Bowel Habits before and during Menses in Japanese Women of Climacteric Age: A Population Based Study

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¹First Department of Internal Medicine, ²Department of Hygiene, Hirosaki University School of Medicine, Hirosaki, ³Department of Nursing, Akita Keijo Junior College, Odate, and ⁴Division of Health Promotion and Exercise, National Institute of Health and Nutrition, Tokyo, Japan

FUKUDA, S., MATSUZAKA, M., TAKAHASHI, I., OYAMA, T., UMEDA, T., SHIMOYAMA, T., NAKAJI, S., WADA, S. and KUMAE, T. *Bowel Habits before and during Menses in Japanese Women of Climacteric Age: A Population-Based Study.* Tohoku J. Exp. Med., 2005, **206** (2), 99-104 — A good deal of data are available on the bowel habits of pre-climacteric females during menstruation. Few studies have examined the same subject in females of climacteric age but who are still menstruating, so the present study was undertaken to examine the bowel habits in menstruating females in this age group. Subjects ($n = 246$) were residents of a city in northern Japan, aged from 45 to 55 years old and who were still menstruating. Their every-day state of defecation and fecal characteristics were assessed with regard to four parameters: bowel movement frequency, defecation state, fecal appearance and fecal consistency. Based on a perfect match to these four criteria, the subjects were assigned to two groups, the normal group and the constipation group, and changes were assessed by enquiring how their bowel habits differed immediately before and during menses compared with their usual state. Immediately before menstruation, in the constipation group feces became harder and looser in 22.1% and 13.7%, respectively, compared with 8.7% and 9.5% in the normal group. On the other hand, during menstruation in the constipation group, feces became harder and looser in 11.6% and 16.8%, respectively, compared with 5.7% and 8.9% in the normal group. In other words, the constipation group showed a greater change immediately before and during menstruation compared with the normal group, though the differences were not significant. Our data thus suggest that the changes in the bowel habits of women of climacteric age at menstruation are greater for those suffering from constipation than those who are not. ——— defecation; bowel habits; bowel movement; menstruation; climacteric age

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Bowel habits represent important clinical events, and in particular, constipation is a very common complaint among women. Furthermore, constipation tends to affect a greater proportion of women concomitant with aging (Everhart et al. 1989; Heaton et al. 1992; Nakaji et al. 2002b, 2004). Many women experience changes in their bowel habits at their menstrual cycle; most women report hard stools and prolongation of transit time during the luteal phase and loose and more frequent stools at the time of menses (Rees and Rhodes 1976; Wald et al. 1981; Davies et al. 1986; Whitehead et al. 1988; Hinds et al. 1989; Davies et al. 1993; Celik et al. 2001), though a few researchers did not find such differences (Wyman et al. 1978; Turnbull et al. 1989). However, there have been no studies which have examined the relationship between bowel habits and menses in females of climacteric age (around the menopausal age, i.e., 45 - 55 years of age). To clarify the relationship between bowel habits and menstruation in climacteric age women is very useful in order to clarify the relationship between these two factors, bowel habits and menstruation, in detail, because defecation characteristics during the menstrual cycle in women of climacteric age remain unclear in comparison with those of premenstrual women.

The aim of this study was thus to examine the relationship between menses and the bowel habits of climacteric age women in a general Japanese population.

SUBJECTS AND METHODS

Subjects

Subjects were all women who were residents of a town in an agricultural region in northern Japan, aged from 45 to 55 years old, and who were still menstruating. In all, 760 menstruating climacteric women were included in the study. Subjects who were attending hospital for the treatment of any severe organic gastrointestinal, gynecological, endocrine (including diabetes), neurological or psychological diseases, and those who were regularly taking laxatives or drugs for any other bowel movement disorders, were excluded from this study.

Methods

Assessment to obtain the normal defecation status

This survey was performed in August 1995, and evaluated the normal defecation status of the subjects based on three subjective assessments via a questionnaire and one objective assessment, as follows.

Subjective assessment.

Each item in the questionnaire addressed the state of defecation and fecal properties under the following three items. (1) Bowel movement frequency: three or more per day, twice per day, once per day, once per two days, once per three days, or once or less per four days; (2) Self-reported defecation state: normal, marked constipation, constipation, slight constipation, alternating diarrhea/constipation disorder and diarrhea; and (3) Fecal appearance: watery, semisolid, mushy, plump and soft, small and hard, hard, or unknown.

