Nonrestorative sleep and long-term healthcare costs: A 6-year cohort study

Shota Matsunaga (1,2)
Mitsuhiro Sado (3,4,5), Yoshitaka Kaneita (6), Norio Sasaki (7), Katsutoshi Tanaka (8), Kenichi Kuriyama (9)

1 : Center for Medical and Nursing Education, Tokyo Women's Medical University
2 : Department of Healthcare Administration, Nagoya University Graduate School of Medicine
3 : Keio University Health Center
4 : Keio University Mindfulness and Stress Research Center
5 : Department of Neuropsychiatry, Keio University School of Medicine
6 : Division of Public Health, Department of Social Medicine, Nihon University School of Medicine
7 : Japan Depression Center
8 : Department of Occupational Mental Health, Kitasato University Graduate School of Medical Sciences
9 : Department of Sleep-Wake Disorders, National Institute of Mental Health, National Center of Neurology and Psychiatry

Aim : Nonrestorative sleep (NRS) refers to the subjective experience of not feeling refreshed after sleep. Although associations between NRS and various health outcomes have been reported, the relationship between NRS and long-term healthcare costs remains unclear. This study aimed to examine whether NRS is associated with increased long-term healthcare costs in a large-scale Japanese cohort.

Methods : We analyzed health screening and medical claims data of 185,639 individuals enrolled in a health insurance union for civil engineering and construction workers. NRS was assessed during the 2018 health screening using a single item: “Do you feel refreshed after a typical night’s sleep?” Annual healthcare costs were calculated from medical claims data for fiscal years (FY) 2018 to 2023. Mixed-effects models for repeated measures, including interaction terms, were applied. Sex-stratified analyses were also performed.

Results : At baseline, 45.7% of participants reported NRS. From FY 2020 onward, healthcare costs were significantly higher in the NRS group than in the restorative sleep (RS) group. In FY 2023, the cost difference was JPY 18,468 (95% CI, 7,306–29,630). The interaction analysis revealed that the cost gap between the NRS and RS groups widened significantly over time. Similar trends were observed in the sex-stratified analyses.

Conclusions : NRS is significantly associated with increased long-term healthcare costs, indicating a substantial medical and economic burden. Incorporating routine NRS screening and early interventions in health checkups may help reduce future healthcare expenditures.

Smoking Cessation after Cancer Diagnosis: A Cohort Study of 149,439 Patients in Korea

Yehyun Kim (1)
Heewon Kang (2), Freddy Sitas (3), Sung-il Cho (1,4)

1 : Seoul National University / Graduate School of Public Health, Seoul National University, Seoul, Korea
2 : Korea University / Institute for Health Sciences, Korea University
3 : University of New South Wales (UNSW Sydney) / Centre for Primary Health Care and Equity, School of Population Health, UNSW Sydney
4 : Seoul National University / Institute of Health and Environment, Seoul National University, Seoul, Korea

Smoking is a well-established risk factor for cancer development and poor prognosis. A cancer diagnosis presents a critical opportunity to encourage quitting. However, evidence on the benefits of quitting after diagnosis remains limited, as most studies have relied on pre-diagnosis smoking status or small sample sizes. To address these gaps, we used large, nationwide longitudinal cohort data with post-diagnosis smoking status to examine its impact on mortality. We analyzed Korean National Health Insurance Service(2002–2023) for adults aged 20-79 who underwent health screening in 2002–2003 and were newly diagnosed with cancer in one of five baseline waves(Wave 2: 2004–2005 to Wave 6: 2012–2013). These waves were selected to ensure sufficient sample size and assess the impact of smoking cessation after cancer diagnosis on survival. Eligible individuals had smoking data from the wave before diagnosis, at diagnosis, and after diagnosis. They were classified into four groups: non-smokers, former smokers, recent quitters(current before diagnosis and former in both subsequent waves), and continuous smokers (current in all three waves, reference group). Those missing data on sex, age, pack-years, or alcohol use were excluded. All-cause mortality was tracked through December 2023, and hazard ratios were estimated using Cox models, stratified by smoking-related vs. unrelated cancer sites. Among 149,439 eligible individuals, 4,163(2.8%) were classified as recent quitters. Smoking-related cancers accounted for 48.5%(n=72,442) of all cases. Compared to continuous smokers, recent quitters had lower risk of all-cause mortality(HR 0.91, 95% CI: 0.84, 0.99, p=.02). This association was strongest among smoking-related cancer cases(HR 0.88, 95% CI: 0.80, 0.97, p<.01). Smoking cessation after cancer diagnosis was associated with lower all-cause mortality, especially in smoking-related cancers. These findings highlight the importance of promoting cessation even after diagnosis.

