The association between health promoting school culture and workplace social capital: multi-level analysis.

Akira Kyan (1,2)
Kiyonori Masukawa (3), Minoru Takakura (1,4)

1 : Faculty of Medicine, University of the Ryukyus
2 : Center for Social Common Capital beyond 2050, Kyoto University
3 : Faculty of Education, Kanasai University of Social Welfare
4 : Graduate School of Sports and Health Sciences, Meio University

Health Promoting School is a whole-school approach integrating health into school culture, environment, and community engagement. A positive culture is essential for sustainable health promotion, while workplace social capital (WSC)—trust, reciprocity, and cooperation among colleagues—enhances organizational functioning and staff well-being. Yet little is known about its association with health promoting school culture. We conducted a cross-sectional survey of 148 public high schools in A Prefecture. Participants were staff responsible for school health, including principals, health division heads, committee members, yogo teachers, and PE teachers. Data were collected between November and December 2023 via an anonymous web-based questionnaire. Of 1,605 respondents, 1,090 were included in the final analysis. Health Promoting School Culture was assessed using the Health Promoting School Culture Scale (Kalubi et al., 2023) translated into Japanese, with three factors: (1) teacher commitment to student health, (2) physical environment, and (3) parent/community engagement. WSC was measured using the validated 8-item scale (Kouvonen et al., 2006), covering bonding, bridging, and linking. Associations were examined using multilevel linear models with individuals (Level 1) nested within schools (Level 2), adjusting for demographic and occupational covariates. Analyses showed significant positive associations between WSC and school culture. Individual-level coefficients ranged from $\beta = 0.060$–0.092, while school-level coefficients ranged from $\beta = 0.064$–0.219, with stronger effects at the school level. Bonding and bridging showed stronger associations, whereas linking had smaller effects ($\beta \approx 0.065$–0.071). Similar patterns were found for teacher commitment and school environment subscales. Strengthening social capital may enhance the development and sustainability of health promoting schools.

Association of circulatory proteins with risk of back pain: a Mendelian randomization study

Chun Yin Gabriel Sung (1)
Shiu Lun Au Yeung (1)

1 : School of Public Health, LKS Faculty of Medicine, The University of Hong Kong

Background : Back pain (BP) is a major contributor to years lived with disability worldwide due to population aging. Since BP is often idiopathic, there are no standard effective treatment strategies. At such, identifying potential drug targets with proteomics for prevention is of public health importance.

Methods : We conducted a two-sample, cis-Mendelian randomization study with the use of genome-wide association studies (GWAS) summary statistics of populations with European ancestry. We assessed the causal role of 1,756 circulating proteins from the UK Biobank Pharma Proteomics Project (N=54,219) with risk of BP and 4 related structural pathologies, including ankylosing spondylitis, spinal stenosis, intervertebral disc disorder, and lumbar disc herniation (N=450,630 to 1,028,947). Main analyses were Wald ratio (1 instrument) and inverse variance weighted method (2+ instruments), with Bonferroni correction to correct for multiple testing ($p < 2.85 \times 10^{-5}$). Genetic colocalization was conducted to assess whether the observed associations were due to confounding by linkage disequilibrium.

Results : Amongst 1,756 circulatory proteins, 4 proteins were associated with BP, 1 with intervertebral disc disorder, and 5 with lumbar disc herniation, all with strong evidence of colocalization ($PP.H_4 \geq 0.80$). Of note, genetically predicted cadherin 6 (CDH6) was associated with elevated risks for both back pain (Odds ratio (OR) = 1.04 per standard deviation (SD), 95% Confidence Interval (CI) [1.03–1.06], $PP.H_4 = 0.98$) and intravertebral disc disorder (OR = 1.04 per SD, 95% CI [1.02–1.06], $PP.H_4 = 0.96$), whilst elevated apolipoprotein E (*APOE*) was associated with higher risk of back pain (OR = 1.06 per SD, 95% CI [1.03–1.08], $PP.H_4 = 1.00$).

Conclusion : We identified 9 proteins associated with BP risks. Our study provides genetic validation in exploring possible reposition of medications which act upon these proteomic pathways.

Identification of nutrient–proteome relationships associated with Uric Acid: UKB and YMoC study

Hinako Nishikawa (1)
Keita Naito (1), Go Goto (1,2), Daisuke Hanawa (1), Shu Kanai (1), Ken Ando (1), Momoko Awaji (1), Tadao Ooka (1)
1 : Department of Health Sciences, University of Yamanashi
2 : Dept. of Orthopedic surgery,University of Yamanashi

Background : Serum uric acid (UA) is linked to gout and cardiometabolic diseases. Plasma proteins can reveal biological pathways, and diet is a major modifiable factor influencing UA levels.

Objective : To identify proteomic biomarkers for UA, validate them across cohorts, and assess their links to dietary patterns.

Methods : In a two-stage design, protein data underwent quality control, log2 transformation, and z-standardization. Protein–UA associations were identified in the UK Biobank (UKB; N=41,946; 54.1% female; mean age 56.8±8.2 years) using covariate-adjusted linear regression with Benjamini–Hochberg FDR ($q<0.05$). Findings were validated in the Yamanashi multi-omics cohort (YMoC; n=162; 40.1% female; mean age 54.2±7.3 years), requiring concordant direction and significance (FDR $q<0.05$). Significant proteins were then used for dietary analysis. Spearman's partial rank correlations between the identified proteins and energy-adjusted dietary intake from the Food Frequency Questionnaire (FFQ) were estimated, adjusting for age, sex, BMI, smoking, physical activity, and income. Multiple testing for nutrient–protein pairs was controlled using FDR <0.1.

