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Associations of marital and parental status and family members living together with health-related behaviors in Japanese young workers : a cross-sectional study

Mariko Nakamoto*, Yukiko Tanaka, Satomi Ono, Akiko Nakamoto, Emi Shuto, and Tohru Sakai

Department of Public Health and Applied Nutrition, Institute of Biomedical Sciences, Tokushima University Graduate School, Tokushima, Japan

Abstract : The aim of this study was to clarify the associations of family members living together with health-related behaviors in Japanese young workers. The participants were 300 men and women aged 20-39 years in 2015 who had a job. A web-based self-administered questionnaire on status of partnering and parenting, number of family members living together, dietary habits, drinking habit, smoking habit, self-rated health, employment status, working time and commuting time was conducted through Internet. Multiple logistic regression analysis and general linear models were used to assess the association of family members living together with health-related behaviors. The multivariate-adjusted odds ratio (95% confidence interval, p-value) for current drinking in unmarried participants living with their parents compared to unmarried participants living alone was 0.35 (0.13-0.93, p=0.036). The adjusted means of frequency of breakfast skipping and frequency of eating out showed a trend for inverse associations with the presence of a partner and children. However, those associations disappeared after adjustment for age of youngest child. The findings suggest that the presence of parents might affect drinking behavior and that age of youngest child living together might affect the frequency of breakfast skipping in young Japanese workers. J. Med. Invest. 66 : 141-147, February, 2019

INTRODUCTION

In the past several decades, the rates of partnering (becoming married and/or living as married) and parenting have been decreasing in Japan (1) and the decreasing rates have become a social problem. Vital statistics obtained by the Ministry of Health, Labour and Welfare in Japan have shown that the average ages of mothers at the birth of the first child were 25.7 years in 1975, 27.5 years in 1995 and 30.7 years in 2015 (2). The average age of mothers at the birth of their children is estimated to continue to increase in Japan (2). Partnering and/or parenting are important life-stage changes that commonly occur during young adulthood such as 20-40 years of age.

Life-stage changes such as partnering and/or parenting are often associated with changes of lifestyle and/or behavior such as the use of time, social norms, social support, income, smoking and drinking habits, dietary behavior and expectations of others (3-8). The household environment and social environment have been reported to affect health-promoting behaviors such as a healthy diet and physical activity in western populations (9-11). In a cross-sectional study, a positive association of partnering and better dietary eating (e.g., intake of more fruit and vegetables) was shown in Australian men (12). In addition, it was shown that people who were single or had no children were more likely to skip breakfast and consume fast foods than those who were married or had children (13, 14). On the other hand, it was reported that partnered women have worse dietary eating (e.g., intake of more

fat and sugar) than single women (12). Incoherent associations between partnering and/or parenting and dietary habits have also been shown in several prospective studies (15-19). In Japan, a few studies showed an association between partnering and/or parenting and dietary skipping (20, 21), though there is a possibility of differences in concepts about partnering and/or parenting from those in western countries.

The associations of marital and parental status and family members living together (e.g., unmarried and alone, unmarried and living with parents, married and living with a partner, and married and living with both a partner and children) with health-related habits including self-rated behavior, smoking habit, drinking habit, skipping breakfast, eating out and dietary variety have not been elucidated. Therefore, we analyzed the associations of marital and parental status and family members living together with the above six health-related habits in Japanese workers aged 20-40 years.

PATIENTS AND METHODS / MATERIALS AND METHODS

Study population

We conducted an Internet panel survey that included participants already registered with an Internet survey company (Marsh Co., Ltd.). This internet panel survey was conducted between August 28, 2015 and September 2, 2015 for Internet users aged 20-49 years in Tokushima Prefecture, Japan. For survey participants registered in advance, questionnaires and a response column were displayed on the website for the respondents to complete and transmit their responses. A total of 300 people who had registered with the survey company took part in the present study. The participants were extracted on the basis of the population composi-

tion ratios for residential areas so as to make a male/female ratio of 1 : 1. Participants were those who completed the survey. All of the people who were registered with the survey company had been registered by open recruitment. In August 2015, the total number of monitors was about 800,000, and the total number of monitors in Tokushima Prefecture was about 4000. As a countermeasure against incorrect answers, at the time of registration, the system check was performed to prevent duplicate registration and registration inconsistency points based on some registration information as well as mandatory update of monitor registration information once a year. The study protocol was approved by the institutional review board of Tokushima University Hospital (Ethical approval number : 2335).

