Home cooking, cooking skills and dementia requiring long-term care: a population-based cohort study in Japan

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ABSTRACT

Background People have come to rely on restaurants and takeaway foods, and less on cooking at home. We examined the association between home cooking and dementia incidence, ascertained through administrative long-term care records, and whether the benefits of home cooking differ by cooking skills.

Methods Participants in the Japan Gerontological Evaluation Study, a population-based cohort study, were followed for 6 years. The incidence of dementia was ascertained in 10 978 participants through data from the public long-term care insurance system, which captures functionally significant cognitive impairment requiring care. Cooking frequency and skills were assessed in a baseline survey. Participants with high and low frequencies of home cooking were matched in men and women based on demographic, socioeconomic and health-related factors using propensity score matching. Fine-Grey competing risk models were used, with death treated as a competing event.

Results During the follow-up, 1195 dementia cases were found. A total of 1347 male and 321 female pairs were matched between high (at least once a week) and low (less than once a week) cooking frequencies. The subdistribution hazard ratio (SHR) for high cooking frequency (vs low cooking frequency) was 0.77 (95% CI 0.61 to 0.98) in men and 0.73 (95% CI 0.54 to 0.98) in women. The benefits of higher cooking frequency were more pronounced in those with low cooking skills (SHR 0.33, 95% CI 0.13 to 0.84).

Conclusions Creating an environment where people can cook meals when they are older may be important for the prevention of dementia.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ High frequency of home cooking was associated with improved diet quality. Over the past decades, people have relied on restaurants, takeaway foods and frozen foods as their basic meals, and home cooking has become less frequent. However, the association between home cooking and dementia is unknown.

WHAT THIS STUDY ADDS

⇒ In a population-based cohort study, we found that cooking at least once a week was associated with a 30% reduction in dementia risk. For novice cooks with low cooking skills, the benefits of higher cooking frequency were significant, with a 70% reduction in dementia risk.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Creating an environment where people can cook meals when they are older may be important for the prevention of dementia.

INTRODUCTION

As populations age, the number of people with dementia is projected to increase worldwide,[1] placing enormous burdens on families, communities, social welfare and long-term care costs.[2] The 2020 report by the Lancet Commission identified 12 potentially modifiable risk factors for dementia and indicated that approximately 40% of dementia cases could be prevented or delayed.[3] Most of the risk factors were related to lifestyle factors, such as diet and physical activity, and thus the development of interventions for these factors is important.

Meal preparation, including home cooking, is a lifestyle factor with the potential to improve diet and promote physical activity. Evidence is accumulating on the dietary benefits of cooking, with reports of increased vegetable and fruit consumption, improved adherence to a Mediterranean diet, decreased ultra-processed food intake, and improved diet quality, all of which contribute to health promotion.[4–6] Conversely, eating out more often was shown to decrease diet quality, increase energy and total fat intakes, and increase sugar-sweetened beverage and alcohol intakes, all of which are harmful for health.[7]

Cooking-related activities such as going to the supermarket, preparing meals and cleaning dishes are major physical activities for older adults.[8] Aspects of daily life in which physical activity may take place include leisure time, household chores, mobility and occupational exercise.[9] As older adults lose occupational exercise on retirement, a higher proportion of their physical activity is achieved through household chores, with a report indicating that they spend nearly 3 hours a day on household chores.[10] The household chores in which older adults are most involved are shopping and meal preparation.[11] Therefore, daily cooking-related activities represent an important source of physical activity for older adults.

Meal preparation provides opportunities for cognitive stimulation because it involves a cognitively complex series of tasks with multiple steps[12 13]: (1) meal planning, which consists of thinking about menus and which ingredients to use;

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(2) selecting and acquiring ingredients, which involves selecting and purchasing ingredients with a budget and use-by dates in mind; (3) cooking procedures, which include turning ingredients into a meal; and (4) serving.

During the past 50 years, people have relied on restaurants, takeaway foods, prepared foods and frozen foods as their basic meals, and home cooking has become less frequent.[14–16] In a 2018/2019 global poll of 142 countries, the frequency of cooking dinner at home was only three times a week for adults, including older adults.[17] Loss of someone to cook meals and living alone as a result of bereavement, divorce or other family changes are frequent occurrences with ageing. These changes can result in the need to prepare meals in old age. Older people with no one to cook their meals were found to have a three times higher risk of undernutrition if they had poor cooking skills.[18] Therefore, the impact of cooking frequency on health may differ between those with high cooking skills who have been cooking for many years and those with low cooking skills who begin cooking in old age.

