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Potential Relationship between Self-Assessed Eating Speed and Recalled Duration of Eating Meals in Apparently Healthy Adults

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Authors' contributions

This work was carried out in collaboration between all authors. Authors KN and HO designed the collaborative project; authors TM and KS collected and analyzed the data; authors KN and HO researched and evaluated the literature and author KN wrote the first draft of the manuscript. All authors reviewed and edited the manuscript, and approved the final version of the manuscript.

Short Research Article

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ABSTRACT

Background: Self-assessed eating speed was frequently used to assess an individual's eating speed in previous clinical studies. However, the relationship between self-assessed eating speed and the duration of eating meals is unknown.
Place and Duration of Study: A cross-sectional study in Saitama, an eastern district of Japan, near Tokyo, in 2012.
Methodology: We determined self-assessed eating speed relative to other people and recalled duration of eating meals (rDEM) in 472 apparently healthy Japanese adults aged 18–69 years. Self-assessed eating speed was assessed using a simple question and was divided into three categories (slow, normal, and rapid). Subjects were asked to report rDEM over the last few days to the nearest 5 min.

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Results: rDEM decreased significantly from slow to rapid self-assessed eating speed (all, $P < .0001$), and from dinner and lunch to breakfast ($P < .0001$). Similar trends were observed when subjects were divided into three categories according to chewing frequency.
Conclusion: Self-assessed eating speed and rDEM may be closely correlated with each other and with chewing frequency, and might be useful to evaluate overall eating behaviors.

Keywords: Eating speed; rapid eating; duration of eating; simple question; chewing.

1. INTRODUCTION

Eating rapidly is putatively associated with obesity and type 2 diabetes [1-5]. Because it is difficult to measure the duration of eating meals, self-assessed eating speed relative to other people is frequently assessed using a simple question to evaluate an individual's eating speed, especially in large clinical studies [1,3-5]. However, the eating speed, corresponding to rapid, normal, or slow self-assessed eating speed, is unknown.

Mealtimes, jobs, and sleeping patterns differ markedly among individuals [6], and some aspects of these activities may be driven by endogenous factors, such as the circadian clock [7], while others are driven by the external environment, including the individual's job. Nevertheless, the durations of eating meals are broadly consistent and hardly change among individuals [8]. Consequently, it may be possible to estimate the duration of eating meals by asking subjects to recall or review their daily life. In this context, we investigated the relationship between self-assessed eating speed, as determined using a simple question, and recalled duration of eating meals (rDEM) in apparently healthy Japanese adults.

2. METHODS

This study was part of a collaboration research program conducted in three institutions in Saitama, Japan: Josai University, Jichi Medical University, and Saitama Health Promotion Corporation. The protocol was approved by the ethics committees at each institution. The subjects were not asked to provide additional written informed consent for this study. They were informed of the purpose of the study, and those who responded to the self-administered questionnaire were regarded to have consented to participate in the study. We initially recruited 506 apparently healthy clerical workers who were working for companies in Saitama prefecture. Most of the subjects met each other for the first time at Saitama Health Promotion Corporation where they completed the questionnaire. Overall, 34 subjects were excluded because of incomplete data. Therefore, 472 subjects (310 men and 152 women) aged 18–69 years (mean 43.8 ± 10.9 years) who regularly ate dinner were included in the analysis.

We made a questionnaire including some questions about eating habits. The first question was "Do you think your meal-eating speed is usually rapid compared with other people's?", with the description of "Please answer the question without due consideration of your eating habits", for which the possible responses were "slow", "normal", or "rapid". The next question was "How long does it take to eat a meal?", "Please answer the question by recalling your daily life and eating habits in the past few days". The subjects were asked to estimate their

duration of eating meals (i.e., breakfast, lunch, and dinner); responses were to be given to the nearest 5 min. While completing the questionnaire, the subjects were not allowed to talk to other subjects completing the questionnaire at the same time; therefore, they did not know whether their rDEM was actually slow, normal, or rapid compared with that of other people. The questionnaire also included items to assess habitual skipping of meals and self-assessed chewing frequency, which was classified as slow, normal, or rapid.