In the survey, subjects were asked to express their defecation status and fecal properties as an average of the previous one year.

Objective assessment.

Fecal consistency in all subjects was measured using Nakaji's method (Nakaji et al. 2002a), developed by modification of the Exton-Smith method (Exton-Smith et al. 1975), as follows. Each fecal sample was placed in a Petri dish (depth; 10 mm, diameter; 10 cm), flattened to a uniform height using a spatula, and placed on one dish of an even balance. After the Petri dish containing the fecal sample descended, a penetrometer (Marubishi Co. Ltd., Tokyo) (tip area 1 cm²) was placed above the dish with the tip 10 mm above the fecal surface. The other side of the balance was lifted and a 500 g weight placed on it, held and released. As the weight descended at a constant rate, the fecal sample ascended at a constant rate, and collided with the penetrometer tip. The maximum penetrometer tip length inserted into the fecal sample after collision was 4 mm. The maximum restitution shown on the penetrometer at collision was used as an index of fecal consistency (g/cm²). The stool samples were collected in the morning, excluding the menstruation period and 5 days before and after it.

Classification into groups.

Referring to previous reports (Parks 1943; Rendtorff and Kashgarian 1967; Milne and Williamson 1972; Hardy 1978; Sandler and Drossman 1987; Heaton et al. 1992; Drossman et al. 1993; Nakaji et al. 2002), defeca-

tion-related items were first used to classify the subjects into three groups, "normal," "constipation" or "diarrhea," as follows: bowel movement frequency, "once or twice per one or two days," "once or less per three days" and "three or more times per day"; self-reported defecation state, "normal," "constipation," or "diarrhea"; fecal appearance, "plump and soft," "hard, or small and hard," or "watery, or mushy"; and fecal consistency, "200-399 g/cm²," "400 g/cm² or more," or "199 g/cm² or less". Subjects were then assigned to one of the three groups, using an exact match in all four of the above criteria.

Assessment of changes in defecatory status immediately before/during menstruation

All subjects were asked how their bowel habits changed immediately before and during menses compared with their normal state; no change, looser than ordinary state or harder than ordinary state.

Statistical analysis

The differences in the various defecation statuses between the normal defecation group and the constipation group were tested using the Chi-square test. A probability (*p*) of < 0.05 was considered significant.

RESULTS

Five hundred and eighty women replied to the questionnaire (a response rate of 76.3%). Two hundred and fifty-three women were entered into

the constipation (*n* = 95) and normal (*n* = 158) groups based on an exact match in the four selection criteria. Too few subjects were entered into the diarrhea group and alternating diarrhea/constipation disorder to allow meaningful statistical analysis, so only the normal and constipated groups were used in the study. The background of the subjects is shown in Table 1.

In the constipation group immediately before menstruation, feces became harder and looser in 22.1% and 13.7%, respectively, compared with 8.7% and 9.5% in the normal group (Table 2). On the other hand, during menstruation, 11.6% and 16.8% of the stools in the constipation group became harder and looser, respectively, compared with a respective 5.7% and 8.9% in the normal group (Table 2). In other words, the constipation group showed a greater change in stool consistency between immediately before and during menstruation compared with the normal group, although there was no significant difference in changes from looser to harder or *vice versa* in either of the groups. As the overall result, no significant changes in defecation during menstruation among Japanese climacteric age women were seen although the above tendency to increased stool hardness was noted in the constipation group.

TABLE 1. *Background of subjects (n = 253)*

Age range	No (%)	BMI	No (%)
45-49	127 (50.2)	< 20	26 (10.3)
50-55	126 (49.8)	20.0-24.9	150 (59.3)
		25.0-29.9	69 (27.3)
		> 30	8 (3.2)
Number of deliveries	No (%)	Status	No (%)
0	2 (0.8)	Marked constipation	14 (5.5)
1	4 (1.6)	Moderate constipation	39 (15.4)
2	95 (37.5)	Slight constipation	42 (16.6)
3	92 (36.4)	Normal	158 (62.5)
Over 4	60 (23.7)		

BMI, body mass index; deliveries, birth.