Post-disaster work motivation and depressive symptoms among Fukushima nuclear power plant workers

Tomokazu Tajima (1)
Ai Noda (1,2), Jun Shigemura (3,4), Takeshi Tanigawa (1)

1 : Juntendo University Graduate School of Medicine / Department of Public Health
2 : Juntendo University / Faculty of International Liberal Arts
3 : Mejiro University / Faculty of Health Sciences
4 : Uniformed Services University / Department of Psychiatry

Background : The 2011 Fukushima Daiichi Nuclear Power Plant accident, involving plant explosions, reactor meltdown, and radioactive leak, was a traumatic and distressing event for the plant workers.

Objective : The study aimed to understand the factors affecting the workers' long-term work motivation, as well as the impact of work motivation on depressive symptoms over three years. *Method*: A total of 670 workers from the Fukushima Daiichi Nuclear Power Plant participated in the study. Work motivation and depressive symptoms were annually assessed from 2012 to 2014 using self-reporting concern questionnaires and the Center for Epidemiologic Studies Depression Scale (CES-D). The relationships between background factors in 2011 and work motivation and depressive symptoms (CES-D score ≥16) were analyzed using mixed-effects models, as were the associations between work motivation and depressive symptoms.

Results : Sense of purpose for work and residents, and perceived support from colleagues, were associated with long-term work motivation, and the effects remained until 2014. The experience of discrimination/slur increased work motivation over time. Multivariate-adjusted odds ratios (OR, 95% CI) of the association between depressive symptoms and baseline work motivation were significantly low (OR = 0.95: 95% CI 0.93–0.96 in 2012; OR = 0.96: 95% CI 0.95–0.98 in 2013; OR = 0.98: 95% CI 0.96–0.999 in 2014).

Conclusions : Sense of purpose for work and residents, and perceived support from colleagues, affected the workers' long-term work motivation. The increase in work motivation after the experience of discrimination/slur suggested psychological resilience during the recovery period. The risk of depressive symptoms was significantly low among workers with high work motivation. It is important to understand workers' motivation and perceived emotional support during the disaster to provide mental health support in the workplace and clinical interventions when needed.

Weight gain trajectories and cardiometabolic profile at age 8

Naw Awn J-P (1)
Keiko Yamasaki (1), Masamitsu Eitoku (1), Naomi Mitsuda(2), Narufumi Suganuma(1)

1 : Department of Environmental Medicine, Kochi Medical School, Kochi University, Japan
2 : Department of Pediatrics, Kochi Medical School, Kochi University, Kochi, Japan

Background : Rapid infancy weight gain and early adiposity rebound are two key early-life predictors of later obesity. However, it remains unclear which contributes more significantly to future risk. From a prevention standpoint, it is critical to examine longitudinal weight gain patterns, as distinct trajectories may confer different cardiometabolic risks. This study aimed to identify coherent weight gain trajectories and evaluate their associations with obesity and cardiometabolic outcomes at age 8.

