Effects of Socioeconomic Status on Nutrition in Asia and Future Nutrition Policy Studies

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Summary Evidence of health disparities has been reported around the world. One of the intermediate factors between socioeconomic status (SES) and health is nutrition. Many studies reported socioeconomically disadvantaged people had more risk of obesity and lifestyle-related diseases than others in western society. Micronutrient intake affected by SES, but little evidence indicates that SES affects either energy intake or the macronutrient composition of the diet in western countries. In contrast, there is not enough evidence of a consistent relationship between SES and nutrition in Asian countries at present. The present status of nutrition disparities in Asia is considered to vary by economic level of the country. For developing countries in Asia, India and Vietnam, SES associates with BMI positively in women. For relatively developed countries in Asia, Korea and Japan, SES associates with BMI negatively in women. Low SES groups consume more carbohydrate, and less protein and fat, so not only micronutrient but also macronutrient intake is affected by SES both in developing and in developed Asian countries. There are some studies on the pathway from SES to diet/nutrition. The association between low SES and obesity may be mediated, in part, by the low cost of energy-dense foods, concern about food price and dietary knowledge. Nutrition policy research is required to reduce nutrition disparities in Asia. We need a collaborative study of the impact of potential political options on diet and on health with other academic fields.

Key Words socioeconomic status, nutrition disparities, Asia, nutrition policy

Evidence for health disparities has been reported around the world. One of the intermediate factors between socioeconomic status (SES) and health is diet/nutrition. Many studies report socioeconomically disadvantaged people have more risk of obesity and lifestyle-related diseases than others in western society (1). There is a review of social class and diet quality in western society. This review demonstrate whole grains, lean meats, fish, low-fat dairy products, and fresh vegetables and fruits are more to be consumed by high SES groups, and refined grains and added fats has been associated with lower SES. Micronutrient intake is affected by SES, but little evidence indicates that SES affects either energy intake or the macronutrient composition of the diet (2). In contrast, there is not enough evidence of a consistent relationship between SES and nutrition in Asian countries at present and no review paper. The present status of nutrition disparities in Asia is considered to vary with the economic level of the country. In this mini review, some studies of the effects of SES on nutrition/diet in Asia are introduced and future study on nutrition policy for low SES people is recommended. Nutrition disparity is defined as differences in diet and nutrition by SES in this report.

Studies of Nutrition Disparities in Asia

For developing countries in Asia, higher SES groups have a higher prevalence of obesity among women in

India and Vietnam (3). For food consumption, the proportion of monthly per capita food expenditure spent on cereals, pulses and vegetables drops and that spent on milk, dairy products, fruits, eggs, meat and fish increases, moving from low to high SES groups, in both rural and urban areas in India (4). After the initiation of Doi Moi in 1986, the structure of the diet shifted to less starchy staples while protein and lipids increased significantly. Although the gap in nutrient intake between the poor and the non-poor decreased, the proportion of calories from protein- and lipid-rich food for the poor is lower than for the nonpoor (5).

For relatively developed countries in Asia, Korea and Japan, the relationships between SES and nutrition are the same as for western society or not. In recent years, a series of papers on SES and nutrition based on the data of the Korea National Health and Nutrition Examination Survey has been published in Korea. Significant gender-specific relationships of SES with obesity and BMI were observed. In men, income, but not education, showed a slightly positive association with BMI. In women, education, but not income, was inversely associated with both obesity and BMI (6). There was no statistical difference in prevalence of underweight by SES (7). Low income was associated with iron deficiency anemia (8). For food consumption, both men and women, in the low-education group had the lowest intake of fruits and vegetables (9).

Few studies have been done on SES and nutrition in Japan. It is very difficult to ask about SES in Japan, and