Assessment of health-related behaviors

We assessed six variables (self-rated health, smoking habit, drinking habit, skipping breakfast, takeaway-food consumption and dietary diversity) during the last year as health-related behaviors with the following questions. Self-rated health was assessed by the question "How do you feel about your health status?" We defined participants who answered 'very good' or 'reasonably good' for this question as participants with good self-rated health. We defined participants who answered 'very bad' or 'reasonably bad' for this question as participants with bad self-rated health. Smoking habit was assessed by the question "Do you smoke?" We defined participants who answered 'every day' and 'sometimes' for this question as a current smokers. We defined participants who answered 'in the past' and 'never' for this question as not current smokers. The participants were asked how often they take alcohol and five response options were given : never or almost never, once a week, 2 or 3 times a week, 4 or 5 times a week, and every day. To analyze drinking behavior, nondrinkers were categorized as those who responded never or almost never, and current drinkers were categorized as those with a drinking frequency of more than one time a week. Weekly breakfast skipping was estimated using the question "How many times per week do you usually skip breakfast?". All of the participants answered the number of times they skip breakfast in one week. Weekly takeaway-food consumption was estimated using the question "How many times per week do you usually eat takeaway food?". All of the participants answered the number of times they eat takeaway food in one week. Dietary variety was calculated using the method reported by Kumagai *et al* (22). For assessing dietary variety, we used a dietary variety score for 10 food groups consumed daily from food frequency questionnaires : fish and shellfish, meats, eggs, milk and dairy products, beans, green/yellow vegetables, seaweed, potatoes, fruits, and fat and oil. If participants selected 'almost every day' as the frequency of each food group intake, the score for that food group was one point. Therefore, the dietary variety score ranged from 0 to 10 with a higher score indicating a higher dietary variety.

Marital and parental status and family members living together

The participants were asked to report their marital status (single, married or separated/divorced). Regarding parental status, the participants were asked to report how many biological children they had and the age for each child. Regarding family members living together, the participants were asked to report their family members including their father, mother, grandfather, grandmother, brother/sister, children, and others. The number of separated/divorced participants was very small (n = 13). In addition, almost of all of the unmarried participants living with someone reported that they live with their parents (90.6%). The participants were classified into four groups of marital and parental status : 'Single and unmarried (including separated/divorced) and living with a person other than their parents', 'unmarried (including separated/divorced) and living with parents', 'married without

children' and 'married with children'.

Covariates

The participants were requested to provide information on all of the following variables : age, gender (binary : man or woman), employment status (categorical : regular employment, part time or other), working time (hours), and commuting time (hours).

Statistical analysis

At first, comparisons of the basic characteristics of participants according to marital and parental status and family members living together were performed. Continuous variables were expressed as means ± standard deviation, and simple comparisons of the means of data were performed using analysis of variance. Categorical variables were expressed as numbers (percentages), and comparisons of proportions were performed using the chi-square test.

Next, multiple logistic regression analysis was used to estimate the odds ratios (OR) and 95% confidence intervals (CI) for health-related behaviors including bad self-rated health, current smoking and regular drinking according to marital and parental status and family members living together after controlling potential confounders. Single and unmarried participants living with a person other than their parents were defined as references in the present analysis. General linear models were used to estimate the adjusted means of frequency of weekly breakfast skipping and eating out and score of dietary variety according to marital and parental status and family members living together after controlling for potential confounders. When we used those analyses to assess the association between the six health-related behaviors and marital and parental status and family members living together, we controlled the following variables as potential confounders. The confounding variables were 1) Model 1, age (continuous) and sex (binary : man or woman) ; 2) Model 2, Model 1 + employment status (categorical : regular employment, part time or other) and working time (continuous) ; and 3) Model 3, Model 2 + age of youngest child (as continuous:no child, 0-4 years, 5-9 years, 10-14 years, 15-19 years, ≥20 years).