Results : Eleven proteins showed replicated associations with UA across UKB and YMoC (e.g., apical endosomal glycoprotein [MAMDC4], beta-Ala-His dipeptidase [CNDP1], heat shock protein beta-6 [HSPB6]; $q<0.05$, respectively). In YMoC, 14 significant nutrient–protein associations were identified. Ethanol was positively associated with MAMDC4 ($r = 0.436$, $q<0.001$), and niacin with CNDP1 ($r = 0.265$, $q = 0.0039$). Cereal intake was positively associated with HSPB6 ($r = 0.220$, $q = 0.0183$) and inversely associated with CNDP1 ($r = -0.233$, $q = 0.0183$).

Conclusion : We identified links between dietary intake and UA-associated proteins. Alcohol, cereals, and niacin may influence UA via proteomic pathways. Further research is needed to confirm causality through dietary intervention studies.

Working Conditions and Self-Rated Health among Childcare Teachers: A Nationwide Multilevel Study

Tomosa Mine (1)
Satoshi Tsuboi (2), Junko Minowa (1)

1 : Department of Early Childhood Education and Care, Musashino University
2 : Department of Hygiene and Preventive Medicine, Fukushima Medical University

Background : Work environments involving breaks, overtime, and bringing work home affect health. In workplace in Early Childhood Care, difficulties taking breaks, overtime, and bringing work home have been reported, but studies on their health impacts remain limited. This study examined the relationship between working conditions (breaks, overtime, bringing work home) and self-rated health (SRH) among childcare teachers at individual and workplace levels, and the association between teachers' SRH and managers' conditions.

Methods : From February to May 2024, questionnaires were sent to managers and childcare teachers at 5,000 randomly selected childcare facilities in Japan. The survey collected demographics, work conditions, and SRH. SRH was measured on a four-point scale; "very healthy" and "healthy" were classified as healthy, while "not very healthy" and "not healthy" as unhealthy. Difficulties in taking breaks, overtime, and working at home were grouped into three categories. Multilevel logistic regression estimated crude and adjusted odds ratios at individual and workplace levels. Managers' working conditions were added to assess changes in odds ratios.

Results : A total of 998 facilities responded (19.9%). The analysis included 2,540 childcare teachers with administrator information (valid rate: 93.1%). Of these, 2,254 (88.7%) were classified as healthy and 286 (11.3%) as unhealthy. Overall, 35.7% reported few or no breaks, 44.1% worked overtime, and 43.1% brought work home. Logistic regression showed that difficulty taking breaks, overtime, and bringing work home were significantly associated with poor SRH. Multilevel analyses confirmed these factors at both levels were linked to poor SRH. Including managers' conditions altered some odds ratios, indicating the role of workplace management.

Conclusion : Both individual- and workplace-level conditions were associated with childcare teachers' SRH, and managers' practices also influenced staff health.

Associations of sleep quality and quantity with menstruation-related symptoms in middle-aged women

Shoko Nukui (1)
Etuko Ozaki (1,2), Kazuya Setoh (2), Daisuke Matsui (2), Naoyuki Takashima (2)

1 : Department of Nursing, Faculty of Health and Medical Sciences, Kyoto University of Advanced Science
2 : Department of Epidemiology for Community Health and Medicine, Kyoto Prefectural University of Medicine

Introduction : Menstrual hormonal fluctuations impair daily life through physical and psychological changes, defined as menstruation-related symptoms (MRS). Although sleep affects MRS along with diet and exercise, its effects have not been well studied in middle-aged women. This study examined both sleep quantity and quality in relation to MRS.

Method : Subjects were 535 women in their 40s, participating in the J-MICC study at Kyoto field. Sleep quality and MRS were evaluated by Pittsburgh Sleep Quality Index (PSQI-J) and Menstrual Distress Questionnaire (MDQ), through a self-reported questionnaire. MRS at the premenstrual (pre-M), menstrual (M), and postmenstrual (post-M) phases were assessed. Subjects were divided into groups by two criteria of sleep condition. The sufficient sleep group included women with ≥6 h duration for quantity, or PSQI-J<6 for quality. MRS were assessed between groups under each classification using the Mann–Whitney U test.

Result : Mean age was 44.4. The numbers of sufficient sleepers were 409 for duration, and 179 for sleep quality. Mean MDQ scores were 17.5 (pre-M), 15.8 (M), and 3.7 (post-M). The MDQ scores in sufficient sleep groups were lower at all three phases. Significant differences were observed for both sleep duration and sleep quality: pre-M ($p=0.019$ and $p<0.001$), M ($p=0.006$ and $p<0.001$), and post-M ($p=0.047$ and $p=0.020$). The MDQ subscale scores for pre-M *Pain* ($p<0.001$), *Behavioral Changes* ($p=0.006$), *Autonomic Imbalance* ($p=0.048$), and *Fluid Retention (FR)* ($p=0.036$) were significantly lower in the ≥6h sleep group. *Pain* score was also lower at the M ($p=0.002$) and post-M ($p=0.003$) phases. Post-M MDQ subscale scores except *FR* were lower among the group with PSQI-J <6.

Discussion : MRS were linked to both sleep quantity and quality. Most post-M MDQ scores were lower with good sleep quality. Improving sleep quality may help women with severe MRS, while adequate duration remains important.