TABLE 2. *Changes in defecatory state immediately before menstruation or during menstruation in comparison with the normal condition*

Normal condition	No change	To harder	To looser	Total
Before menstruation				
Constipation	61 (64.2%)	21 (22.1%)	13 (13.7%)	95 (100%)
Normal	129 (81.7%)	14 (8.7%)	15 (9.5%)	158 (100%)
Total	190 (75.1%)	35 (13.8%)	28 (11.1%)	253 (100%)
During menstruation				
Constipation	68 (71.6%)	11 (11.6%)	16 (16.8%)	95 (100%)
Normal	135 (85.4%)	9 (5.7%)	14 (8.9%)	158 (100%)
Total	203 (80.2%)	20 (7.9%)	30 (11.9%)	253 (100%)

DISCUSSION

An objective and precise evaluation of defecation status is recognizably very difficult, which increases the difficulty in examining the relationship between defecation and other factors. To evaluate the usual state of defecation precisely and objectively, the authors used three subjective and one objective measures (bowel movement frequency, self-reported defecation state, fecal appearance, and fecal consistency) and assigned the subjects to groups defined by defecatory state, namely "constipation," "diarrhea" or "normal," depending on an exact match of the responses of the subjects to all four criteria. The use of fecal consistency as an objective criterion in the present study, coupled with the three subjective criteria, is one of its strong points.

There have been several studies which have examined the relationship between menses and bowel habits (Rees and Rhodes 1976; Wyman et al. 1978; Wald et al. 1981; Davies et al. 1986; Whitehead et al. 1988; Hinds et al. 1989; Turnbull et al. 1989; Davies et al. 1993; Celik et al. 2001).

In Davies et al. (1993), the stool frequency, fecal form and dietary fiber intakes of 25 menstruating women were recorded during the 4 days just before menstruation and the first 4 days of menstruation. At the time of bleeding there was a significant increase in stool frequency and a signifi-

cant decrease in fecal form.

Celik et al. (2001) examined the prevalence of alterations in bowel habits during menses using 230 apparently healthy premenopausal women (mean age, 30 ± 12.5 years old) who had a normal menstrual cycle (mean, 28.2 days; range, 25-30 days). Consequently, whereas 144 females (62.6%) defined easier defecation and 10 (4.3%) more difficult defecation at any phase, 49 subjects (21.3%) had no change in bowel habits, and 27 (11.7%) had no opinion about the subject. Of the subjects who reported easier defecation 115 (80%) had looser stools, and 40 (28%) had increased frequency of defecation. Eighty seven females (76%) who reported having looser stools said this was in the first and second days of menstruation, and fourteen (12%) reported looser stools throughout menstruation.

In the study by Whitehead et al. (1988), 34% of women who were apparently free from any chronic bowel symptoms reported that the onset of menstruation was associated with a change in bowel habits: either increased diarrhea (19%), increased gas (14%), or increased constipation (11%).

Furthermore, 64% women studied by Rees and Rhodes (1976) and 96% women studied by Hinds et al. (1989) reported a change in bowel habits with menses. These apparent differences in the findings may be attributable to the study of

unrepresentative samples by previous investigators.

The change of bowel habits at menstruation in the current study was less than those reported in previous studies (in which the subjects were younger, premenstrual females). This difference suggests that climacteric age women are less influenced by menstruation in comparison with women who are younger than them. This could be due to a lower hormonal influence in this population of climacteric age women.

The physiologic basis for the change in bowel habits associated with menses is uncertain. In the luteal phase, hormonal fluctuations may be responsible: high progesterone levels in the luteal phase may inhibit bowel motility, causing a longer bowel transit time and hence, hard defecation (Celik et al. 2001).

It has been suggested that changes in anorectal motility could account for the change in bowel habits during menses. The available data show that rectal sensitivity and maximal tolerated rectal volume during menses is no different from that during the other phases (Delechenaut et al. 1991; Jackson et al. 1994). Therefore, the loosening of stools during menses may be because of the production of prostaglandins (Arthur et al. 1992), which are suspected to cause diarrhea by inhibiting transepithelial ion transport in the small intestine (Matuchansky and Bernier 1973).

This study has two limitations. First, we did not have any control groups consisting of subjects of ages other than our climacteric group, such as younger subjects. Second, the evaluation for defecatory changes during menses was entirely subjective, based on data provided by the subjects themselves, although we added the fourth objective test to the defecatory status before menses. Future studies will require evaluation of the defecatory state before, during and after menstruation by the same set of criteria.

In conclusion, although the differences were not statistically significant, the constipation group showed a greater change immediately before and during menstruation compared with the normal group by climacteric females. However, the changes in the premenstrual bowel habits in the

constipation group thus differs from the changes noted in the previous literature in preclimacteric females.

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