χ^2 tests were used to examine whether the distribution of self-assessed eating speed was significantly different between men and women. Differences in rDEM across the three categories of self-assessed eating speed and chewing were examined using the Kruskal–Wallis test. Differences in rDEM between men and women and between the three daily meals were examined using Mann–Whitney's U-test and Friedman's test, respectively. Statistical analyses were performed using Statview version 5.0 (SAS Institute, Cary, NC, USA). Values of $P < .05$ were considered statistically significant.

3. RESULTS

Overall, 8.5%, 50.4%, and 41.1% of subjects reported their self-assessed eating speed to be slow, normal, or rapid, respectively. The distribution of self-assessed eating speed was not significantly differ between sexes ($P = .15$, χ^2-test). A total of 47 subjects skipped breakfast on ≥3 days/week (mean 4.7 days), while nine subjects regularly skipped lunch. The mean ± standard deviation rDEM was 11.5 ± 5.4, 17.6 ± 7.6, and 24.7 ± 12.6 min for breakfast, lunch, and dinner, respectively ($P < .0001$, Friedman's test). As shown in Fig. 1, the rDEM decreased significantly from slow to rapid self-assessed eating speed for all meals, and from dinner and lunch, to breakfast ($P < .0001$). Age was not significantly different between the three categories of self-assessed eating speed ($P = .50$). The rDEM was significantly different between men and women at lunch and dinner, but not at breakfast ($P < .0001$, $P = .001$, and $P = .30$, respectively, Mann-Whitney's U-test; data not shown). Fig. 2 shows that rDEM decreased significantly from slow to rapid self-assessed frequency of chewing (7.2%, 68.4, and 24.4%, respectively) in all meals.

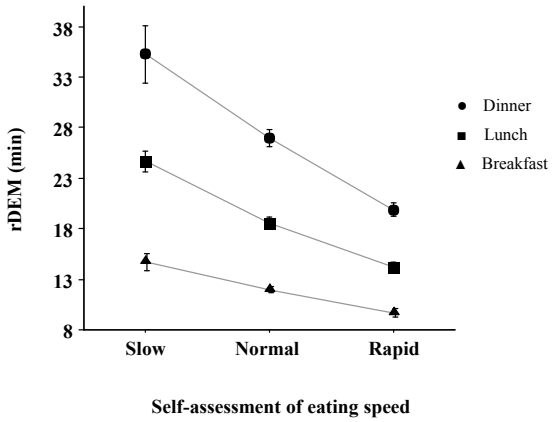

Fig. 1. Relationship between self-assessed eating speed and rDEM at each meal

Self-assessed eating speed was reported to be slow, normal, or rapid by 38, 216, and 171 subjects, respectively, at breakfast, by 40, 236, and 187 subjects, respectively, at lunch, and by 40, 238, and 194 subjects, respectively, at dinner. The rDEM decreased significantly from slow to rapid self-assessed eating speed for all three meals (all P < .0001, Kruskal–Wallis test). rDEM: recalled duration of eating meals

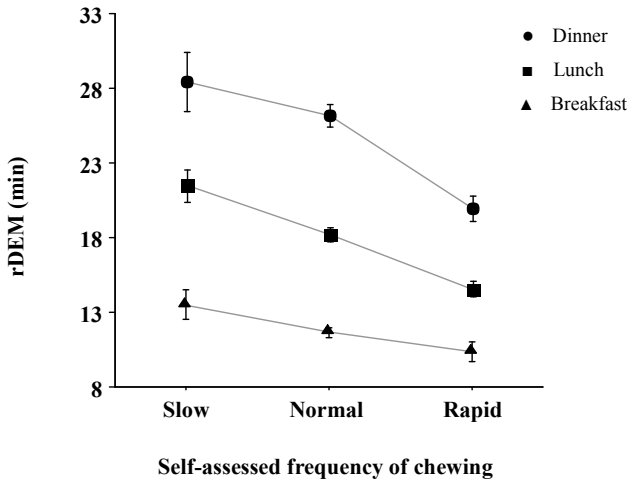

Fig. 2. Relationship between self-assessed frequency of chewing and rDEM according to three meals

