Epidemiology and outcomes of pediatric out-of-hospital cardiac arrest by detailed origins in Japan

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Background : Epidemiology of detailed origins in pediatric out-of-hospital cardiac arrests (OHCAs) has not been sufficiently investigated worldwide.

Methods : We evaluated characteristics of pediatric OHCAs by detailed origins and factors associated with the outcomes after OHCAs in Japan. From the All-Japan Utstein Registry and Emergency Transport Records (2021–2023), we enrolled pediatric OHCA patients aged 0–19 years old in whom resuscitation was attempted before Emergency-Medical-Services (EMS) arrival. The primary outcome measure was one-month survival after OHCA. Multiple logistic regression analysis was used to assess factors that were potentially associated with the outcome.

Results : A total of 4043 pediatric patients was registered, and 11.4% (460/4043) in total had one-month survival after OHCAs. As for internal origins, the proportion of one-month survival was 16.4% (225/1368) in cardiac origin, 16.2% (6/37) cerebrovascular diseases, 16.7% (2/12) malignant tumors, and 0.0% (0/2) aortic diseases, respectively. As for external origins, the proportion of one-month survival was 15.4% (71/462) in asphyxia, 15.2% (5/33) drug overuse, 12.9% (33/256) drowning, 0.0% (0/3) accidental hypothermia, 0.0% (0/1) anaphylaxis, 4.8% (26/544) hanging, and 4.0% (11/277) traffic injury, respectively. In a multivariable analysis, witness by bystanders, bystander cardiopulmonary resuscitation, first documented ventricular fibrillation, public places including school, earlier EMS response time were significantly associated with the improved outcome after pediatric OHCAs.

Conclusions : In Japan, one-month survival after pediatric OHCAs by detailed origins was still poor. Further strategies to improve outcomes after pediatric OHCAs would be warranted.

Physical activity and calcaneus quantitative ultrasound stratified by sleep duration among children

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Background : We examined the association between physical activity levels and calcaneus quantitative ultrasound (QUS) stratified by sleep duration among school-age children.

Methods : This study was conducted to target children aged 7-8 who participated in the Osaka-regional Adjunct Study of the Japan Environment and Children's Study from 2019 to 2022. A total of 2,734 children who completed both the questionnaire and calcaneus QUS were included in the analysis. Physical activity levels were assessed using the Health Behaviour in School-aged Children (HBSC) questionnaire. Calcaneus QUS was evaluated using a QUS device (A-1000 EXP II, GE Healthcare Japan Co., Ltd., Tokyo, Japan), and the stiffness index was calculated. We conducted logistic regression analysis to estimate multivariable odds ratios (ORs) and 95% confidence intervals (CIs) for low bone index (defined as the lowest 5% of stiffness index) according to physical activity levels. We adjusted for age, sex, body mass index, sleep duration, medical history of fracture, maternal occupation, and household income. In addition, stratified analyses were conducted, dividing sleep duration by the median value (9.0 hours).

Results : Higher physical activity levels had a lower prevalence of low bone index compared to those with lower activity levels. [Multivariable ORs (95% CIs): total 0.62 (0.43-0.88); short sleep duration group 0.49 (0.32–0.77); long sleep duration group 0.93 (0.49–1.76)] (interaction p = 0.15).

Conclusions : An inverse association was observed between physical activity levels and the prevalence of low bone index in children with shorter sleep durations.

Associations of Metal Exposure and Dyslipidemia among Adults in Beijing, China: A Cohort Study

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Objective : To investigate the association between single-metal and multi-metal mixed exposures with dyslipidemia, evaluating potential dose-response relationships, temporal associations, and interactions among metals.

Methods : Utilizing the Beijing Population Health Cohort, cross-sectional and nested case-control studies were conducted to assess the association between single-metal exposure and dyslipidemia. Probabilistic Bayesian kernel machine regression (BKMR) was employed to analyze the effects of multi-metal mixed exposures.

