somatic symptom severity. Explanatory variables included demographic characteristics and other factors previously reported in the literature. Logistic regression analysis was used to calculate odds ratios. [Results] The analytical sample consisted of 22,601 participants. Factors significantly associated with higher somatic symptom severity included sex, age, BMI, presence of current medical conditions, loneliness, childhood abuse experiences, mental health status, and physical activity level. Notably, physical activity showed an inverse association. [Conclusions] This study identified multiple factors associated with somatic symptoms in a general Japanese population. The inverse association between physical activity and somatic symptoms suggests that promoting physical activity may contribute to reducing somatic symptom burden.

Keywords : somatic symptoms, Japanese population, physical activity

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Association between neighborhood environments and fifth-grade student's physical fitness: a cross-sectional study using national survey

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[Aims] Few studies have examined neighborhood factors that are associated with adolescent's physical fitness. The purpose of this study is to clarify neighborhood environmental factors associated with adolescents' physical fitness using national survey of Japan. [Methods] We used individual data of national survey on physical fitness and motor ability and exercise habits in 2023. 858,916 fifth-grade adolescents were targeted for the analysis. Physical performance tests (e.g., grip strength, 50m sprint) were conducted and calculated total physical fitness score. Physical environments (e.g., parks, walkability) and social environments (e.g., areal deprivation, incidents of accident and crime) were assessed within participant's elementary school districts. [Results] We used multilevel linear regression analysis adjusted for participant's sex and height. More walkable, more deprived and less safe neighborhoods were significantly associated with lower level of physical fitness (walkability: $b = -1.23$, areal deprivation: $b = -0.23$, accident and crime: $b = -0.55$, $p < 0.01$ respectively). [Conclusion] Adolescents who have higher physical fitness are more likely to live in better social environments. This study suggest that it may be necessary to maintain social environments where adolescents can easily and safely go to sports environments even in socio-economically disadvantaged neighborhoods.

Keywords : physical fitness, elementary school students, neighborhood environment

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Association between segmental extracellular water-to-total body water ratio and prefrailty in community-dwelling older adults

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[Aims] The extracellular water-to-total body water ratio (ECW/TBW), derived from segmental multifrequency bioelectrical impedance analysis (S-BIA), is recognized as a marker of muscle quality. This study aimed to examine the associations between segmental ECW/TBW and prefrailty in community-dwelling older adults. [Methods] A total of 357 community-dwelling Japanese older adults (mean age: 74.7 ± 5.0 years; men, n = 97; women, n = 260) were included. Prefrailty was assessed using the Japanese version of the Cardiovascular Health Study criteria. Whole-body and segmental ECW/TBW ratios (arm, leg, trunk) were measured using a S-BIA device (InBody 770; InBody Japan Inc., Tokyo). Associations between ECW/TBW ratios and prefrailty were evaluated using binary logistic regression and receiver operating characteristic (ROC) analyses. [Results] In women, whole-body ECW/TBW (OR: 1.05, 95% CI: 1.00-1.11, $p < 0.05$) and leg ECW/TBW (OR: 1.06, 95% CI: 1.01-1.10, $p < 0.05$) were significantly associated with prefrailty, whereas no significant associations were observed in men. Among women, ROC analyses yielded under the curve (AUC) values of 0.636 for whole-body ECW/TBW and 0.650 for leg ECW/TBW (both $p < 0.001$). [Conclusion] In community-dwelling older women, whole-body ECW/TBW was associated with prefrailty, and among body segments, only leg ECW/TBW showed a significant association. These findings suggest that leg fluid balance may be an indicator of prefrailty in older women.

Keywords : muscle quality, segmental bioelectrical impedance analysis, prefrailty

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Association between personality traits and exercise habits among community-dwelling older adults

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[Aims] Personality traits have been reported to influence health behaviors, including exercise habits. In this study, the relationship between personality traits and exercise habits in older adults was examined. [Methods] The analysis included 732 men and women aged 60-79 years, who participated in an online survey. Regular exercise was defined as engagement in at least 30 min of physical activity twice a week, for at least one year. Personality traits were assessed using the Ten-Item Personality Inventory, which measures five major personality dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and openness. Multivariable logistic regression analysis was used to examine the association between personality traits and exercise habits, adjusting for sex, age, education, subjective economic status, chronic diseases, and social networks. [Results] Forty-seven percent of the total population had an exercise habit. The results showed that extraversion was positively associated with having an exercise habits (aOR, 1.37; 95% CI, 1.18-1.59). [Conclusions] Relatively high extraversion levels were associated with regular exercise habits. Exercise was thought to meet the needs and preferences of highly extraverted individuals, such as increased interaction with others, proactive self-health management, and enjoyment of physical exercise.

Keywords : personality traits, exercise habit, older adults

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Association between subjective walking speed and 5-year risk of developing metabolic disease in individuals with obesity

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[Purpose] We investigated the association between subjective walking speed and risk of developing metabolic diseases (HT, DM, or DL) within 5 years in individuals with obesity. [Methods] This study included 6,975 individuals with obesity (5,212 men and 1,763 women) aged 40-74 years, with BMI ≥25 or abdominal obesity (waist circumference ≥85 cm for men, ≥90 cm for women), who underwent a specific health examination. HT, DM, and DL were diagnosed based on the guidelines for each disease. Participants were classified into fast or slow subjective walking speed groups. The Cox proportional hazards model was used to examine the association between subjective walking speed and the onset of each metabolic disease, adjusting for age, sex, smoking, drinking, and exercise habits. [Results] Among individuals with obesity, those with fast subjective walking speed exhibited significantly lower risk of developing DM within 5 years (HR: 0.72, 95%CI 0.61-0.85, $p < 0.001$). No significant association was observed for HT and DL. [Conclusion] Subjective walking speed in individuals with obesity may be a useful predictor of DM onset within 5 years.

Keywords : subjective walking speed, metabolic diseases, obesity

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The Impact of Exercise-Induced Mechanical Stress on Gastrointestinal Damage

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[Aim] The purpose of this study was to examine the relationship between the magnitude of mechanical stress during running and the extent of gastrointestinal injury. [Methods] Twenty-two males participated in this study. They performed 60 min of treadmill running at 70 % of $\dot{V}O_{2max}$. We corrected ground reaction forces and accelerations at the tibia, lower back, and head. To evaluate shock attenuation throughout the body, the transfer function between body segments was calculated over the final 5 minutes of exercise (55-60 min) using the following formula: shock attenuation = $10 \times \log_{10} (PSD_{upper}/PSD_{lower})$, where PSD refers to power spectral density. Blood samples were collected before and after exercise to assess gastrointestinal injury, as indicated by plasma concentrations of intestinal fatty acid-binding protein (I-FABP). [Results] A significant positive correlation was observed between the tibia-to-lower back shock attenuation ratio and the relative change in I-FABP concentration ($r = 0.531$, $p < 0.05$). [Conclusions] Shock attenuation from the tibia to the lower back during running may play a protective role in mitigating the extent of exercise-induced intestinal injury.

Keywords : ground reaction force, acceleration, gastrointestinal damage