

ORIGINAL RESEARCH ARTICLE

Dietary trends in patients with fecal incontinence compared with the National Health and Nutrition Survey

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Abstract:

Objectives: Dietary guidance for patients with fecal incontinence (FI) in Japan is lacking. Here, we sought to investigate dietary trends of patients with FI. **Methods:** We performed a comparative study of dietary intake per day between patients with FI and the national mean. Our study group consisted of 100 female patients who consulted a dietitian about meals between June 2015 and March 2017. For national mean values, we used results from 3,332 women included in the 2015 National Health and Nutrition Survey (NHNS). Survey items included dietary fiber (DF), rice, wheat products, vegetables, fruits, and snacks. **Results:** No significant difference with respect to the overall DF (14.2 and 14.5 g, respectively; $P=0.517$) and vegetables (277.0 and 282.7 g, respectively; $P=0.692$) consumption was observed between the intake values reported in patients with FI and in NHNS. The intake of patients with FI was significantly lesser than that reported in NHNS for rice consumption (184.3 and 262.1 g, respectively; $P<0.001$). The intake of patients with FI was significantly higher than that reported in NHNS for wheat products (116.0 and 97.1 g, respectively; $P<0.001$), fruits (151.3 and 116.7 g, respectively; $P=0.002$), and snacks (45.5 and 28.8 g, respectively; $P<0.001$) consumption. **Conclusions:** Dietary trends for patients with FI revealed that the intake of rice was less, whereas that of wheat products, fruits, and snacks was much higher. Although the overall DF intake was about the same as the national mean, our results suggest that contents of DF differ between patients with FI and the NHNS.

Keywords:

dietary trend, fecal incontinence, National Health and Nutrition Survey, dietary fiber intake, contents of dietary fiber

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Introduction

Conservative treatment methods for fecal incontinence (FI) include diet therapy, drug treatment, biofeedback treatment, and the use of anal plugs. Risk factors for FI include older age, gender (female), obesity, diabetes, irritable bowel syndrome (IBS), and frequent vaginal deliveries.

According to the 2017 Japanese FI guidelines, the recommended dietary therapy is to increase the intake of dietary

fiber (DF)¹⁾. Bliss et al. reported that psyllium supplementation improved FI²⁾. DF was found to be effective when used in combination with medicine³⁾.

The 2015 Japanese dietary reference intake guidelines recommend an intake level of DF over 18 g/day for women and over 20 g/day for men aged 18-69 years⁴⁾. The 2015 National Health and Nutrition Survey (NHNS) reported the mean DF intake was 14.5 g/day in Japan⁵⁾. However, little is known about DF intake for patients with FI in Japan.

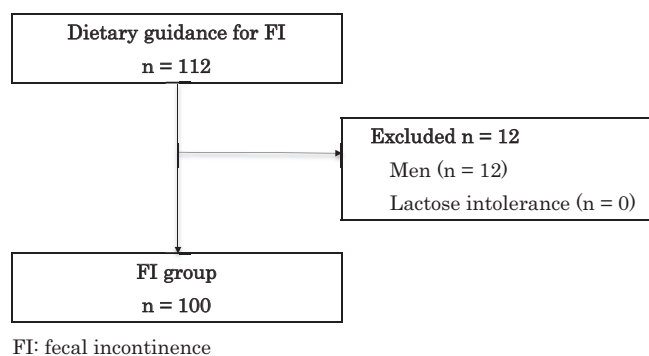


Figure 1. Participant flow.

The purpose of this study was to compare the DF intake of patients with FI with the national mean and to consider which foods should be taken prior to using supplements.

Methods

Our patient study group consisted of 100 women who had consulted a doctor for FI symptoms occurring several times a year between June 2015 and March 2017, and who had consulted a dietitian about meals. As there were few male patients in our clinic, they were excluded. Patients diagnosed with lactose intolerance in the past were excluded. National mean dietary values were determined from the results of 3,332 women surveyed for the NHNS in 2015⁵⁾. The sample size was determined by power calculation. The difference in DF intake between the FI and control groups was 2 g, according to a previous study conducted by Bliss et al.⁶⁾. We expected a 2-g difference in the mean DF intake between the patients with FI and the value reported in NHNS. The sample size was required to have an 80% chance of detecting 2-g differences at a 5% significance level.

The survey nutrient was limited to DF. Survey foods were limited to rice, wheat products, vegetables, fruits, and snacks containing DF. Rice is a Japanese staple food, and the main source of water-insoluble DF and resistant starch⁵⁾. For the study, rice referred to something cooked, while rice cakes and rice vermicelli were also included. Wheat products included were breads and noodles. Vegetables constitute about 40% of the total DF intake⁵⁾. For our study, vegetables included vegetable juices and pickles. Fruits are the main source of water-soluble DF and fructose⁵⁾. For our study, fruits also included jams and fruit juices. Snacks included cakes and rice crackers.

The dietary intakes of patients with FI were recorded in the same way as in the NHNS, focusing on the quantity of all foods consumed. We used the 2015 Standard Tables of Food Composition in Japan for patient nutrition calculations. One-day intake was calculated excluding the Sundays and national holidays in November in NHNS. For each patient,

Table 1. Number and Percentage of Patients in Each Age Group.

Age	FI group		NHNS group	
	n	%	n	%
20-29	1	1.0	245	7.4
30-39	6	6.0	362	10.9
40-49	15	15.0	582	17.5
50-59	19	19.0	519	15.6
60-69	30	30.0	733	22.0
70-	29	29.0	891	26.7
Total	100	100.0	3,332	100.0

FI: fecal incontinence

NHNS: the National Health and Nutrition Survey

the mean per day was calculated from a one-week dietary record.