Using a population-based cohort study of older adults in Japan, we aimed to examine the association between home cooking frequency and dementia incidence, and whether the benefits of home cooking differ according to cooking skills.

METHODS

Study design and participants

The study used cohort data from the Japan Gerontological Evaluation Study (JAGES), which was conducted in 2016 and followed up to 2022. The JAGES was established to assess the social determinants of healthy ageing in Japan.[19 20] A flow chart of the participants is presented in online supplemental eFigure 1. The baseline survey for the JAGES cohort was conducted in 21 municipalities across Japan in 2016, with self-reported questionnaires distributed by mail to 144 046 people aged ≥65 years. Random sampling was conducted in the larger municipalities, while a complete census of older residents was conducted in the smaller municipalities. A total of 103 629 people returned the questionnaires (response rate 72%), and 93 406 were followed from 2016 to 2022. One-eighth of the sample received the cooking-related questionnaire module (n=11 602). The sample for the present study comprised 10 987 participants, after excluding those who received care and assistance with walking, bathing and going to the toilet in their daily lives (n=96) and those with missing data on cooking frequency (n=516). The participants were informed that their involvement in the study was voluntary, and that completion and return of the questionnaire constituted consent to participate in the study.

Dementia incidence

Dementia incidence was ascertained by linking the cohort participants to the public long-term care insurance (LTCI) registry data in Japan during the follow-up period from 2016 to 2022. The public LTCI registry data are derived from home assessments and medical examinations.[21] Briefly, trained investigators assess applicants' eligibility by evaluating six categories: (1) physical function, (2) activities of daily living, (3) cognitive function, (4) mental and behavioural disorders, (5) adaptation to social life, and (6) past medical treatment.[22] Investigators classify applicants on a dementia scale based on the severity of cognitive impairment.[23] In accordance with previous studies,[23 24] this study defined dementia as level II or higher on the Dementia Scale (at least symptoms, behaviours and communication deficits that interfere with daily life; level II corresponds to a 16-point rating on the Mini-Mental State Examination[25]).

Cooking frequency

The frequency of home cooking was assessed using the question 'How often do you cook by yourself? Do not include ready-to-eat food', to which the respondents answered 'more than five times a week', '3–5 times a week', '1–2 times a week', 'less than once a week', or 'never'.[18] This question was confirmed to have remarkable discriminant validity, with women showing a significantly higher frequency than men, and those with high cooking skills showing a higher frequency than those with low cooking skills.[18] In the analysis, cooking frequency was treated as a categorical variable. For analysis examining the dose–response relationship, scores of 6, 4, 1.5, 0.5 and 0 (cooking frequency per week) were assigned to the responses 'more than five times a week', '3–5 times a week', '1–2 times a week', 'less than once a week', or 'never', respectively. The resulting variable was treated as a continuous variable.

Cooking skills

Cooking skills were used as an indicator of whether a person was a novice cook or an advanced cook. Cooking skills were assessed using a cooking skills scale in a baseline self-reported questionnaire. The scale for cooking skills contained seven items designed to consider basic Japanese cooking methods and typical meals: (1) overall cooking skills; (2) able to peel fruits and vegetables; (3) able to boil eggs and vegetables; (4) able to grill fish; (5) able to make stir-fried meat and vegetables; (6) able to make miso soup; and (7) able to make stewed dishes.[18] Participants were asked to rate their cooking skills on a Likert scale ranging from unable (1) to very well (6). The scale had adequate internal consistency (Cronbach's $\alpha=0.96$) and had predictive validity, with those with low cooking skills consuming vegetables and fruits less frequently than those with high cooking skills and having higher risks of being underweight and death.[18 26] The mean score of the seven items was calculated and classified into three categories: high, >4.0; middle, 2.1–4.0; and low, ≤2.0.