All statistical tests were based on two-sided probabilities and were performed using SPSS version 18.0J for Windows (SPSS Inc., Japan, Tokyo Japan). All p values < 0.05 were considered statistically significant.

RESULTS

Characteristics of study participants

The total number of subjects was 300 (150 men and 150 women). The mean ages were 40.2 ± 6.8 years in men and 38.3 ± 6.3 years in women.

Table 1 shows the characteristics of participants according to marital and parental status and family members living together. The number of participants living with a person other than their parents or living alone was 41 (13.7%). The number of participants living with their parents was 58 (19.3%). Among the married participants, 42 (14.0%) had no children and 159 (53.0%) had children. The mean ages of participants living with a person other than their parents or living alone, participants living with their parents, married participants without children and married participants with children were 36.7 ± 6.5 years, 37.2 ± 7.6 years, 40.5 ± 5.6 years and 40.3 ± 6.1 years, respectively. There were statistically significant differences in the proportion of current drinkers and frequency of weekly breakfast skipping according to marital and parental status and family members living together. There were no significant differences in other characteristics between unmarried participants and married participants.

Table 1.   Characteristics of the participants according to existence of family members living together in this study.

	Unmarried		Married		
	Single / Living with a person other than their parents (n=41)	Living with parents (n=58)	Without children (n=42)	With children (n=159)	p value
Age (year)	36.66 ± 6.50	37.17 ± 7.56	40.48 ± 5.63	40.28 ± 6.14	<0.001
Male	17 (41.46)	22 (37.93)	26 (61.90)	85 (53.46)	0.052
Employment status					
Regular employment	27 (65.85)	37 (63.79)	26 (61.90)	94 (59.12)	0.753
Part time	10 (24.39)	17 (29.31)	9 (21.43)	44 (27.67)	
Other	4 (9.76)	4 (6.90)	7 (16.67)	21 (13.21)	
Working time (hours)	8.28±1.11	7.88±1.73	7.95±1.66	7.97±2.07	0.736
Commuting time (hours)	0.75±0.49	0.94±0.73	0.89±0.46	0.86±0.58	0.476
Age of youngest child (years)	-	-	-	9.20±5.86	-
Self-rated health					
Good	28 (68.29)	48 (82.76)	33 (78.57)	116 (72.96)	0.323
Bad	13 (31.71)	10 (17.24)	9 (21.43)	43 (27.04)	
Smoking habit					
Current smokers	9 (21.95)	5 (8.62)	8 (19.05)	37 (23.27)	0.115
Not current smokers	32 (78.05)	53 (91.38)	34 (80.95)	122 (76.73)	
Drinking habit					
Current drinkers	14 (34.15)	9 (15.52)	9 (21.43)	57 (35.85)	0.017
Not current drinkers	27 (65.85)	49 (84.48)	33 (78.57)	102 (64.15)	
Frequency of weekly breakfast skipping (times/week)	2.08±2.39	1.73±2.42	2.17±2.83	1.20±2.01	0.025
Frequency of weekly eating out (times/week)	3.26±2.73	2.63±3.00	2.22±2.08	2.22±2.61	0.134
Score of dietary variety (score)	1.34±1.80	2.50±3.14	1.86±2.30	1.88±2.23	0.121

Values are mean ± standard deviation or number (%)

Associations of marital and parental status and family members living together with self-rated health, smoking habit and drinking habit

Table 2 shows multivariate-adjusted associations of marital and parental status and family members living together with health-related behaviors including self-rated health, smoking habit and drinking habit.

After adjustments for age and sex (Model 1), the risks of current drinking in unmarried participants living with their parents significantly decreased comparing to the reference (single/unmarried and living with a person other than their parents). The risks of bad self-rated health and current smoking in unmarried participants living with their parents tended to decrease comparing to the reference, though there was no statistically significant difference. After adjustments for age, sex, employment status and working time (Model 2), the results in Model 2 were similar to those in Model 1. To assess whether the association of the presence of a partner and/or children in health-related behaviors including self-rated health, smoking habit and drinking habit was confounded, age of youngest child (Model 3) was further adjusted. After adjustment for age of youngest child, the ORs (95% CIs) for current drinking in unmarried participants living with their parents, married participants without children and married participants with children were 0.35 (0.13-0.93 ; p=0.036), 0.40 (0.14-1.11 ; p=0.079) and 1.10 (0.41-2.97 ; p=0.856), respectively. There was no significant association between marital and parental status and family members living together and health-related behaviors including self-rated health and smoking habit in Model 3.

