National trends in body mass index and physical activity among adults in Mongolia: Nationwide cross-sectional surveys

Namuun Ganbaatar (1)
Tserenlkham Byambajav (2,3), Aya Kadota (3), Sachiko Tanaka (2,3), Katsuyuki Miura (3)

1 : Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia
2 : Kobe Pharmaceutical University, Kobe, Japan
3 : NCD Epidemiology Research Center, Shiga University of Medical Science, Otsu, Japan

Background : Low- and middle -income countries are facing rapid increase in prevalence of non-communicable diseases (NCDs) and body mass index (BMI), and physical activities (PA) are crucial factors. The tendency of the proportion of these factors in Mongolia is unclear. We aimed to investigate the relationship between PA and BMI and its trends among adults in Mongolia aged 18 to 65.

Methods : In this descriptive study, a series of population-based surveys, the World Health Organization Steps survey* in Mongolia in 2009, 2013, and 2019 which aimed to assess the prevalence of NCD risk factors among adults were extracted. The trends in PA and BMI were investigated in the average of 5363 individuals. BMI was calculated by dividing individual's weight in kilograms by the square of height in meters. The percentage of less than 150 minutes of PA per week was defined as insufficient PA. The generalized linear model was used to analyze an association between PA and BMI, using age, sex adjusted models.

Results : The mean age of participants was 38.22 years (SD 13.23), with 56.6% identified as women. The BMI in the study population was 25.47 kg/m^2 (SD 4.72) in 2009, 25.48 kg/m^2 (SD 6.49) in 2013, and 26.67 kg/m^2 (SD 6.31) in 2019 ($p<0.001$). In 2009, 8.3% of participants had insufficient physical activity (PA), increasing to 20.5% in 2019. Furthermore, moderate PA was stratified into quartiles to assess the relationship between PA and BMI. No significant association between PA and BMI was observed in 2009 or 2013 after adjusting for age and sex. In 2019, individuals in the lowest PA quartile had the highest BMI at 26.91 kg/m^2 (95% CI: 26.69-27.12), while those in the highest PA quartile had the lowest BMI at 26.61 kg/m^2 (95% CI: 25.97-27.24) in the unadjusted model ($p=0.006$). After adjustment, the association was only marginally significant. The proportion of individuals engaging in high-intensity exercise declined drastically.

Conclusion : The physically inactive population in Mongolia almost tripled from 8.3% to 20.5% within a decade, and mean BMI was relatively increased contributing to the rise in overweight population. To address this issue, effective prevention and population-based strategy should be implemented. *The data source, the World Health Organization NCD Microdata Repository (URL: https://extranet.who.int/ncdsmicrodata/index.php/catalog), is hereby acknowledged.

Projections of future heat-related emergency hospitalizations for asthma: A time-series analysis

Hisaaki Nishimra (1)
Nobutoshi Nawa (1), Kiyohide Fushimi (2), Brian Schwartz (3), Takeo Fujiwara (1)

1 : Department of Public Health, Institue of Science Tokyo
2 : Department of Health Policy and Informatics, Institute of Science Tokyo
3 : Department of Environmental Health and Engineering, Bloomberg School of Public Health, Johns Hopkins University

Background : There is growing concern about climate impacts on human health. However, empirical evidence is lacking regarding future projections of heat-related asthma hospitalizations. This study aimed to estimate future excess emergency hospitalizations for heat-related asthma exacerbation in Japan.

Methods : We used nationwide administrative data in Japan from 2011 to 2019 and applied a time-series quasi-Poisson regression analysis to estimate the heat-related relative risk of emergency hospitalization for asthma over a lag of 0 –3 days during the warm season (June-September). Heat exposure was defined as the mean temperature exceeding the region-specific daily minimum morbidity temperature percentile (MMP). Future Heat-related excess hospitalizations for asthma were projected under future climate and demographic change scenarios based on Shared Socioeconomic Pathways (SSPs).

Results : We identified 75,829 emergency asthma hospitalizations. The heat-related relative risk was 1.18 (95% confidence interval (CI): 1.10–1.27) at the 97.5th percentile temperature relative to the MMP, with the highest estimates observed among cases aged 0–14 years. Heat-related excess hospitalizations were projected to increase by 6.78 (95%CI: 5.84–7.67) times in 2091–2099 versus 2011–2019 under SSP5-8.5 when constant population structure was assumed. The increasing trend persisted even when the future population decline was considered (4.19 (95%CI: 3.53–4.85) times in 2091–2099 versus 2011–2019 under SSP5-8.5).

