Prognostic impact of hyponatremia on admission and at discharge in patients with heart failure

Takuya Taniguchi (1)
Hirokazu Shiraishi (1), Satoaki Matoba (1), Keisuke Kida (2), Nobuyuki Enzan (3), Masataka Ikeda (4), Takahiro Okumura (5) Takeshi Kitai (6), Takeshi Tohyama (7), Tatsunori Taniguchi (8), Shouji Matsushima (9), Yuya Matsue (10), Tomomi Ide (9) Hiroyuki Tsutsui (11)

1 : Department of Cardiovascular Medicine, Kyoto Prefectural University of Medicine
2 : Department of Pharmacology, St. Marianna University School of Medicine
3 : Cardiovascular Disease Initiative, Broad Institute
4 : Department of Cardiovascular Medicine, Kyushu University Beppu Hospital
5 : Department of Cardiology, Nagoya University Graduate School of Medicine
6 : Department of Heart Failure and Transplantation, National Cerebral and Cardiovascular Center
7 : Institute for Medical Engineering and Science, Massachusetts Institute of Technology
8 : Department of Cardiovascular Medicine, Osaka University Graduate School of Medicine
9 : Department of Cardiovascular Medicine, Faculty of Medical Sciences, Kyushu University
10 : Department of Cardiovascular Biology and Medicine, Juntendo University Graduate School of Medicine
11 : International University of Health and Welfare

Background : Hyponatremia is associated with poor in-hospital outcomes in patients hospitalized with heart failure (HF). However, it is unclear which serum sodium concentration is more important, on admission or at discharge, and how these transitions affect prognosis.

Methods : We studied the characteristics and in-hospital treatment in 4007 patients registered in the JROADHF-NEXT, which is a prospective, multicenter, nationwide registry of patients hospitalized for acute decompensated HF. Patients were divided into four groups based on the presence or absence of hyponatremia, defined as serum sodium levels below 135 mmol/L, on admission and at discharge.

Results : The mean age was 72.9 ± 14.0 years and 61.4 % were male. Hyponatremia was present in 11.0% (444/4007) of patients at admission and 11.5% (464/4007) at discharge. During the median follow-up period of 728 days, the mortality rate was 17% in the group without hyponatremia at admission or discharge (n=3245), 27.2% in the group with hyponatremia at admission but resolved by discharge (n=298), 30.5% in the group without hyponatremia at admission but present at discharge (n=318), and 40.4% in the group with hyponatremia at both admission and discharge (n=146). In the ROC analysis related to prognosis prediction, the area under curve (AUC) for serum sodium levels on admission was 0.57655, with a cut-off value of 137 mmol/L, sensitivity of 0.39, and specificity of 0.76. On the other hand, the AUC for serum sodium levels at discharge was 0.57745, with a cut-off value of 136, sensitivity of 0.34, and specificity of 0.80.

Conclusions : The presence of hyponatremia at discharge was associated with poorer prognosis. Patients with hyponatremia present on admission and persisting at discharge had the poorest prognosis.

Vaccine impact of hypothetical Nipah virus vaccine in Bangladesh and India [Work in progress]

Sol Kim (1)

1 : Nagasaki University/School of Tropical Medicine and Global Health/Joint PhD Programme for Global Health
2 : Nagasaki University/Institute of Tropical Medicine/Infectious Disease Epidemiology and Dynamics
3 : London School of Hygiene and Tropical Medicine/Epidemiology and Population Health/Department of Infectious Disease Epidemiology and Dynamics

Nipah virus (NiV) is an emerging zoonotic pathogen with a high mortality rate and recurrent outbreaks in South Asia, more regularly in Bangladesh and India, posing a global health concern. Despite its urgency, no vaccines or drugs are available for prevention or treatment, though development is underway. My PhD research seeks to address this gap by understanding the transmission dynamics of NiV disease (NiVD) and vaccine impact modelling through simulation-based projection. The primary objective is to reconstruct the NiV transmission dynamic model to understand the current outbreak patterns and the probability of a major outbreak using the multitype branching process model. Furthermore, the research will conduct vaccine impact modelling to estimate the potential health impact of future NiV vaccines under various vaccination strategies and epidemiological scenarios. The base-case vaccine characteristics will employ the draft Target Product Profile for NiV vaccines published by the WHO in 2017. These assessments will estimate the number of cases, deaths, hospitalisations and disability-adjusted life years averted by different vaccination strategies, aiding policy decisions and resource allocation. This research has the potential to inform vaccine development decision-making, enhance epidemic preparedness, and facilitate timely responses to emerging infectious diseases. Despite limitations such as data incompleteness and uncertainties in vaccine characteristics, the study aims to address these challenges through extensive sensitivity analyses and contribute to epidemic preparedness against emerging infectious diseases.

Utilization of community resources in households with young carers: The 2022 National Survey on Social Security and People's Life

Chisa Shinsugi (1)
Daisuke Nishioka (2), Manami Ochi (3)

1 : Department of Empirical Social Security Research, National Institute of Population and Social Security Research
2 : Department of Social Impact Assessment and Evaluation, Graduate School of Medicine and School of Public Health, Kyoto University
3 : Department of Health Policy, National Center for Child Health and Development

Objectives : Young carers, who excessively engage in caregiving and other daily life support for their families, face challenges not only in their daily lives but also regarding the long-term negative impacts on their health. To alleviate the heavy burden on young carers, it is crucial for households that rely on them to effectively utilize community resources, such as child-rearing support programs. However, the extent to which these resources are utilized remains unclear. This study aims to examine the relationship between the presence of young carers in households and their utilization of community resources.

