Seasonal Influenza in Elementary Schools: Hierarchical Bayesian Analysis Within/Between Schools

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Background and Objective : Seasonal influenza remains a major public health concern, with schools playing a key role in its spread. Outbreak size varies considerably among schools, grades, and classes, but the reasons are poorly understood. This study aimed to identify factors contributing to outbreak variability by analyzing school, grade, and class hierarchies using Bayesian methods.

Methods : During the 2018/2019 season, a survey was conducted among all 23 public elementary schools in Isesaki City, Gunma Prefecture. Parents reported physician-confirmed influenza diagnoses and provided background information. Hierarchical Bayesian logistic regression was used, modeling random effects at the school, grade, and class levels. Four models were compared, progressively adding hierarchical levels, and model fit was assessed using Bayesian R^2 and AUC.

Results : Among 11,684 eligible children, 10,151 (86.9%) were analyzed. Significant fixed effects included grade, sex, underlying disease, vaccination, and handwashing. Model fit improved with hierarchical structure from model1 to model4 (R^2: 0.023 → 0.067; AUC: 0.59 → 0.67). Random-effect variances were higher at the grade (0.35) and class (0.36) levels, exceeding school-level variance (0.12).

Conclusion : Influenza transmission showed greater variability within grades and classes than between schools. These findings suggest that class-targeted interventions may be more effective than school-wide measures for outbreak control.

Association between sleep quality and overweight after the Great East Japan Earthquake

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Background : Following the Great East Japan Earthquake, lifestyle changes and psychological stress associated with evacuation led to a sustained increase in individuals reporting poor sleep quality. In Fukushima Prefecture, the prevalence of metabolic syndrome and overweight also increased after the disaster and has remained elevated. We hypothesized that impaired sleep quality may be one contributing factor and examined this association.

Methods : We used data from the National Database (NDB). The study population comprised 107,622 individuals who underwent specific health checkups in Fukushima Prefecture before the earthquake, were re-examined shortly thereafter (2011–2012) and in subsequent years, and were not overweight in 2012. Participants were classified into evacuation and non-evacuation areas. Using Cox proportional hazards models, we estimated hazard ratios (HRs) and 95% confidence intervals (CIs) for development of overweight through 2017, with those reporting good sleep quality both before and after the earthquake as the reference group. Poor sleep quality was defined as responding "No" to the question, "Do you get adequate rest from sleep?" Overweight was defined as BMI ≥25 kg/m^2.

Results : Among participants, 775 in evacuation areas and 11,509 in non-evacuation areas reported poor sleep quality only after the earthquake. Compared with those with good sleep quality both before and after the earthquake, the HR (95% CI) for development of overweight among those with poor sleep quality only after the earthquake was 1.07 (1.00–1.14) in non-evacuation areas and 1.25 (0.99–1.56) in evacuation areas.

Conclusion : The post-disaster increase and persistence of metabolic syndrome and overweight, particularly in evacuation areas of Fukushima Prefecture, may be partly attributable to deteriorated sleep quality. Improving sleep quality may play an important role in preventing lifestyle-related diseases

Association between work-related stressors in midlife and comprehensive prefrailty after retirement

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Objective : This study aimed to explore the association between midlife work-related stressors and the risk of comprehensive prefrailty after retirement.

Methods : We analyzed data from 248 retired civil servants from Aichi workers' cohort study (200 men and 48 women) aged 65–74 years in 2018 who participated in both a baseline survey in 2002 and the follow-up survey in 2018. Work-related stressors assessed in 2002 were treated as dichotomized variables, including quantitative job overload, qualitative job overload, physical demands, interpersonal conflict, poor physical environment, job control, skill utilization, job suitability, and meaningfulness of work. In addition, stress patterns were defined according to the demand–control model (low-strain, active [reference], passive, and high-strain). Frailty and prefrailty status were defined using the validated Kihon Checklist, with scores ≥4 indicating prefrailty and ≥8 indicating frailty. Poisson regression models were applied to estimate relative risks (RRs) and 95% confidence intervals (CIs), adjusting for age, sex, smoking, alcohol consumption, regular exercise, sleep duration, overwork, obesity, education, blood sugar, CVD history (2018), medication use (2018), and family history of dementia.