Methods : We analyzed data from 1,528 children (767 boys; mean age, 96.7 ± 3.6 months) in the Kochi Adjunct Study of the Japan Environment and Children's Study. Anthropometric data from birth to age 8 were used to calculate conditional weight gain at ages 1, 2, 3, 4, 5, 6, and 8 years, adjusting for height and prior weight. At age 8, we assessed blood pressure, blood lipids, glucose metabolism, inflammation, and other metabolic markers. Using conditional weight gain and latent growth modeling, we identified distinct weight gain trajectories and examined their associations with obesity and cardiometabolic outcomes.

Results : Four distinct weight gain trajectories were identified: (1) Low infancy gain with catch-up (18.9%): slow early growth, later acceleration; (2) Accelerated childhood gain (6.8%): average early growth, steep gain from age 5; (3) Average gain (59.8%): steady growth throughout; (4) High infancy gain with catch-down (14.5%): rapid infancy gain, later slowdown. Children in the accelerated childhood gain group had the highest obesity rates and poorest cardiometabolic profiles at age 8, characterized by the highest blood pressure, elevated levels of triglycerides, LDL cholesterol, uric acid, and CRP.

Conclusion : An accelerated weight gain trajectory emerging after age 5 was most strongly associated with obesity and adverse cardiometabolic profiles, highlighting a potential window for early intervention.

eGFR Trajectories & Lifestyle Factors in Japanese Diabetes: A Population-Based Latent Class Analysis

Tomoyuki Yamamoto (1,2)
Yoshimitsu Takahashi (3), Susumu Kunisawa (5), Tomonari Shimamoto (2), Tomohiko Imamura (2), Yuichi Imanaka (4,5)
Taku Iwami (1,2)

1 : Department of Implementation Science for Health Security, Center for Health Security, Graduate School of Medicine, Kyoto University, Kyoto, Japan
2 : Department of Preventive Services, School of Public Health, Graduate School of Medicine, Kyoto University, Kyoto, Japan
3 : Department of Implementation Science in Public Health, School of Public Health, Graduate School of Medicine, Kyoto University, Kyoto, Japan
4 : Department of Health Security System, Center for Health Security, Graduate School of Medicine, Kyoto University, Kyoto, Japan
5 : Department of Healthcare Economics and Quality Management, School of Public Health, Graduate School of Medicine, Kyoto University, Kyoto, Japan

Background : Chronic kidney disease (CKD) with diabetes is increasing worldwide and is a leading cause of end-stage kidney disease. In Japan, age-specific patterns of kidney function decline among adults with diabetes have not been clearly described.

Objectives : To identify distinct eGFR trajectories and examine whether lifestyle habits are associated with any high-risk classes identified.

Methods : We used population-based health check-up data from Kyoto Prefecture (fiscal years 2013–2023). We included adults with diabetes who had at least two eGFR measurements (40–59 years: n=2,902; 60–69 years: n=14,394; 70–79 years: n=21,040). The mean follow-up period was 48.4 months. We applied latent class mixed models separately within each age group (40–59, 60–69, and 70–79) to estimate eGFR trajectories. We then compared baseline characteristics and lifestyle factors across classes.

Results : Across the three age groups, four consistent trajectories were identified: Slow decline, Intermediate decline, Fast decline, and Stable/Increase. The Slow decline class was the most common. The Fast decline class, considered the high-risk class, was relatively small but characterized by lower baseline eGFR and more adverse clinical profiles. Regarding lifestyle indicators, although there were variations among age groups, differences were observed between classes in smoking, exercise/physical activity, walking speed, and eating dinner within two hours of bedtime.

Conclusions : To our knowledge, this is the first trajectory-based analysis of Japanese adults with diabetes and CKD using population-based data. Distinct decline patterns were observed, and modifiable lifestyle behaviors were suggested to be associated with the Fast decline class, identified as the high-risk class. These findings highlight the potential importance of early identification and lifestyle-oriented prevention strategies to mitigate kidney function loss.