



Research report

Cohabitation effect of grandparents on dietary intake among young Japanese women and their mothers living together. A multicenter cross-sectional study [☆]



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ABSTRACT

We examined the cohabitation effect of the grandparents on dietary intakes among young Japanese women and their mothers, using data from a cross-sectional multicenter study conducted in 35 of 47 prefectures in Japan. Among a total of 2032 three-generation families, 1336 female dietetic students (18–20 years), 1336 of their mothers (36–59 years), and 1560 of their paternal or maternal grandmothers (59–94 years) were included. Intake of foods and nutrients was assessed with self-administered diet history questionnaires. The prevalence of students and their mothers living with the grandparents (GP) was 36%. Students living with GP had a higher intake of fruits, vegetables, total dietary fiber, β -carotene, vitamin C and potassium and lower intake of meats than those living without GP. For mothers, fish and shellfish and vitamin C intakes were higher and meat intake was lower among participants living with GP. The median correlation coefficients of food and nutrient intakes in the students–grandmothers living together was higher than in those living apart for both paternal grandmothers (PGM) and maternal grandmothers (MGM) (all $P < 0.01$). The median values of mothers–PGM living together were also significantly higher than in those living apart ($P < 0.01$). However, the values of mothers–MGM did not significantly differ between those living with and without MGM. These results may suggest that family members who live together tend to share similar dietary habits. Further, the mother's dietary habits might affect those of their children even after they live apart.

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Introduction

The resemblance of dietary habits within families has considerable importance in public health. Many studies have observed a resemblance in the dietary intakes of parents and their children (Garn, Cole, & Bailey, 1979; Pearson, Biddle, & Gorely, 2009; Wang, Beydoun,

Li, Liu, & Moreno, 2011). These studies show that the intake of foods and nutrients of children is correlated with that of their parents (Pearson et al., 2009; Raynor et al., 2011; Shrivastava, Murrin, Sweeney, Heavey, & Kelleher, 2013; Vagstrand, 2010; Wang et al., 2011; Wroten, O'Neil, Stuff, Liu, & Nicklas, 2012). In particular, the correlation of dietary intake between mother and child is stronger than that between father and child in many countries (Beydoun & Wang, 2009; Feunekes, de Graaf, Meyboom, & van Staveren, 1998; Oliveria et al., 1992; Park, Yim, & Cho, 2004; Shrivastava et al., 2013), and women continue to spend much more time on household activities, including cooking (2.5 hours/day), than men (0.3 hours/day) (Ministry of Internal Affairs and Communications, 2012). These two findings both suggest that the mothers' dietary habits have a strong impact on the habits of their children. It is therefore hoped that young women, many of whom will become mothers in the near future, adopt appropriate dietary habits for the health of the next generation, as well as for themselves. In order to achieve this goal, effective dietary education should be conducted among young women.

Abbreviations: BDHQ, brief-type self-administered diet history questionnaire; BMI, body mass index; DHQ, self-administered diet history questionnaire; GC, grand-children; GP, grandparents; GM, grandmothers; MGM, maternal grandmothers; PGM, paternal grandmothers.

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Meanwhile, family structure influences dietary habits (Garn et al., 1979; Pearson et al., 2009; Wang et al., 2011). Therefore, dietary education should be conducted after the effect of family members on their diet is understood. Although the associations of diet between parent and younger children or adolescents have been investigated, studies of these associations among adult women are limited (Wang et al., 2011), and the effect of family members on diet among young adult women remains unclear. In this study, we collected information on dietary intake as well as family structure among young adult women. The participants were all aged ≥ 18 years, allowing us to investigate the effect of family on habitual diet in adult women.

Although family resemblances in dietary intake should be generally considered due to the effects of cohabitation (Garn et al., 1979), some people live with not only their parents but also their grandparents. Indeed, 13% of Japanese families are non-nuclear, and include three generations (Ministry of Health, Labour, and Welfare, 2014a). If dietary intake is affected by the family members living together, the intakes of younger people living with their grandparents may resemble those of their grandparents as well as their parents. In Japan, elderly people eat more vegetables, fruits, pulses, and fish and shellfish, and eat less meats and fats than the younger generation (Ministry of Health, Labour, and Welfare, 2014b). The younger people living with their grandparents may have the similar dietary characteristic of elderlies because of the effect of cohabitation. However, few studies have investigated the association of dietary intake in grandparents and grandchildren among adult women (Sasaki & Tsuji, 2003; Stafleu, Van Staveren, de Graaf, Burema, & Hautvast, 1994). Stafleu et al. examined the correlation of nutrient intakes among young women, their mothers, and grandmothers. The correlations between young women and their grandmothers were lower than those between young women and their mothers. Since all the subjects in this study were living apart, they did not examine the effect of the cohabitation. Meanwhile, Sasaki et al. described the dietary intake of young women living with and without their grandmothers. They showed that the correlations of dietary intake between the young women and their grandmothers living together were higher than those living apart, but did not separate grandmothers into paternal and maternal grandmothers (Sasaki & Tsuji, 2003). One three-generation study among the families with young children (5 years) showed positive correlation for the intakes of nutrients in maternal line, not in paternal line (Shrivastava et al., 2013). Therefore, separate investigation of maternal and paternal line may be important in examining the effect of families on their diet.