Results : Serum metal exposure levels in the general Beijing population were low to moderate. The nested case-control study revealed that for hypercholesterolemia, elevated mercury (Q3 vs. Q1, OR = 2.30, 95% CI: 1.29–4.09) and barium (Q2 vs. Q1, OR = 1.80, 95% CI: 1.03–3.13) exposure significantly increased risk, whereas cobalt (Q2 vs. Q1, OR = 0.49, 95% CI: 0.27–0.86) exhibited a protective effect. For high low-density lipoprotein cholesterol (LDL-C) dyslipidemia, increased barium (Q3 vs. Q1, OR = 1.94, 95% CI: 1.12–3.39) and mercury (Q3 vs. Q1, OR = 1.99, 95% CI: 1.16–3.42) exposure significantly elevated risk, while cobalt (Q2 vs. Q1, OR = 0.50, 95% CI: 0.29–0.85) was associated with reduced risk. Multi-metal mixture analysis demonstrated that when chromium, manganese, cobalt, nickel, mercury, and lead concentrations exceeded the 35th percentile of exposure levels, the risk of low high-density lipoprotein cholesterol (HDL-C) dyslipidemia increased significantly. Additionally, cobalt, barium, and mercury mixtures within the 40th–55th percentile range were associated with elevated high LDL-C dyslipidemia risk.

Conclusion : Dyslipidemia in the Beijing general population was associated with internal metal exposure, with distinct metal-specific and differential effects on lipid metabolism, as well as potential interactions. These findings provide novel insights into the relationship between environmental metal exposure and lipid metabolism disorders, offering critical implications for environmental pollutant risk assessment and public health intervention strategies.

The participants provided written informed consent prior to study enrolment, and the Ethical Review Committee of the Centre for Disease Prevention and Control approved the study protocol [No. 2017D(6)]

Socioeconomic Inequality in Acute Myeloid Leukaemia Treatment in England, 2015-2022

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Introduction : Socioeconomic inequality exists in the survival of acute myeloid leukaemia (AML). This survival inequality may be attributable to an unequitable access to treatment, which has been studied by few countries with universal healthcare coverage (UHC). We aimed to quantify socioeconomic inequalities in the use of intensive chemotherapy (ICT) among patients with AML in England, and identify its key driver.

Methods : We evaluated 11,254 patients with de novo AML identified in the national cancer registry of England (2015–2022) along with their area-deprivation status, as a measure of socioeconomic inequality, and treatment information based on linkage databases. We related prevalence of the ICT use to deprivation with multivariable-adjusted generalised regression and mixed-effects probit regression.

Results : Overall, 5,771 patients with AML (51%) received ICT. The patients in the most deprived area were 4·4% less likely to receive ICT than those in the least deprived area (difference in prevalence: –4·4%, 95% CI: –7·0% to –1·8%). The differences in the prevalence measures varied across the 125 administrative clusters of health service units (NHS Trusts). If all patients had access to ICT similarly to the least deprived patients, 220 more patients would have potentially received ICT. Of the deprivation effect, 92% was estimated to be attributable to the variability between administrative clusters.

Conclusion : Despite UHC, socioeconomic inequality was suggested in treatment of AML in England. The deprivation-related inequality may be driven by cluster-level variations such as institutional culture and resource capacity.

Association between MTHFR rs1801133 Polymorphism and Myocardial Infarction: the J-MICC Study

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Background : The *methylenetetrahydrofolate reductase* (*MTHFR*) rs1801133 polymorphism has been suggested to increase cardiovascular disease risk through elevated plasma homocysteine levels, but evidence in Japanese populations remains limited.

Objective : To investigate the association between the *MTHFR* rs1801133 C/T polymorphism and incident myocardial infarction (MI) using data from the Japan Multi-Institutional Collaborative Cohort (J-MICC) Study.

Methods : We analyzed 16,678 participants (7,566 men, 9,112 women) from the Shizuoka, Shiga, Saga, and Tokushima areas of the J-MICC Study with available GWAS data. Genotyping was performed using Illumina OEE, ASA, and Japonica arrays. Incident MI was identified through hospital record follow-up. Conditional logistic regression was applied to a 1:1 sex- and age-matched case-control set, and sex- and age-adjusted Cox proportional hazards models were applied using Stata ver.18.

Results : During a median follow-up of 14.2 years, 151 MI cases were observed. Conditional logistic regression showed no significant association for the TT genotype (OR=0.69, 95% CI: 0.38–1.26) or T allele carriers (OR=0.82, 95% CI: 0.51–1.31). Cox models similarly showed no significant association (TT genotype: HR=0.82, 95% CI: 0.50–1.34; T allele carriers: HR=0.74, 95% CI: 0.53–1.03).

Discussion : Although the *MTHFR* rs1801133 polymorphism has been hypothesized to increase atherosclerotic risk through elevated homocysteine, our analysis in the J-MICC Study showed no significant association with incident MI. These findings suggest that the contribution of the MTHFR rs1801133 polymorphism to MI risk is likely limited in the Japanese population.