Associations of marital and parental status and family members living together with breakfast skipping, takeaway-food consumption and dietary diversity

Table 3 shows multivariate-adjusted means of each of the dietary habits including breakfast skipping, eating out and dietary variety according to marital and parental status and family members living together.

In Model 1, the adjusted means of frequency of weekly breakfast skipping and frequency of eating out showed significant inverse associations with marital and parental status and family members living together (p for trend=0.028 and 0.031, respectively). Those results in Model 2 were similar to the results in Model 1. However, there was no significant association of marital and parental status and family members living together with frequency of weekly breakfast skipping or frequency of eating out after adjustment for age of youngest child (Model 3). There was no significant association of marital and parental status and family members living together with dietary variety.

DISCUSSION

In this study, the OR of current drinking in unmarried participants living with their parents was decreased by 65% compared to the reference. In addition, although the presence of family tended to decrease the frequency of breakfast skipping and the frequency of eating out, there were no significant association between the presence of family and frequency of weekly breakfast skipping or the frequency of eating out after adjustment for age of youngest child. For participants who lived with a partner and children, dietary habits such as skipping breakfast and eating out were greatly influenced by the age of youngest child in our study. On

Table2. Odd ratios (95% confidence intervals) for self-rated health, smoking habit and drinking habit according to the existence of family members living together.

Variables	case/control	Model 1 OR (95% CI)	*p* value	Model 2 OR (95% CI)	*p* value	Model 3 OR (95% CI)	*p* value
Bad self-rated health							
Single / unmarried and living with a person other than their parents	13/28	1.00(reference)		1.00(reference)		1.00(reference)	
Unmarried and living with parents	10/48	0.43(0.17-1.12)	0.084	0.42(0.16-1.11)	0.082	0.41(0.16-1.08)	0.169
Married without children	9/33	0.52(0.19-1.43)	0.207	0.54(0.19-1.50)	0.237	0.52(0.19-1.45)	0.173
Married with children	43/116	0.71(0.33-1.52)	0.375	0.71(0.32-1.54)	0.381	0.94(0.33-2.63)	0.336
Current smoking							
Single / unmarried and living with a person other than their parents	9/32	1.00(reference)		1.00(reference)		1.00(reference)	
Unmarried and living with parents	5/53	0.33(0.10-1.10)	0.070	0.32(0.10-1.08)	0.066	0.32(0.10-1.08)	0.066
Married without children	8/34	0.60(0.20-1.82)	0.363	0.59(0.19-1.81)	0.356	0.57(0.19-1.78)	0.335
Married with children	37/122	0.85(0.36-2.04)	0.721	0.85(0.35-2.03)	0.712	1.71(0.56-5.21)	0.345
Current drinking							
Single / unmarried and living with a person other than their parents	14/27	1.00(reference)		1.00(reference)		1.00(reference)	
Unmarried and living with parents	9/49	0.35(0.13-0.92)	0.033	0.34(0.13-0.92)	0.033	0.35(0.13-0.93)	0.036
Married without children	9/33	0.38(0.14-1.06)	0.065	0.39(0.14-1.08)	0.069	0.40(0.14-1.11)	0.079
Married with children	57/102	0.87(0.41-1.85)	0.711	0.87(0.41-1.86)	0.716	1.10(0.41-2.97)	0.856

Wald confidence intervals for adjusted ORs (95% CIs)
Model 1 : adjusted for age (continuous) and sex (binary : men and women)
Model 2 : adjusted for Model 1 + employment status (categorical : regular employment, part time or other) and working time (continuous)
Model 3 : adjusted for Model 2 + age of youngest child (as continuous : no child, 0-4 years, 5-9 years, 10-14 years, 15-19 years, ≥20 years)
Abbreviations : odds ratios, OR : confidence intervals, CI

Table3. Multivariate-adjusted means (95% confidence intervals) for breakfast skipping, eating out and dietary variety according to the existence of family members living together.