Covariates

Covariates were assessed using a self-reported questionnaire at baseline (table 1). Sociodemographic characteristics (education, annual household income, employment status, cohabitation status), alcohol drinking and smoking habits, health-related factors (instrumental activities of daily living (IADL), depressive symptoms, cognitive complaints), availability of food stores[27] and city scale (urban or rural) were included as potential confounders. Annual household income was adjusted for household size by dividing the income by the square root of the number of people in the household. Alcohol drinking and smoking habits were categorised as never, former or current. IADL was assessed using the Tokyo Metropolitan Instite of Gerontology Index of Competence. Participants were categorised as either fully capable (score=13) or less capable (score ≤12).[28] Depressive symptoms were assessed using the Japanese version of the 15-item Geriatric Depression Scale (GDS-15).[29] Responses were coded as: 1=symptoms present; 0=no symptoms. The 15 items were summed, with a score of 5 or higher defined as depressed and a score below 5 defined as non-depressed.[29 30] Baseline cognitive function was assessed using three items from the Kihon Checklist–Cognitive Function scale, for which predictive validity regarding dementia incidence has been confirmed.[31] City scale was defined as urban for municipalities with a population density ≥4000 and

Table 1 SHR and 95% CI for the association of dementia with cooking frequency in older adults in Japan (n=10 987)

Cooking frequency	N	Number with dementia (%)	Incidence rate per 100 000 person-years (95% CI)	Model 1 SHR (95% CI)	Model 2 SHR (95% CI)
All (n=10 987)					
None	2924	387 (13.2)	6.68 (6.05 to 7.38)	Reference	Reference
<1/week	739	81 (11.0)	5.36 (4.31 to 6.67)	0.82 (0.64 to 1.04)	0.83 (0.65 to 1.06)
1–2/week	758	83 (10.9)	5.33 (4.30 to 6.61)	**0.73 (0.57 to 0.93)**	**0.77 (0.60 to 0.98)**
3–4/week	887	112 (12.6)	6.18 (5.13 to 7.43)	0.80 (0.63 to 1.02)	0.79 (0.62 to 1.01)
≥5/week	5679	532 (9.4)	4.46 (4.10 to 4.86)	**0.59 (0.49 to 0.71)**	**0.63 (0.52 to 0.76)**
Men (n=5005)					
None	2705	309 (11.4)	5.69 (5.09 to 6.36)	Reference	Reference
<1/week	626	56 (8.9)	4.31 (3.32 to 5.60)	0.90 (0.68 to 1.19)	0.91 (0.68 to 1.22)
1–2/week	540	41 (7.6)	3.65 (2.68 to 4.95)	**0.72 (0.52 to 1.00)**	0.73 (0.52 to 1.01)
3–4/week	404	45 (11.1)	5.47 (4.08 to 7.32)	1.01 (0.74 to 1.39)	0.95 (0.68 to 1.33)
≥5/week	730	69 (9.5)	4.72 (3.73 to 5.98)	0.77 (0.59 to 1.01)	**0.72 (0.52 to 0.98)**
Women (n=5982)					
None	219	78 (35.6)	21.8 (17.4 to 27.2)	Reference	Reference
<1/week	113	25 (22.1)	11.8 (7.94 to 17.4)	**0.57 (0.36 to 0.92)**	**0.59 (0.36 to 0.96)**
1–2/week	218	42 (19.3)	9.71 (7.17 to 13.1)	**0.60 (0.40 to 0.89)**	0.67 (0.44 to 1.02)
3–4/week	483	67 (13.9)	6.76 (5.32 to 8.59)	**0.53 (0.37 to 0.75)**	**0.58 (0.40 to 0.83)**
≥5/week	4949	463 (9.4)	4.42 (4.04 to 4.85)	**0.42 (0.32 to 0.55)**	**0.49 (0.37 to 0.65)**

Boldface indicates statistical significance (p<0.05).
Model 1: adjusted for age and sex.
Model 2: model 1 with additional adjustment for education, annual income, employment status, cohabitation status, food store availability, city scale, alcohol drinking, smoking, instrumental activities of daily living, depressive symptoms, and cognitive complaints.
SHR, subdistribution hazard ratio estimated from Fine and Gray competing risks regression models, with death treated as a competing event.

rural for municipalities with a population density <4000, using the index of densely inhabited districts.[32] To investigate whether the cooking frequency was associated with dementia independently of other productive activities, paid work, volunteer activities, gardening and handicrafts were assessed as productive activities.[33 34] The frequency of paid work and participation in volunteer groups was categorised according to the frequency of cooking. Regarding gardening and handicrafts, participants were asked whether they engaged in gardening or handicrafts as a hobby or activity during their leisure time (yes/no).[35] Potential mediating factors included frequency of going out, time spent walking or standing[26] and grocery shopping as cooking-related activities. For grocery shopping, participants were asked whether they usually went out and bought fresh groceries on their own. Covariates without data were categorised as 'missing'.