Methods : We used data from the 2022 National Survey on Social Security and People's Life. The household members who have children under the age of 18 are included in this analysis (n = 2,541). Community resources were assessed by the utilization of child-rearing support programs and the recognition and use of children's cafeterias. Multiple logistic regression analysis was conducted, adjusting for mental health status (K6), life challenges (relative poverty, material deprivation, loneliness, and having someone to rely on for caregiving or nursing), and demographic characteristics.

Results : The proportion of individuals with young carers was 17.2%. Compared to those without young carers, individuals with young carers were less likely to utilize child-rearing support programs (adjusted odds ratio [aOR]: 0.63, 95% confidence interval [95% CI]: 0.47 – 0.85). Individuals with young carers had a higher recognition of children's cafeterias (aOR: 1.78, 95% CI: 1.29 – 2.46).

Conclusion : This study suggests that individuals with young carers are less likely to utilize child-rearing support programs, despite having a higher recognition of children's cafeterias. Further research is necessary to develop targeted interventions that improve the accessibility and utilization of support services for these individuals.

Nationwide Time-Series Stud of Bathtub-Drowning Deaths: Seasonal Variation and Future Projections

Yoshiaki Tai (1)
Kenji Obayashi (1), Yuki Yamagami (1), Keigo Saeki (1)

1 : Department of Epidemiology, Nara Medical University School of Medicine.

Introduction : Japan reports the world's highest drowning mortality among older adults, largely attributed to traditional bathing practices. Although bathtub-drowning deaths surge in winter, the nationwide influence of seasonality and outdoor temperature has not been systematically quantified. Furthermore, projections of future bathtub-drowning deaths that jointly consider different temperature and population scenarios have not yet been investigated.

Methods : We collected daily data on mean outdoor temperatures and the number of bathtub-drowning deaths, along with population counts for all 47 prefectures, from 1995 to 2020. Seasonality and temperature-attributable fractions (AFs) were estimated with a time-series regression model that included a cyclic spline for day-of-year and a distributed lag cross-basis for temperature up to 21 days. Applying the same modelling framework to projected temperature and population scenarios, we estimated daily bathtub-drowning deaths and then aggregated these estimates by decade from the 2020s through the 2060s.

Results : Over the 26-year study period, 99,799 bathtub-related drowning deaths were recorded. Seasonality alone accounted for 77.8% of these deaths (95% empirical confidence interval [eCI]: 76.7–78.8%); once ambient temperature was taken into account, the AF declined to 15.3% (eCI: 13.1–18.0%), showing that temperature explains 85.5% of the seasonal excess. In our projection, the total number of deaths begins to decline from the 2040s across all temperature scenarios. In contrast, the projected mortality per population remains above 2020s levels through the 2060s. Under the SSP1-2.6 and SSP2-4.5 temperature pathways, the number of deaths per population continues to rise.

Conclusions : These findings highlight the importance of mitigating the impact of outdoor temperature on bathtub-drowning risk. Our projections suggest that the number of deaths per population will likely persist through the 2060s.

Utilization of Personal Health Records in Community Healthcare

Akemi Nishio (1)
Yuya Yamamoto (2), Asuka Suzuki (3), Keika Hoshi (1), Tomonori Nakano (2), Ayako Matsuda (1)

1 : Center for Health Informatics policy, National Institute of Public Health, Wako-shi, Saitama, Japan.
2 : Department of Endocrinology, Diabetes and Metabolism, Japan Medical Alliance East Saitama General Hospital, Satte-shi, Saitama, Japan
3 : Teikyo University Graduate School of Public Health, Itabashi, Tokyo, Japan.

Background : In the Saitama Tone Health and Medical Care Region, a regional health information system called "Tonetto" was introduced to facilitate information sharing among hospitals and clinics. Tonetto consists of two components: (1) an electronic health record (EHR) sharing function for medical institutions and (2) a personal health record (PHR) function that allows individuals to enter and manage their own health data. The aim of this study was to investigate the characteristics of patients who consented to EHR sharing and to evaluate the utilization of the PHR self-entry function.

Methods : We identified individuals who registered for electronic health record (EHR) sharing and analyzed those who actively used the personal health record (PHR) self-entry function. The variables included disease categories, age, sex, and types of self-entered data, such as blood pressure, weight, body temperature, blood glucose, and daily steps.

Results : Among the 6,135 PHR users, the most prevalent disease category was diabetes/metabolic/endocrine disorders (65.2%), followed by malignant neoplasms (43.6%), cardiovascular diseases (42.7%), renal diseases (42.4%), and gastrointestinal diseases (36.3%). The median age was 74 years (interquartile range [IQR]: 67–79), and there were no significant sex differences across disease categories. Only ~2% of all EHR-sharing registrants used the PHR function, with the highest rate observed among diabetes patients (2.6%). Most PHR users entered only one data type; however, 22.7% of cardiovascular patients and 21.7% of diabetes patients recorded four items consistently.

Conclusions : This study shows that although EHR-based information sharing has been widely adopted in an aging community, the use of PHRs for self-entry remains limited. Nevertheless, meaningful engagement among patients with chronic conditions suggests that PHRs could facilitate self-management and monitoring. Promoting PHR adoption could improve personalized care for older populations.