Conclusion : Heat-related asthma exacerbations are projected to rise in Japan by the end of this century, even when demographic changes are considered. These findings highlight the need to strengthen health system resilience in the face of ongoing climate change.

Clinical insights and severity of Enterovirus D68 respiratory infections in Vietnamese children

Hirono Otomaru (1)
Yurika Kawazoe (2), Hien Anh Thi Nguyen (3), Katsumi Mizuta (4), Hoang Huy Le (3), Duc Anh Dang (3)
Hiroyuki Moriuchi (5), Lay-Myint Yoshida (1), Michiko Toizumi (1), Hien Minh Vo (6)

1 : Nagasaki University, Institute of Tropical Medicine
2 : Nagasaki University, Clinical Research Center
3 : National Institute of Hygiene and Epidemiology
4 : Yamagata Prefectural Institute of Public Health
5 : Nagasaki University, National Research Center for the Control and Prevention of Infectious Diseases (CCPID)
6 : Khanh Hoa General Hospital

Background : Enterovirus D68 (EVD68) causes respiratory disease, yet the risk of severe respiratory disease remains incompletely quantified, especially when stratified by comorbidity status. This study aims to describe the clinical features and risk of severe disease in children with EVD68 compared to those with non-EVD68-enterovirus (EV), accounting for comorbidity.

Methods : We analyzed 1,100 pediatric EV-positive cases from surveillance in Vietnam (2019–2022), excluding viral co-infections. EVD68 was confirmed by real-time PCR. We examined clinical features, treatments, and comorbidities. Standardization methods estimated risk differences (RDs) and risk ratios (RRs) stratified by (i) general comorbidity, (ii) asthma, and (iii) either of these. Time-to-recovery in ICU was compared using Kaplan–Meier methods.

Results : EVD68 was detected in 55/1,100 cases (5.0%). Children with EVD68 more often had wheeze, pneumonia, oxygen therapy, and ICU admission. For wheeze, EVD68 was associated with similar elevated risk with and without general comorbidity (RR 1.40 in both; RD 0.27). Pneumonia risk was likewise elevated with EVD68 (with comorbidity: RR 1.17; RD 0.12; without: RR 1.73; RD 0.14). By asthma status, EVD68 increased wheeze risk in both groups; however, the excess was smaller in asthma (RR 1.10; RD 0.09) than non-asthma (RR 1.43; RD 0.29), consistent with baseline wheeze susceptibility in asthma. Pneumonia risk was similar regardless of asthma status. During ICU stay, wheeze persisted longest in both groups. Time-to-recovery was similar between groups.

Conclusions : EVD68 infection was associated with a higher risk of severe disease than non-EVD68-EV, independent of documented comorbidity, indicating substantial risk even among previously healthy children.

Associations of ABCA1 DNA methylation levels with memory and attention performance

Hiroshi Okumiyama (1)
Hiroya Yamada (2), Ryosuke Fujii (1), Yoshiki Tsuboi (1), Akihiko Iwahara (3), Takeshi Hatta (5), Yoshitaka Ando (5)
Eiji Munetsuna (6), Mirai Yamazaki (2), Genki Mizuno (7), Koji Ohashi (5), Hiroaki Ishikawa (5), Kazuma Murakami (1)
Riku Umematsu (1), Koji Suzuki (1)

1 : Fujita Health University/School of Medical Sciences/Department of Preventive Medical Sciences
2 : Fujita Health University/School of Medicne/Department of Hygiene
3 : Kyoto Women's University/Faculty of Psychology and Collaboration/Department of Psychology and Collaboration
4 : Kansai University of Welfare Sciences/Faculty of Health and Welfare/Department of Health Sciences
5 : Fujita Health University/School of Medical Sciences/Department of Informative Clinical Medicine
6 : Azabu University/School of Veterinary Medicine, Kanagawa, Japan/Department of Animal Science and Biotechnology
7 : Tokyo University of Technology/School of Health Sciences/Department of Medical Technology

Background : A latest update from our group suggested that leukocyte *ABCA1* DNA methylation (DNAm) levels are associated with general cognitive function. However, it is unclear which cognitive domain is involved. We aimed to investigate the association between *ABCA1*promoter DNAm levels and memory and attention performance in a Japanese middle-aged and elderly population.