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researchers are afraid they will decrease response rate when they ask about SES, so SES has not been used in health and nutrition studies. Some ecological studies have been done, using the poverty index of the city. The study using national data on reported household expenditure was positively related to the nutritional quality of the diet (10). For the study of the relationship between SES and diet, education, not income, was positively related with their dietary quality among pregnant women (11), and infants (12). In Japan, household income was included in the National Health and Nutrition Survey in 2010 and in 2011 for the first time. The basic goal of the national health promotion plan "The second term of National Health Promotion Movement in the twenty first century (Health Japan 21 (the second term))" from 2013 for 10 y is an extension of healthy life expectancy and reduction of health disparities. This is the first time to include "Health disparity" issues in the national plan. The status of health and nutrition disparities will be monitored by the National Health and Nutrition Survey periodically. One of the research projects funded by the Ministry of Health, Labor and Welfare started a series of studies on nutrition disparities in Japan in 2012. Significant associations were found between household income and nutritional status, food consumption and nutrient intake by the analysis of the data of the National Health and Nutrition Survey in 2010 and in 2011. Higher prevalence of obesity, higher blood-sugar levels and higher triglyceride levels were observed among low-income groups than high-income groups. Low-income groups consumed more cereals and less fish, meat, vegetables and fruits than high-income groups. These food consumption patterns led to higher intake of carbohydrate and lower intake of protein, fat, potassium and vitamins among low-income groups (13, 14). Significant associations were found between household income and the diet of children. The latest study for school children and parents demonstrated school children in low-income households skipped breakfast, consumed processed foods more frequently, and consumed vegetables less, than others (14).

These results suggest the associations between SES and nutrition in Asian countries are more varied than in western countries at the present. For developing countries in Asia, India and Vietnam, SES are positively associated with BMI in women. For relatively developed countries in Asia, Korea and Japan, SES are negatively associated with BMI in women. Low-SES groups consume more carbohydrate, and less protein and fat, so not only micronutrient but also macronutrient intake is affected by SES both in developing and in developed Asian countries.

The Pathway from SES to Diet/Nutrition

Why do low-SES groups choose unhealthy foods? There are some studies on the pathway from SES to diet/nutrition. Low-SES groups have lower food expenditure and high energy-dense foods have lower energy costs, in the USA. The association between low SES and obesity may be mediated, in part, by the low cost of energy-

dense foods and may be reinforced by the high palatability of sugar and fat. This economic framework provides an explanation for the observed links between socioeconomic variables and obesity when taste, dietary energy density, and diet costs are used as intervening variables (15, 16). The socio-economic pathways to diet were studied from the view point of purchasing behavior in Australia. Significant associations were found between education, household income and food purchasing behavior. Food shoppers with low levels of education, and low income households, were least likely to purchase foods that were comparatively high in fiber and low in fat, salt and sugar. Food purchasing differences by household income were related to diet in part via food-cost concern. Educational attainment influenced diet in part via dietary knowledge. Socio-economic differences in dietary knowledge and concerns about the cost of healthy food play an important role in these relationships (17). Low-SES groups had lower concern about diet and regarded food price important compared with high-SES groups in Japan (13). These results suggest that physical food price intervention for healthy foods and nutrition education intervention for healthier foods with low cost will be effective in reducing health inequalities and encouraging the general population to improve their diet.

Nutrition Policy Studies for Reducing Nutrition Disparities

How can we reduce nutrition disparities? This is a big challenge for nutritionists, because we need research collaboration with other academic fields, such as economics and public policy. Powell et al. reviewed the research on food price and obesity in the USA. They found when statistically significant associations were found between food and restaurant prices (taxes) and body weight outcomes, the effects were generally small in magnitude, although in some cases they were larger for low-SES populations and for those at risk for overweight or obesity. The limited existing evidence suggests that small taxes or subsidies are not likely to produce significant changes in BMI or obesity prevalence, but that nontrivial pricing interventions may have some measurable effects on Americans' weight outcomes, particularly for children and adolescents, low-SES populations, and those most at risk for overweight (18).

Tiffin and Salois reviewed the influence of socio-demographic factors on nutrition and health status and considered the impacts of nutrition policy across the population drawing on methodologies from both public health and welfare economics. The effects of a fat tax on diet are to be small, but the regressivity of the policy increases as the tax becomes focused on products with high saturated fat contents in the UK. A fiscally neutral policy that combines the fat tax with a subsidy on fruit and vegetables is actually more regressive because consumption of these foods tends to be concentrated in socially underserved households. When inequality is of concern, population-based measures must reflect this, and approaches that target vulnerable populations

which have a shared propensity to adopt unhealthy behaviors are appropriate (19).

Nutrition policy research is required to reduce nutrition disparities in Asia. There are some potential political options such as food price (or tax) policy, increase in income (including financial assistance), food subsidy and nutrition education for healthy eating with low cost. We should consider population approaches and high-risk approaches. We need the collaboration study of the impact of these political options on diet and on health with other academic fields.

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