Statistical analysis

Fine-Grey subdistribution hazards models were used to obtain subdistribution hazard ratios (SHRs) and 95% CI for dementia incidence during the 6-year follow-up period to account for death as a competing risk. This approach allows direct estimation of the effect of cooking frequency on the cumulative incidence function of dementia. Time-to-event was defined as the time from baseline to dementia onset; participants who died before developing dementia were treated as having experienced a competing event, whereas those who were lost to follow-up (eg, moved away) or remained alive without dementia at the end of follow-up were censored. The proportional subdistribution hazards assumption was assessed by visually inspecting cumulative incidence function curves and by testing interactions between cooking frequency and time in the Fine-Grey competing risk models. The following series of models were constructed: model 1, adjusted for age and sex; model 2, model 1 with additional adjustment for education, annual income, employment status, cohabitation status, food store availability, city scale, alcohol drinking and smoking status as potential confounders, and additional adjustment for IADL, depressive symptoms and cognitive complaints to account for baseline health status. Furthermore, additional models incorporating cooking-related activities assessed at baseline (frequency of going out, time spent walking/standing, frequency of grocery shopping) as potential mediating factors were constructed. Models were fitted sequentially, and changes in the SHRs for cooking frequency after additional adjustment for these factors were examined as supportive evidence for possible mediation.

Propensity score matching was applied to balance observed covariates. For the propensity score analysis, the high cooking frequency group was defined using the cut-off for cooking frequency that lowered the risk of dementia obtained from the above-mentioned analysis, and participants with high cooking frequency were matched to those with low cooking frequency on a 1:1 propensity score by sex. The probability of high cooking frequency versus low cooking frequency was calculated by a multivariate logistic regression model that included the covariates. The estimated propensity score was used to match participants with high cooking frequency to those with low cooking frequency using a calliper equal to 0.2 of the standard deviation of the logit of the propensity score.[36] Using the matched samples, we examined the association between cooking frequency and dementia based on a Fine-Grey SDH model.

In addition, two sensitivity analyses were performed. First, we conducted a landmark analysis by setting a landmark time at 1, 2 or 3 years after baseline. Participants who developed dementia or died within the first 1, 2 or 3 years of follow-up were excluded. Follow-up for the remaining participants started at the landmark time and continued until dementia onset, death or censoring. Second, we performed an analysis excluding individuals with

cognitive complaints at baseline to minimise potential reverse causation.

All analyses were conducted using Stata Version 17.

RESULTS

The baseline characteristics of the participants are shown in online supplemental eTable 1. One-fifth of the participants were aged ≥80 years, one half were female, one third had ≤9 years of education, 40% had an annual income of <2 million yen, and more than one half were retired. Approximately one half of the participants cooked at least five times a week, while more than one quarter did not.

The median follow-up period was 6.13 years (IQR 6.00–6.38) (online supplemental eTable 2). During follow-up, 1195 participants developed dementia (cumulative incidence of dementia: 1195/10 978 (11%)); 870 participants died before developing dementia, and 157 were lost to follow-up due to moving out of the study area before developing dementia.

In the multivariate analysis using Fine-Grey competing risk models, higher cooking frequency was associated with a lower risk of dementia (table 1 and online supplemental eTable 3). In models adjusting for cooking skills as a continuous variable, each one-time-per-week increase in cooking frequency was associated with a lower risk of dementia (online supplemental eTable 3). When cooking frequency was categorised, cooking at least once a week was significantly associated with a lower risk of dementia (table 1). Therefore, we used propensity score matching to assess whether cooking more than once a week was associated with a lower risk of dementia compared with cooking less than once a week. Because cooking frequency differed between men and women, propensity score matching was performed separately for men and women. A total of 1347 male and 321 female pairs were matched, and the characteristics of the participants before and after propensity score matching are shown in online supplemental eTables 4 and 5. After propensity score matching, the biases of covariates were no longer significant.