Methods : This cross-sectional analysis was performed among participants in the health examinations held in either 2015 or 2016 at Yakumo Town, Hokkaido. Of 724 study participants, 311 Japanese adults (135 men, mean age (SD) is 61.3 (10.2)) without clinical history, completed cognitive assessment and DNAm measurements were included in our analysis. Leukocyte *ABCA1* DNAm levels were measured by using pyrosequencing method. The measurement sites were 8 CpGs in the promoter region, and the average of measured sites was used in the analysis. Individual's memory performance was assessed by logical memory test (LMT), and an attention ability was assessed by digit cancellation test 3 (D-CAT 3). Multivariable linear regression was conducted to investigate the association between *ABCA1* DNAm and the ability of memory and attention.

Results : The mean (SD) levels of leukocyte *ABCA1* DNAm were 37.4 % (6.4%), and the mean score (SD) for each cognitive function test were 13.7 (5.1) for LMT, and 171.2 (41.2) for D-CAT 3. Multivariable regression models showed that D-CAT 3 score was 0.68 (95% CI: -1.35 to -0.02) lower with a 1% higher in *ABCA1* DNAm levels. However, there was no significant association between *ABCA1* DNAm and LMT score with a β-value (95% CI) of -0.06 (-0.14 to 0.03).

Conclusions : Our results suggested that higher *ABCA1* DNAm level in leukocytes is associated with lower attention ability.

Temporal changes in snoring-hypertension associations in the urban population: KOBE Study

Junji Miyazaki (1,2)
Aya Hirata (2), Kazuyo Kuwabara (2,3), Yoshimi Kubota (4), Yoko Nishida (5), Sachimi Kubo (6), Takumi Hirata (7)
Aya Higashiyama (8), Aya Kadota (9), Daisuke Sugiyama (2,10), Tomofumi Nishikawa (11), Naomi Miyamatsu (12)
Yoshihiro Miyamoto (13), Tomonori Okamura (2)

1 : Division of Public Health, Department of Social Medicine, Graduate School of Medicine
2 : Department of Preventive Medicine and Public Health, School of Medicine, Keio University
3 : Department of Public Health Nursing, Institute of Science Tokyo
4 : School of Medicine, Department of Preventive Medicine, Hyogo Medical University
5 : Osaka Institute of Public Health
6 : Department of Public Health, Kindai University Faculty of Medicine
7 : Health Care Research Team, Tokyo Metropolitan Institute for Geriatrics and Gerontology
8 : Department of Hygiene, Wakayama Medical University
9 : Center for Epidemiologic Research in Asia, Shiga University of Medical Science
10 : Faculty of Nursing And Medical Care, Keio University
11 : Department of Health and Nutrition, Kyoto Koka Women's University
12 : Department of Clinical Nursing, Shiga University of Medical Science
13 : Open Innovation Center, National Cerebral and Cardiovascular Center

Objective : We examined the long-term association between snoring severity and incident hypertension, with body mass index (BMI) as a modifying factor.

Methods : Among 1,117 adults in the KOBE Study, we excluded those with cancer, cardiovascular disease, suspected sleep apnea, sleep medication use, baseline hypertension, antihypertensive medication use, and missing covariates, resulting in 557 participants (142 men, 415 women). Snoring severity was self-reported and categorized as no snoring, mild, moderate, loud, or severe. Hypertension was defined as systolic blood pressure ≥140 mmHg, diastolic blood pressure ≥90 mmHg, or antihypertensive medication use, confirmed at 2-, 4-, 6-, and 8-year follow-ups. Cox proportional hazards models estimated hazard ratios (HRs) with "no snoring" as reference, adjusting for age, sex, systolic blood pressure, LDL cholesterol, triglycerides, sleep duration, smoking, drinking, depression, and walking habits. Analyses were stratified by BMI.

Results : During a median follow-up of 7.7 years, 101 participants (18.1%) developed hypertension. In the fully adjusted model, HRs across snoring categories were 0.63 (95% CI: 0.32–1.27) for mild, 1.06 (0.63–1.78) for moderate, 1.73 (0.94–3.20) for loud, and 1.92 (0.91–4.05) for severe snoring (p for trend = 0.030). BMI modified this association (p for interaction = 0.020). In the BMI ≥25 group, severe snoring was associated with a markedly elevated risk (HR = 7.08, 95% CI: 1.30–38.62; p for trend = 0.013). No associations were observed in the BMI <25 group. Hypertension incidence was 6.33 per 100 person-years in the BMI ≥25 group compared with 2.28 per 100 person-years in the BMI <25 group (rate ratio = 2.78, 95% CI: 1.65–4.51).

Conclusions : Snoring severity is associated with hypertension risk, with this association modified by BMI. Severe snoring increases hypertension risk 7-fold among individuals with BMI ≥25 kg/m², while no association exists in those with BMI <25 kg/m².