Optimal Diet for Achieving Favorable Pregnancy Outcomes in East Asian Women—A Literature Review

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Summary Ensuring nutritional adequacy during pregnancy is one of the necessary factors to achieve favorable pregnancy outcomes. In order to clarify the current optimal diet for achieving favorable pregnancy outcomes among East Asian women, we conducted a systemic literature review. English and Japanese articles were searched using PubMed and Igaku Chuo Zasshi. A total of 167 papers were retrieved, and six papers were finally selected for review. Five studies were conducted prospectively, and one was a case-control study. No significant associations were observed between dietary intakes and infant birthweight, but low intakes of fat and vitamin E were associated with preterm birth risk. Maternal diet with various food groups including vegetables was associated with higher birthweight and lower risk of preterm birth. A balanced diet with a combination of diverse food groups may be effective in achieving favorable pregnancy outcomes.

Key Words pregnancy, nutrients, diet, fetal growth, review

Ensuring nutritional adequacy during pregnancy is one of the necessary factors to achieve favorable pregnancy outcomes (1). Therefore, dietary reference intakes pay special attention to the increased nutritional requirements during pregnancy. For example, additional increments are shown for protein, vitamins A, B1, B2, B6, B12, C, niacin, folate, magnesium, iron, zinc, copper, iodine, and selenium, in the latest “Dietary Reference Intakes for Japanese: 2020 version” (2). However, in order to develop dietary guidelines in pregnancy, we need further scientific evidence that examines the association between the quality of the maternal diet and pregnancy outcomes, not only intakes of specific foods or nutrients. In particular, both infant size at birth and gestational length are known to be related to health outcomes in adulthood (3–6).

Other important dietary factors to be examined are the regional/ethnic characteristics. For example, the traditional East Asian diet covers a wide variety of food items (7), though high in salt (8). In addition, the body size of East Asian women is smaller: average height in adult Japanese women is 154.3 cm and average body weight is 53.6 kg (9).

In order to clarify the current optimal diet for achieving favorable pregnancy outcomes among East Asian women, we conducted a systemic literature review as shown below.

MATERIALS AND METHODS

The current systematic review adhered to the PRISMA guidelines (10). The search terms to identify the relevant articles are shown in Table S1 (Supplemental Online Material). We utilized the following two bibliographic databases for searching the articles: PubMed from MEDLINE and Igaku Chuo Zasshi (ICHUSHI), a bibliographic database that was established in 1903 by the Japan Medical Abstracts Society (JAMAS). The last date of the search was August 27, 2019. First, the title and abstract of each study was checked to ascertain whether they met the inclusion criteria described below (primary screening) and then the full text to determine whether it should be included in the review (secondary screening). The screenings were independently conducted by two investigators, and disagreements were resolved by consensus or arbitration by a third reviewer.

Selection criteria Our inclusion criteria were as follows: human studies in an East Asian population; not a commentary, feature, nor review article; information available on characteristics of the study population; studies which focused on diet quality or dietary patterns as well as nutrient intakes during pregnancy; studies examining the association between maternal diet and fetal growth (preterm birth, low birth weight, small for gestational age, macrosomia, and large for gestational age); and studies published from January 1, 2009 to June 30th, 2019.

RESULTS

A total of 167 papers were retrieved. 53 from PubMed and 114 from Igaku Chuo Zasshi. One hundred twenty-eight papers did not meet the above selection criteria,
Results from nutrient intake analyses

In the selected three studies, maternal dietary intake showed insufficiency compared to reference intakes. Kubota et al. (11) reported that average energy intake of the participants was approximately 1,600 kcal/d, irrespective of their gestational stage or body size. Average intake of other nutrients also showed the same tendency. Neither energy nor nutrient intakes showed significant associations with birth weight. According to Yachi and Sone (15), average energy intakes in underweight or normal weight pregnant women were 1,770 kcal/d, and very few women achieved intakes shown in the “Dietary Reference Intakes for Japanese (2010 version)”. Intakes of folate and iron were also insufficient. No significant associations were observed between dietary intakes and infant birthweight. Zhang et al. (16) reported that vitamin A, calcium, and iron intakes among Chinese pregnant women were insufficient compared to reference values shown in the Chinese Dietary Reference Intakes. Low intakes of fat and vitamin E were associated with preterm birth risk.