Cooking at least once a week was associated with a lower risk of dementia in both men and women (table 2). In the model adjusted for age only, the SHR for cooking frequency at least once a week (vs less than once a week) was 0.83 (95% CI 0.68 to 1.00) in men and 0.52 (95% CI 0.41 to 0.66) in women, and remained significant after adjustment for potential confounders (SHR 0.79, 95% CI 0.64 to 0.98 in men, and SHR 0.60, 95% CI 0.47 to 0.77 in women). Visual inspection of the cumulative incidence function curves suggested that the proportional subdistribution hazards assumption was generally satisfied (online supplemental eFigure 2). In tests incorporating interactions between cooking frequency and time, evidence of time-dependent effects was observed in the overall sample and among women. Notably, these interactions were attenuated and no longer statistically significant in analyses excluding dementia cases diagnosed within the first year of follow-up, indicating that early events may have contributed to the observed non-proportionality. After propensity score matching, the SHR for cooking frequency at least once a week (vs less than once a week) was 0.77 (95% CI 0.61 to 0. 98) in men and 0.73 (95% CI 0.54 to 0.98) in women.

In landmark analyses with landmark times set at 1, 2 and 3 years, the association between cooking frequency and dementia was generally consistent with the primary findings, although the association was attenuated with increasing landmark time (online supplemental eTable 6). Next, after excluding participants with cognitive complaints at baseline, the association was attenuated but remained consistent in direction with the primary findings (online supplemental eTable 7).

Next, we examined whether the association between cooking frequency and dementia differed according to cooking skills. Having low cooking skills was associated with a higher risk of dementia (SHR 1.69, 95% CI 1.36 to 2.11, model 1 in table 3), and this association was independently associated with cooking frequency (model 2). The association between cooking frequency and dementia appeared to vary by level of cooking skills, as participants with low cooking skills had a lower risk of dementia if they cooked at least once a week (p for interaction 0.05, model 3). The risk of dementia among participants with low cooking skills and low cooking frequency as the reference is shown in figure 1 and online supplemental eTable 8. Compared with participants with low cooking skills and low cooking frequency, the SHR for risk of dementia was 0.33 (95% CI 0.13 to 0.84) in participants with low cooking skills who cooked at least once a week.

The results examining whether the association between cooking frequency and dementia was independent of other productive activities are shown in online supplemental eTable 9.

Table 2 SHR and 95% CI for the association of dementia with cooking frequency in older men and women in Japan before and after propensity score matching

	Before matching					After matching	
				Model 1	Model 2		
Cooking frequency	N	Number with dementia (%)	Incidence rate per 100 000 person-years (95% CI)	SHR (95% CI)	SHR (95% CI)	N	SHR (95% CI)
Men							
Low (<1/w)	3331	365 (11.0)	5.42 (4.89 to 6.01)	Reference	Reference	1347	Reference
High (≥1/w)	1674	155 (9.3)	4.55 (3.88 to 5.32)	**0.83 (0.68 to 1.00)**	**0.79 (0.64 to 0.98)**	1347	**0.77 (0.61 to 0.98)**
Women							
Low (<1/w)	332	103 (31.0)	18.0 (14.9 to 21.9)	Reference	Reference	321	Reference
High (≥1/w)	5650	572 (10.1)	4.81 (4.43 to 5.22)	**0.52 (0.41 to 0.66)**	**0.60 (0.47 to 0.77)**	321	**0.73 (0.54 to 0.98)**

Boldface indicates statistical significance (p<0.05).
Model 1: adjusted for age.
Model 2: model 1 with additional adjustment for education, annual income, employment status, cohabitation status, food store availability, city scale, alcohol drinking, smoking, instrumental activities of daily living, depressive symptoms, and cognitive complaints.
SHR, subdistribution hazard ratio estimated from Fine and Gray competing risks regression models, with death treated as a competing event; w, week.