Since the NHNS and the study patients with FI belonged to different age groups, we calculated the weighted mean from the mean for every age over 20 years based on the female population census of 2015⁷⁾. Results were shown as age-adjusted intake and mean, with the 95% confidence interval indicated. The z-test was used for statistical analysis and a P value <0.05 was considered significant. Excel was used for all calculations.

Results

Participant flow is presented in Figure 1. In total, 100 female patients in our study consulted a dietitian about meals between June 2015 and March 2017. The mean Bristol stool form scale usually was 4.4 (range, 1-7) in the 100 patients. Leaking stool was mainly loose or watery stools. The mean fecal incontinence severity index was 17.1 (range, 8-42) in patients. The mean values for the 84 patients who underwent anorectal manometry were maximum resting pressure 50.2 (range, 4.0-125.7) cmH₂O and maximum squeeze pressure 149.2 (range, 28.9-407.0) cmH₂O. A doctor diagnosed 85 patients with idiopathic incontinence; 3 patients with IBS; and 82 patients with a birth history, of whom 15 were diagnosed with obstetric anal sphincter injuries.

Table 1 shows the number and percentage of patients in each age group. The average patient age was 61.4 (range, 27-88) years, with 59 patients over the age of 60. On the other hand, the average age of the NHNS group was not disclosed.

Table 2 shows the age-adjusted dietary intake. There was no significant difference in DF between the FI and NHNS groups. Rice consumption was significantly less in the FI group than in the NHNS group. There was no significant difference in vegetables intake between the 2 groups. The intake of wheat products, fruits, and snacks was significantly more in the FI group than in the NHNS group.

Table 2. Age-adjusted Dietary Intake in Both Groups.

	FI group (n = 100)		NHNS group (n = 3,332)		P value
	Mean (g)	95% CI (g)	Mean (g)	95% CI (g)	
DF	14.2 [14.9]	13.3-15.1	14.5 [14.7]	14.3-14.7	0.517
Rice	184.3 [181.1]	169.2-199.4	262.1 [260.7]	256.9-267.3	<0.001
Wheat products	116.0 [118.1]	105.0-127.0	97.1 [96.6]	93.8-100.4	<0.001
Vegetables	277.0 [280.9]	253.7-300.2	282.7 [288.7]	276.7-288.7	0.692
Fruits	151.3 [154.6]	129.6-173.0	116.7 [122.5]	112.4-121.0	0.002
Snacks	45.5 [44.9]	39.3-51.7	28.8 [28.5]	27.3-30.3	<0.001

FI: fecal incontinence

NHNS: the National Health and Nutrition Survey

95% CI: 95% confidence interval

(g): grams

DF: dietary fiber

[]: the row date before the age-adjustment

Discussion

In this study, we demonstrated that DF intake for patients with FI did not meet the 18-g reference intake level suggested for Japanese women, but overall was about the same as the mean intake of Japanese women. The intake of rice, the main source of water-insoluble DF and resistant starch, was significantly less in patients with FI than the national mean. Wheat products intake was significantly higher in the FI group than in the NHNS group. The intake of vegetables, which constitutes about 40% of the total DF intake, was the same in patients with FI and the national mean. The intake of fruits, which are the main source of water-soluble DF and fructose, was significantly higher in patients with FI than the national mean. Snacks intake was significantly higher in the FI group than in the NHNS group.

Previous studies showed that the diets of patients with FI were similar to those of control subjects with normal bowel function, and there were no significant differences in the intake of DF⁶⁾. In addition, studies have shown that fiber supplementation, such as the use of psyllium, improved FI^{8,9)}. Comparisons of fiber supplementation by psyllium, gum arabic, and pectin showed that pectin resulted in the greatest percentage of loose/unformed or liquid stools⁸⁾. Pectin is DF that is abundant in fruits.

While the DF intake for patients with FI was about the same as the national mean, the intake of foods that included DF differed. The FI group may have consumed wheat products, fruits, and snacks instead of rice. This finding suggested that DF was derived less from rice and more from wheat products, fruits, and snacks. It is important to note that the types of DF differ between rice and fruits. Furthermore, this study suggested that resistant starch was derived less from rice and that fructose was derived more from wheat products, fruits, and snacks as the available carbohydrates. Water-insoluble DF increases fecal mass and water-

soluble DF increases fecal moisture¹⁰⁾. Resistant starch has both elements, and hence can increase fecal mass and fecal moisture¹⁰⁾. Resistant starch is similar to DF. Fructose causes malabsorption^{11,12)}. Wheat products and snacks also contain fructose. We suspect that the balance of water-insoluble DF, water-soluble DF, resistant starch, and fructose could affect stool consistency. From these studies, further investigation is necessary to determine if patients with FI might improve by increasing rice intake and reducing wheat products, fruits, and snacks prior to using supplements.

Several limitations of our study should be acknowledged. First of all, the NHNS investigated a one-day dietary intake of November excluding Sundays and national holidays. On the other hand, we calculated the average one-day dietary intake of patients with FI using a one-week dietary record, regardless of any season. Second, while the NHNS was conducted nationwide, the patients with FI in this study lived in Tokyo or nearby areas. The NHNS has shown that rice intake is lesser in Tokyo and surrounding areas than in other areas⁵⁾. Third, we could not compare the weight of DF contained in each diet, because the NHNS results in woman did not show contents of DF (14.7 g). Further investigations conducted in the same season, in the same areas, and by the same approach between patients with FI and controls may resolve these limitations.

In conclusion, the results revealed that rice intake was low and the intake of wheat products, fruits, and snacks was high in our patients. Although the intake of DF was about the same as the national mean, it suggested a difference in the type of DF. While providing dietary guidance, it is necessary to consider not only the total amount of DF but also its contents.

Conflicts of Interest

There are no conflicts of interest.

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