Results from the dietary pattern analyses

Three studies examined the association between maternal dietary patterns and pregnancy outcomes. Okubo et al. (14) reported that women who were classified under the “wheat products” pattern were more likely to deliver infants with lower birthweight and smaller head circumference, compared to the “rice, fish, and vegetable” pattern group. Lu et al. examined the association between maternal dietary patterns in mid-pregnancy and preterm birth (13), and reported that compared with women classified under the “vegetables” pattern, those under the “milk” pattern had greater odds of overall preterm delivery (adjusted odds ratio [OR] 1.59, 95% confidence interval [CI] 1.11, 2.29, p<0.05), spontaneous preterm delivery (adjusted OR 1.73, 95% CI 1.14, 2.62, p<0.05) and late preterm delivery (adjusted OR 1.73, 95% CI 1.08, 2.62, p<0.05). Women in the “cereals, eggs, and Cantonese soups” and “fruits, nuts, and Cantonese desserts” patterns had greater odds of late preterm delivery (adjusted OR 1.54, 95% CI 1.01, 2.35 for “cereals, eggs, and Cantonese soups”, adjusted OR 1.61, 95% CI 1.04, 2.50 for “fruits, nuts, and Cantonese desserts”, respectively). Women in the “vegetables” pattern had higher intakes of leafy vegetables and cruciferous vegetables, and women in the “milk” pattern had higher intakes of milk/milk products but low vegetable intake. Lu et al. (12) reported the association between dietary patterns and fetal growth using the same cohort data. Women in the “fruits, nuts, and Cantonese desserts” and “varied” groups had significantly heavier infants compared with those in the traditional “cereals, eggs, and Cantonese soups” group. Moreover, those in the “varied” group had marginally significantly lower odds of having a small-for-gestational age (SGA) infant after adjustment for other confounders (OR 0.77, 95% CI 0.57, 1.04, p=0.08).

DISCUSSION

The results from our literature review showed that although dietary intakes of energy and nutrients were generally insufficient among East Asian pregnant women, a balanced diet with a combination of diverse food groups may be effective in achieving favorable pregnancy outcomes. According to the systematic review conducted by Ota et al. (17), nutrition education aimed at increasing balanced energy and protein intakes in pregnancy may be effective in reducing risks of preterm birth and low birthweight. In our small-scale single-center study, higher intakes of vegetable and fruits were associated with improved dietary quality in Japanese pregnant women, by using the Nutri-Rich Food Index 9.3 (18).

The Japanese government issued The Fourth Basic Plan for the Promotion of Shokuiku (19) in March 2021. In this national plan, the government aims to increase the number of citizens who adopt a balanced diet (“combine staples, main dishes and sides”), which was 36.4% in FY2020, to 50% or more by FY2025. The frequency of taking meals “combined staples, main dishes and sides” in a day leads to adequate intakes of major nutrients in all age groups, according to Ishikawa-Takata et al. (20). Furthermore, the “Dietary Guidelines for Pregnant and Lactating Women” in Japan was updated in March 2021 (21), to promote a healthy and balanced diet among reproductive age women.

Although the available literature was limited, following a balanced diet combined with vegetables and fruits may be effective in promoting fetal growth in East Asian pregnant women. Interventions studies to help women adopt a healthy diet in pregnancy, may be needed to develop effective methods for further diet modification.

Disclosure of state of COI

No conflicts of interest to be declared.

Acknowledgments

This work was supported by the 2019 Ministry of Health, Labour and Welfare Program Grant, Promotion...
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of Child Research Project, “Research project for developing a revision draft for the Dietary Guidelines for Pregnant and Lactating Women.”

Supporting information
Supplemental online material is available on J-STAGE.

REFERENCES