Results : The prevalence of prefrailty was 26.6%, while the combined prevalence of frailty and prefrailty was 32.2%. After multivariable adjustment, high interpersonal conflict, low job control, and low meaningfulness of work were associated with increased risk of prefrailty/frailty, with RRs (95% CI) of 2.00 (1.24–3.21), 2.17 (1.23–3.81) and 2.83 (1.00–8.04), respectively. Furthermore, compared with the active pattern, the passive pattern was significantly associated with a higher risk of frailty (RR 2.37; 95% CI 1.00–5.60).

Conclusion : These findings suggest that reducing adverse psychosocial stressors and promoting supportive, meaningful work environments may contribute to healthier aging trajectories after retirement.

Associations of discrepancy between anthropometric indices with mortality

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Background : Body mass index (BMI) is a widely used parameter in obesity assessment, but it does not sufficiently reflect individual differences in body shape or visceral fat distribution. Recently, body roundness index (BRI) has been proposed as an alternative indicator and is associated with visceral fat and metabolic risks. We hypothesized that differences in BRI within the same BMI category may be associated with health risks. This study aims to examine whether discrepancies between BMI and BRI categories are associated with mortality risks.

Methods : We targeted 1772 individuals who participated in health check-up programs from 2004 to 2018, with follow-up data until December 31, 2023. Out of all eligible participants, 1907 participants (38.5% men) without any history of cancer, stroke, heart disease, and diabetes were included in the analysis. BRI was calculated based on height (cm) and waist circumference (cm). Those who died with ICD-10 codes of C00-99 were defined as cancer mortality. Participants were first classified into three groups based on BMI: “underweight” (BMI<18.5, n=97), “normal” (18.5≤BMI<25.0, n=1,168), “obese” (BMI≥25.0, n=642). Subsequently, each BMI group was further divided into tertiles (low, middle, high) according to their BRI values.

Results : During the follow-up period (median: 13.3 years), 233 deaths were confirmed. In Cox proportional hazards models, among individuals aged 65 years and older with normal BMI, compared with the middle BRI group, increased hazard ratio (HRs) were observed in the low BRI group for both all-cause mortality (HR: 1.95, 95% CI: 1.11–3.43) and cancer mortality (HR: 6.56, 95% CI: 1.74–24.67). No significant associations with mortality were observed among those classified as obese or underweight.

Conclusion : In elderly individuals, a lower BRI even with normal BMI was associated with higher risks of all-cause and cancer mortality.

Menstruation-Related Diseases, Work Performance, and Oral Contraceptive: Nationwide Online survey

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Background : Menstruation-related diseases, including premenstrual syndrome (PMS), premenstrual dysphoric disorder (PMDD), and dysmenorrhea, can deteriorate women's work performance (WP). However, no empirical studies have evaluated the impact of menstrual-related diseases on WP and whether oral contraceptives mitigate their effects in the general population.

Methods : The data from an online-based nationwide survey conducted from October to November 2023 in Japan, the JACSIS pregnant and postpartum women study 2023, were analyzed (N=4,818). The primary outcomes were presenteeism and absenteeism. Presenteeism was categorized into three levels using the Work Functioning Impairment Scale. Absenteeism was asked as the number of whole absent days due to health problems. Menstruation-related diseases were assessed as the current status of PMS, PMDD, and dysmenorrhea. We further assessed oral contraceptive use as medication history for menstrual cramps or premenstrual discomfort. An ordered logistic regression model was applied to presenteeism, and a multivariate linear regression model was applied to absenteeism. Population attributable fractions (PAFs) for severe work-functioning impairment were calculated model-based.

Results : 558 women (11.6%) had PMS, 261 (5.4%) had PMDD, and 2,319 (48.1%) had dysmenorrhea. PMDD increased the risk of presenteeism (adjusted odds ratio (aOR) (95% confidence interval (CI)): 4.17 (2.32-7.51)) and the absenteeism (coefficient (95%CI): 1.65 (0.27-3.03)). PMS and dysmenorrhea were associated with presenteeism (aOR (95%CI): 2.25 (1.63-3.11) and 1.59 (1.21-2.08), respectively). Oral contraceptive significantly alleviated presenteeism only among women with PMDD (aOR (95%CI): 0.17 (0.06-0.50)). The PAFs were significant for PMS and PMDD and approximate 15% in total.

Conclusion : PMS, PMDD, and dysmenorrhea spoiled WP. Oral contraceptive use mitigates the effect of menstrual-related diseases on WP in women with PMDD.