Table 3 SHR and 95% CI for the association of dementia with cooking skills and cooking frequency in older adults in Japan (n=10 888)

	Model 1	Model 2	Model 3
	SHR (95% CI)	SHR (95% CI)	SHR (95% CI)
Cooking skill			
High (reference)	Reference	Reference	Reference
Middle	**1.34 (1.14 to 1.57)**	**1.26 (1.06 to 1.49)**	**1.32 (1.06 to 1.65)**
Low	**1.69 (1.36 to 2.11)**	**1.53 (1.22 to 1.92)**	**1.70 (1.31 to 2.20)**
Cooking frequency			
Low (<1/w) (reference)		Reference	Reference
High (≥1/w)		**0.80 (0.67 to 0.95)**	0.84 (0.68 to 1.04)
Cooking skill x cooking frequency			
Middle skill x high frequency (≥1/w)			0.93 (0.67 to 1.30)
Low skill x high frequency (≥1/w)			0.39 (0.16 to 1.00)

For cooking skill, the reference category was high skill.
For cooking frequency, the reference category was low frequency (<1/week).
For interaction terms, the reference group was high cooking skill with low cooking frequency (<1/week).
Boldface indicates statistical significance (p<0.05).
Models were adjusted for age, sex, education, annual income, employment status, cohabitation status, food store availability, city scale, alcohol drinking, smoking, instrumental activities of daily living, depressive symptoms, and cognitive complaints.
SHR, Subdistribution hazard ratio estimated from Fine and Gray competing risks regression models, with death treated as a competing event; w, week.

When other productive activities, including paid work, volunteer activities, gardening and handicrafts, were included simultaneously in the model, the association between cooking frequency and dementia remained unchanged.

DISCUSSION

Cooking at least once a week was associated with a lower risk of dementia among older adults in Japan. The association between cooking frequency and dementia differed according to cooking skills. For those with low cooking skills, cooking frequency was associated with a greater reduction in the risk of dementia. For those with high cooking skills, possession of cooking skills was associated with a lower risk of dementia, and cooking frequency did not reduce the risk of dementia further.

To our knowledge, this is the first study to show an association between cooking frequency and dementia. A dose–response association was observed, and propensity score matching showed a significant reduction in the risk of dementia for cooking at least once a week. These observations are consistent with previous findings that productive activities were associated with a reduced risk of cognitive decline or dementia among older adults.[33 34] A cohort study conducted in Sweden showed that weekly productive activities, including gardening, housekeeping, cooking, paid work, volunteering and handicrafts, were associated with a reduced risk of dementia in older adults.[34] We found that home cooking frequency was associated with a reduced risk of dementia independently of other productive activities, including gardening, paid work, volunteering and handicrafts (online supplemental eTable 9).

A potential pathway linking cooking frequency to dementia may involve physical activity associated with food shopping and cooking. When we incorporated baseline frequency of going out, time spent walking/standing and whether participants purchased groceries themselves into our analytical model, we found the association between cooking frequency and dementia attenuated (online supplemental eTable 10). This finding is consistent with a previous study showing that the association between cooking skills and death was weakened after adjusting for the frequency of going out and time spent walking/standing.[26] Given that cooking is a household chore involving grocery shopping and standing, cooking may have reduced the risk of dementia through physical activity. Future studies should evaluate cooking-related activities assessed at time points after cooking frequency to elucidate better the mechanisms underlying the association between cooking frequency and dementia.

The association between cooking frequency and lower risk of dementia was greater for people with low cooking skills, ie, novice cooks. This may be explained by the fact that cooking is a more cognitively novel and stimulating activity for novice cooks with low cooking skills than for advanced cooks with high cooking skills. Novel and productive activities, such as writing, were reported to benefit the cognitive reserve.[37] A meta-analysis revealed that cognitively stimulating activities were associated with a reduced risk of dementia.[38] Another explanation could be a ceiling effect. Because high cooking skills were associated with

