A Scoping Review of Dietary Optimization Studies Proposing Food Intake Levels

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Objective : This scoping review aimed to provide foundational evidence for developing new food-based dietary guidelines in Japan by synthesizing research using optimization methods.

Methods : A scoping review was conducted in three major research databases to identify studies that applied optimization techniques to propose optimal food intake levels for adults.

Results : Forty studies met the inclusion criteria and were analyzed in detail. About 45% incorporated reducing environmental impacts as a primary objective. Dietary intake data came from national nutrition surveys in 65% of studies and from independent dietary surveys in 35%. Linear programming was the most frequently applied optimization method (78%), followed by data envelopment analysis (13%). The median number of nutrient constraints was 27, and nearly half referenced national dietary reference intakes. Among environmental indicators, greenhouse gas emissions were the most frequently included constraint. Reported trade-offs included those between food and nutrient constraints (45%), food/nutrients and environmental indicators (25%), and food/nutrients and cost (13%).

Discussion : Nearly half of the studies incorporated environmental impact considerations, highlighting the growing emphasis on sustainability in dietary modeling research. The frequent use of national nutrition survey data underscores their utility in developing models that reflect average dietary patterns. Linear programming emerged as the predominant method; however, several studies demonstrated the feasibility and potential advantages of integrating nonlinear models or combining multiple optimization approaches. Across methods, feasibility was consistently prioritized, and trade-offs among nutritional, environmental, and economic constraints were recognized as a critical consideration.

Association between protein intake and incidence of hypertension: the Toon Health Study

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Background : Hypertension affects over 1.28 billion adults worldwide. The association between protein intake and hypertension is controversial, the aim of this study was to examine the association between protein intake and the incidence of hypertension among middle-aged Japanese men and women.

Methods : This cohort study which is part of the Toon Health Study used baseline (2009–2012) and follow-up (2014–2018) data from 912 adults aged 30–79 without hypertension at the baseline. Dietary intake was assessed using a food frequency questionnaire, and blood pressure (BP) was measured with standardized protocols. Hypertension was defined as systolic BP ≥140 mmHg, diastolic BP ≥90 mmHg, or use of antihypertensive medication. Participants were stratified by sex-specific protein intake quartiles and calculate odds ratios (ORs) and 95% confidence intervals (CIs) of hypertension across the quartiles using multivariable-adjusted logistic regression. The same analyses were also conducted after stratifying by body mass index (BMI). The study was approved by the Institutional Review Board of Ehime University Hospital (#170511).

Results : During a 5-year follow-up, 101 participants developed hypertension. Overall, higher total protein intake was not significantly associated with a lower incidence of hypertension (multivariable-adjusted OR: 0.71; 95% CIs: 0.38-1.67; p for trend = 0.30). However, when stratified by BMI, a significant inverse association was found among individuals with a BMI above the median (OR: 0.38; 95% CI: 0.14-1.06; p for trend = 0.046). No consistent trend was observed in the group with BMI below the median (OR: 3.13; 95% CI: 0.84-11.7; p for trend = 0.23).

Conclusion : Higher protein intake may be inversely associated with hypertension risk, particularly among individuals with over median BMI.

The association between workplace social capital and depression by gender

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Objective : To examine whether the relationship between work stress, poor family environment, and depression is mitigated by a good workplace environment (workplace social capital) by gender.

Method : The results of a questionnaire survey on stress and health conducted among Toyama Prefecture employees in January 2014 were used. The survey items included depression (CES-D score), workplace social capital, work situation, work stress, work-life balance, and physical condition. A total of 3,021 individuals (1,873 men and 1,148 women) were analyzed. The association between workplace social capital and depression and each item was compared using the chi-square test. Logistic regression analysis was performed with the presence or absence of depression as the dependent variable and workplace social capital and each item as independent variables. All analyses were conducted by gender.