Variables	Subjects	Model 1 Adjusted mean (95% CI)	Model 2 Adjusted mean (95% CI)	Model 3 Adjusted mean (95% CI)
Weekly breakfast skipping (times/week)				
Single / unmarried and living with a person other than their parents	41	2.02(1.32-2.73)	2.08(1.38-2.77)	1.99(1.26-2.72)
Unmarried and living with parents	58	1.69(1.09-2.28)	1.74(1.15-2.32)	1.63(0.99-2.27)
Married without children	42	2.19(1.50-2.89)	2.16(1.48-2.84)	2.03(1.28-2.77)
Married with children	159	1.22(0.87-1.58)	1.20(0.85-1.55)	1.30(0.88-1.71)
p for trend		0.028	0.013	0.219
Weekly eating out (times/week)				
Single / unmarried and living with a person other than their parents	41	3.26(2.44-4.08)	3.25(2.42-4.07)	3.03(2.17-3.89)
Unmarried and living with parents	58	2.66(1.97-3.35)	2.67(1.98-3.37)	2.42(1.67-3.17)
Married without children	42	2.18(1.37-2.98)	2.18(1.37-2.99)	1.88(1.00-2.76)
Married with children	159	2.22(1.81-2.64)	2.22(1.80-2.63)	2.45(1.95-2.94)
p for trend		0.031	0.032	0.246
Dietary variety (score)				
Single / unmarried and living with a person other than their parents	41	1.31(0.57-2.05)	1.36(0.62-2.10)	1.32(0.54-2.10)
Unmarried and living with parents	58	2.44(1.82-3.07)	2.44(1.81-3.06)	2.38(1.70-3.07)
Married without children	42	1.92(1.19-2.65)	1.90(1.17-2.63)	1.84(1.04-2.64)
Married with children	159	1.89(1.52-2.27)	1.89(1.51-2.26)	1.93(1.49-2.38)
p for trend		0.728	0.805	0.509

Values are adjusted mean (95%CI).
Model 1 : adjusted for age (continuous) and sex (binary : men and women)
Model 2 : adjusted for Model 1 + employment status (categorical : regular employment, part time or other) and working time (continuous)
Model 3 : adjusted for Model 2 + age of youngest child (as continuous : no child, 0-4 years, 5-9 years, 10-14 years, 15-19 years, ≥20 years)
Abbreviations : confidence intervals, CI

the other hand, there were no significant associations of the presence of family members with three health-related habits including bad self-rated health, smoking habit and diet variety in this study.

Our results showed that current drinking in unmarried participants living with their parents was significantly decreased compared to that in single participants, though there was no association between the presence of partner and children and drinking habit. Previous studies suggested that alcohol consumption status was associated with family structure and/or family composition (23-26). Those studies showed that the amount of alcohol consumption was dependent on whether their parents drink alcohol or not. The presence of one parent and especially both parents influences the amount of alcohol intake. It has been reported that the percentage of persons abstaining from alcohol is lower in persons living with their parents than in persons not living with their parents. This might be the reason for the risk of current drinking in unmarried participants living with their parents being lower than that in single participants (Table 2). However, since we could not obtain data about alcohol consumption by parents in this study, we could not perform analysis with consideration of alcohol consumption by parents. Changes in life-stages such as partnering and/or parenting have been reported to change lifestyle and/or behavior such as alcohol consumption (5-8). Therefore, though we expected that married participants would have a lower frequency of current drinking than that of single participants, there was no difference in the present study. One reason for this result may be the difference in the definition of drinking. In this study, we defined participants with a drinking frequency of more than one time a week as current drinkers, because we wanted to assess a drinking habit. On the other hand, previous studies used excessive alcohol consumption patterns such as alcohol abuse for analysis (23, 24).