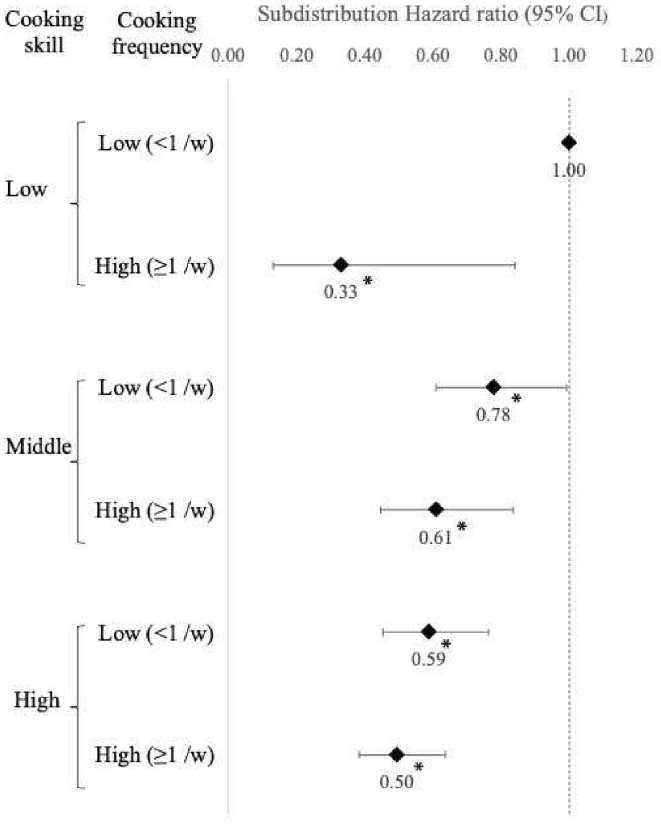

Figure 1 Subdistribution hazard ratios for dementia by cooking frequency and level of cooking skills among older adults in Japan (n=10 888). The model was adjusted for age, sex, education, annual income, employment status, cohabitation status, food store availability, city scale, alcohol drinking, smoking, instrumental activities of daily living, depressive symptoms and cognitive complaints. w, week. *p<0.05.

a reduced risk of dementia, there was little additive association between cooking frequency and dementia.

This study has several limitations. First, cases of dementia may have been underestimated. A nationwide Japanese study that aimed to estimate the prevalence of dementia reported that one-third of dementia cases were not identified in the LTCI registry used in this study, although most of the cases that were not identified involved mild dementia.[39] Second, cooking skills were used to estimate whether the participant was a novice cook, but this may have resulted in misclassification. For example, if a participant had some cooking experience but disliked cooking and only cooked very simple meals, the participant may have been classified as having low cooking skills. However, poor cooking skills were confirmed to be associated with less frequent cooking.[18] Third, propensity score matching was employed, but the variables used for adjustment were limited, and there may be residual unmeasured confounders. Fourth, there is a possibility of selection bias. Participants who were lost to follow-up were more likely to live alone and to exhibit depressive tendencies (online supplemental eTable 11). Therefore, the association between cooking frequency and dementia may have been underestimated. Nonetheless, given that the proportion of participants lost to follow-up was relatively small (1.4%), the potential impact on our findings is likely to be limited. Fifth, the possibility of reverse causality cannot be ruled out. However, it was confirmed that the results remained essentially unchanged even when participants who developed dementia within 1–2 years of follow-up or those with cognitive complaints at baseline were excluded from the analysis (online supplemental eTables 6 and 7). Finally, the generalisability of the findings may not be high because lifestyle factors related to cooking, such as what is eaten and how it is prepared, vary from culture to culture.

This study has revealed an association between home cooking and dementia using a population-based cohort study among Japanese older adults. The study adds findings beyond the nutritional benefits of home cooking. The risk of dementia became lower as people cooked more frequently, and the benefits of cooking were particularly significant for those with low cooking skills, ie, little cooking experience. Creating an environment where people can cook meals when they are older may be important for the prevention of dementia.

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Contributors YT conceived the design, analysed the data, reviewed the literature and wrote the first draft of the paper. TF revised the first draft. KK collected data and edited the manuscript. All authors approved the final version of the manuscript. YT is the guarantor and is responsible for the overall content of the study.

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Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by the Ethics Committee on Research on Human Subjects at the National Center for Geriatrics and Gerontology (No. 1274-2) and Chiba University (No. 3442). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The data that support the findings of this study are available from JAGES Agency but restrictions apply to the availability of these data, which were used under licence for the current study, and so are not publicly available. Data are however available from the corresponding author upon reasonable request and with permission of JAGES Agency (dataadmin.ml@jages.net).

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