Results : The odds ratio for depression was higher among both men and women who lacked workplace social capital, and a dose-response relationship was observed. The adjusted odds ratio for depression among those who lacked workplace social capital was 9.99 (95% CI 4.63-21.58) for men and 3.45 (95% CI 1.38-8.63) for women. After adjusting for workplace social capital, the association between depression and being unmarried, low job position, low control at work, low job support, poor work-life balance, and poor sleep duration was attenuated in men. In women, the association between depression and being unmarried, low job position, long working hours, shift work, low control at work, low job support, poor work-life balance, and poor sleep duration was attenuated.

Conclusion : The association between work conditions, work stress, poor work-life balance, and depression was mitigated by workplace social capital for both men and women.

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Frequency of passive and active musical activities in relation to MCI: Toon Health Study

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Purpose : Musical activities have been reported to improve cognitive function in patients with Mild Cognitive Impairment (MCI) . However, there are no large-scale epidemiological studies reported regarding the frequency of passive and active musical activities and MCI. Therefore, this study aimed to clarify the association between the frequency of passive and active musical activities and MCI among local community residents.

Method : This study included 1,047 subjects (385 males and 662 females) aged 60-84 years without a history of stroke, who responded to the questionnaires on lifestyle and a Japanese version of the Montreal Cognitive Assessment (MoCA-J) in the Toon Health Study. Those who scored 25 or less on the MoCA-J (30-point scale) were considered as MCI. The question for the passive musical activity was “How often do you listen to music in your daily life?”, and the other for the active musical activity was “How often do you play an instrument or sing a song in your daily life?”. For each activity, “almost every day” was classified as high frequency, “1 to 3 times a month” and “1-2 times a week” as moderate, and “rarely” as low. Logistic regression analysis was used to examine the relationship between each music activity and MCI, adjusted for age, sex, education, drinking status, depressive symptoms, physical activity, and smoking status.

Results : The multivariate-adjusted odds ratio (OR) [95% Confidence Interval (CI)] for MCI in the high-active group versus the low-active music activity group was 0.65 [0.45-0.95]. The stratified analysis by gender revealed the association was significantly only in men (OR=0.46, 95% CI: 0.24-0.90), and not significant in women. The p-value for interaction was <0.001. No significant association was observed between passive musical activities and MCI.

Conclusion : In this study, the proportion of individuals with MCI was lower among those who had more active musical activities, particularly in men.

Key Performance Indicators in Japan's Health and Productivity Management

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Workplace health promotion (WHP) is essential for corporate sustainability, yet little is known about the key performance indicators (KPIs) companies adopt to evaluate their initiatives. This study analyzed KPI descriptions from 2,679 large Japanese companies participating in the 2024 **Health and Productivity Management (HPM)** survey, a national program led by the Ministry of Economy, Trade, and Industry. Using text mining, we categorized free-text responses and examined their associations with company ranking, submission history, and industry. We identified 11 KPI categories**,** *Kenko Keiei*: health status, health behavior, health guidance, productivity improvement, productivity loss, paid leave, sickness absence, employee retention, recruitment, mental health, and satisfaction. The most frequent were health status (27.4%), productivity improvement (26.7%), and employee retention (25.9%). Correspondence analysis showed that top-ranked companies emphasized productivity improvement, presenteeism, and engagement, often using validated scales such as the Single-Item Presenteeism Question and Work Functioning Impairment Scale. In contrast, lower-ranked companies highlighted recruitment and retention, particularly among those without consecutive submissions. Industry-specific patterns were evident: mental health was emphasized in IT and electrical equipment, productivity-related KPIs in banking and insurance, and retention/recruitment in retail and healthcare. These findings suggest that KPI selection reflects organizational maturity and sectoral challenges. Higher-ranked firms adopt multiple and essential KPIs, enabling comprehensive evaluation. **Clarifying KPIs provides valuable insights for both companies seeking effective WHP strategies and policymakers aiming to refine evaluation frameworks.**