It has reported that both the status of partnering and that of parenting are related to dietary behavior such as skipping breakfast and eating out. Several studies conducted in Western countries suggested that both partnering and parenting are associated with a lower risk of skipping breakfast (13, 14, 18). Similar results were also obtained in studies conducted in Asian countries including Japan (20, 21). In our study, the presence of a partner and children tended to decrease the frequency of breakfast skipping and eating out after adjustment for age, sex, employment status and working time. Participants with a partner and/or children might be more likely to eat breakfast than those without a partner and/or children because they have a morning routine of making breakfast for their partner and/or children. However, there was no significant association of the presence of a partner and children with frequency of breakfast skipping or frequency of eating out after further adjustment for age of youngest child in this study. One reason for this result may be that the age of youngest child rather than the presence of a partner and/or children plays a greater role in predicting dietary habits such as breakfast skipping and eating out. To determine whether age of the youngest child is associated with dietary habits, we estimated the standardized coefficients (β) for each of the dietary habits according to a 1-unit increase in age of the youngest child in subanalysis after controlling for age, sex, employment status, and working time among persons living with their partner and children. Significant associations were observed between age of the youngest child and frequency of eating out (β = -0.254, p=0.009). Although the association did not reach statistical significance, age of the youngest child was negatively associated with frequency of breakfast skipping (β = -0.130, p=0.187). This means that an increase in the age of the youngest child might affect dietary behaviors including breakfast skipping and eating out. Hirasawa *et al.* also reported that participants who answered 'eat until full' and 'eat an unbalanced diet' tended to be taking care of younger children than participants with other answers (21). Thus, not only the presence of children but also the age of children

might be an important factor when assessing the association between the status of partnering and parenting and dietary habits.

Our study has some limitations that need to be taken into account when interpreting the results. First, there is a possibility that a sample error occurred because we conducted an Internet panel survey. It has been reported that biased age of subjects in an Internet survey is biased toward a relatively young population aged 20-40 years (27) depending on the age of the usual group (20-40 years) of Internet users (28). In addition, it has been reported that sample errors occur because the Internet survey target is Internet users and voluntary investigation participants (29). Thus, it is necessary to interpret the results after taking into account the presence of a sampling error. Second, because of the cross-sectional approach, the temporal relationship between the presence of a partner and/or children and dietary habits remains obscure. Third, the sample size of this study was small. In addition, the findings might not be generalizable to other populations because the study participants were only young Japanese workers. Fourth, the association between drinking habits and family structure might be underestimated because current drinkers in this study had a wide range of drinking frequencies. Therefore, to determine whether the association between drinking habits and family composition changes depending on the definition of current drinking, we estimated the ORs and 95% CIs for current drinking according to family composition in a subanalysis after controlling for covariates. As a result, the ORs (95% CIs) for current drinking (e.g., more over 3 times a week) in unmarried participants living with their parents, married participants without children and married participants with children were 0.27 (0.09-0.84 ; p=0.023), 0.23 (0.07-0.78 ; p=0.018) and 0.45 (0.14-1.46 ; p=0.183), respectively. Those associations were the same in the case of drinking frequency of more over 1 time a week (Table 2). Although the frequency of drinking (e.g., more than 5 times a week) did not reach statistical significance, those associations were similar to the case of drinking frequency of more over 1 time a week (Table 2). Thus, the association between family composition and current drinking might be similar regardless of the definition of current drinking (e.g., more than one time, three times or five times a week). Fifth, we could not obtain data for factors associated with drinking behavior. Some previous studies showed that biological factors (e.g., genetic polymorphism of alcohol-metabolizing enzymes), cultural factors (e.g., religion) and/or psychological factors (e.g., alcohol outcome expectancy) were factors influencing drinking behavior including the amount of alcohol intake and frequency of drinking (30-32). Therefore, those points must be taken into account when interpreting the present association of marital and parental status and family members living together with drinking habit. Sixth, almost all of the data obtained were based on self-reporting, and there is a possibility that the association between partnering and parenting and dietary habits may be underestimated by misclassification of data. Finally, there may be confounding factors that were not removed completely, though some potentially important confounders were adjusted in the analysis.

In conclusion, it is possible that the presence of parents living together affects current drinking in Japanese workers. In addition, the age of children might affect the frequency of breakfast skipping and frequency of eating out for Japanese workers who live with a partner and children. A further large-scale prospective study on the effects of partnering and/or parenting on health-related behaviors including dietary habits is needed.

CONFLICT OF INTEREST

All authors state that they have no conflicts of interest.

ABBREVIATIONS USED

OR, odds ratio ; CI, confidence intervals

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