If we indicate that the favorable dietary habits tend to hand down from grandparents to their grandchildren, we can suggest that handing down the diet may be one of the effective strategies to form favorable dietary habits of the younger generation. Here, we examined the influence of cohabitation with grandparents on the intake of foods and nutrients among young Japanese women as well as their mothers. Further, we examined the association of dietary intake between young women or their mothers and their grandmothers, with separation for paternal and maternal grandmothers.

Methods

Procedure

The study was based on data from the Three-generation Study of Women on Diets and Health. This was a cross-sectional, self-administered questionnaire survey in dietetic students (freshmen), their mothers, and grandmothers or acquaintances from 85 institutions (universities, colleges, and technical schools) in 35 of 47 prefectures in Japan. A detailed description of the study design and survey procedure has been published elsewhere (Kobayashi, Asakura, Suga, & Sasaki, 2013, 2014). Briefly, a total of 7016 dietetic stu-

dents was distributed a dietary assessment questionnaire and lifestyle questionnaire during the orientation session or a first lecture designed for freshmen in April 2011 or 2012. The students were also requested to directly distribute the questionnaires to their mothers and grandmothers and invite them to join the study. Recruitment priority was given first to the maternal grandmother; or if unavailable, to the paternal grandmother; or finally to a 65- to 89-year-old female acquaintance of the student. Written informed consent was obtained from all participants. A total of 4933 students, including 4656 women and 277 men (response rate: 70.3%), 4044 women of the mother's generation (57.6%), and 2332 women for the grandmother's generation (33.2%) answered both questionnaires. The protocol of the study was approved by the Ethics Committee of the University of Tokyo Faculty of Medicine (approval number: 3249, approved on November 29, 2010).

Study population

Among all families ($n = 5057$), analysis in the present study was limited to families having the participation of members of all three generations, and in which the students were aged 18–20 years ($n = 2032$) (Fig. 1). All the participants were dietetic students, their mothers, and grandmothers, who opted to participate in the study by themselves. For students and mothers, we limited analysis to families with the student and her mother living together ($n = 1426$). We excluded families with participants who lived in eastern Japan and who answered questionnaires in 2011 ($n = 8$), in consideration of the effects of the Great East Japan Earthquake in March 2011; families with students who answered the questionnaires on and after May 20th ($n = 15$) to eliminate the influence of dietetic education; families with participants whose age, height, or weight were erroneous or missing ($n = 3$); and families in which one or more members had a reported energy intake less than half the energy requirement for the lowest physical activity category, or equal to or more than 1.5 times of the energy requirement for the highest physical activity category according to the Dietary Reference Intakes for Japanese, 2015 (< 825 – 875 kcal/day or ≥ 3300 – 3450 kcal/day; $n = 64$) (Ministry of Health, Labour, and Welfare, 2014c). The final sample thus consisted of 1336 families in which the student (18–20 years) and her mother (36–59 years) lived together. Students and mothers were categorized into groups living with and without any of their grandparents (GP) whether the GP were the grandmothers participating in this study or not.

For grandmothers, we excluded those participants who lived alone ($n = 305$) to take the same situation of the students and mothers, who did not live alone. Further, we excluded those participants who lived with their parents ($n = 55$); participants who lived in eastern Japan and answered the questionnaires in 2011 ($n = 40$); participants whose age, height, or weight or residential area were erroneous or missing ($n = 16$); and participants with extremely low or high reported energy intakes (< 750 – 825 kcal/day or ≥ 3000 – 3300 kcal/day; $n = 56$) (Ministry of Health, Labour, and Welfare, 2014c). As a final sample, we obtained 1560 grandmothers (including 531 paternal grandmothers and 1029 maternal grandmothers; 59–94 years). They were divided into those living with and without any of their grandchildren (GC) whether the GC were the students participating in this study or not.

Dietary assessment

Dietary habits during the preceding month were assessed using a self-administered diet history questionnaire (DHQ) (Kobayashi et al., 2011, 2012; Sasaki, Yanagibori, & Amano, 1998) for the students and mothers and a brief-type self-administered diet history questionnaire (BDHQ) (Kobayashi et al., 2011, 2012) for the grandmothers. Details of the structure, method of calculating dietary intake, and

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