Self-assessed frequency of chewing was reported to be slow, normal, and rapid by 32, 295, and 98 subjects, respectively, at breakfast, by 34, 317, and 112 subjects, respectively, at lunch, and by 34, 323, and 115 subjects, respectively, at dinner. The rDEM decreased significantly from slow to rapid self-assessed frequency of chewing in all meals (breakfast, P = .01, lunch and dinner, both P < .0001, Kruskal–Wallis test). rDEM: recalled duration of eating meals

4. DISCUSSION

The current study showed that rDEM decreased from slow to rapid self-assessed eating speed for all meals, and from dinner and lunch, to breakfast. Although the current results may be expected, no large study has addressed the relationship between self-assessed eating speed and the duration of eating meals. We initially hypothesized that the rDEM for breakfast, which is often skipped or overlooked by many people in Japan and in other countries, may not vary among subjects who eat rapidly and those who eat at a normal speed because the rDEM for breakfast is generally shorter than those of other meals [9,10]. However, in this study, we observed a significant association between self-assessed eating speed and rDEM, even for breakfast. Taken together, our findings suggest that self-assessed eating speed, as measured using a simple question, may be associated with rDEM. Additionally, rDEM may be partially explained by self-assessed frequency of chewing during eating.

Although rapid eating is an unfavorable risk factor for cardiometabolic disorders [1-5], very few individuals know exactly how long they take to eat their meals. The strength of this study is the classification of the approximate duration of eating meals in three categories, similar to the results of a recent study involving 70 women [8]. Because the subjects do not know whether their speed of eating meals is quicker or slower than that of other people, it would be useful to determine the reference duration of each meal, which probably differs among populations, to help prevent obesity and cardiovascular diseases.

Although rDEM was self-assessed in this study, individuals generally follow routine daily behaviors [6-8], which means that the rDEM is likely to be fairly consistent in the absence of

unexpected events. However, if there are frequent changes in the environment or behavior, rDEM may be unsuitable for assess the duration of eating meals.

In this study, the rDEM was longer for dinner than for other meals. The most plausible explanations are that people may have limited time for eating breakfast and lunch, and that dinner is usually considered the main meal in Japan and in other countries [9,10]. Additionally, people may spend more time relaxing while eating dinner, including talking with their family, watching television, or listening to music [11], which increases the duration of dinner. Therefore, further studies that include the evaluation of chewing, cardiometabolic risk factors, and environmental factors will be needed to determine the precise duration of eating meals.

Some limitations should be mentioned. First, in this study, the backgrounds of subjects were unknown except age and the gender, although we acknowledge that they were apparently healthy and working for companies close to the Saitama Health Promotion Corporation. In addition, we are unable to exclude the possibility of the recall bias. Finally, invalidated questionnaire used in this study may also interfere with the outcomes. Therefore, the observed relationship may be less clear in other populations or other studies that use different statistical methods beyond univariate analysis. Considering these limitations, the current findings should be interpreted with care.

5. CONCLUSION

In conclusion, our study suggests that rDEM and self-assessed eating speed relative to other people, as determined using a simple question, may be closely correlated with each other and with chewing frequency. These factors might be useful to evaluate an individual's eating speed. However, because current findings are obtained from a preliminary study without enough objective clinical data, further studies are needed to confirm the current findings and to evaluate the possible relationship with obesity-related factors, such as obesity and food intake.

CONSENT

The subjects were not asked to provide additional written informed consent for this study. They were informed of the purpose of the study, and those who responded to the self-administered questionnaire were regarded to have consented to participate in the study.

ETHICAL APPROVAL

All authors hereby declare that the protocol of the study was approved by the ethics committees of Josai University and Jichi Medical University and that the study has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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COMPETING INTERESTS

The authors declared no potential conflicts of interest.

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