

A Cross-Sectional Study on Constipation by Questionnaire to Students in Meiji University of Oriental Medicine

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Summary : This study was undertaken to better define the prevalence and the characteristics of self-reported constipation for eventual use in studies on the effect of acupuncture on bowel movements. Self-reported bowel habits and lifestyles were recorded from a survey of 411 students at Meiji University of Oriental Medicine, Kyoto, Japan. The overall prevalence of self-reported constipation was 15.5%. The prevalences shown here with 95% confidence intervals (95% CI) indicate that adult women are more likely to be constipated than adult men (31.2% [95% CI: 22.0-41.1] vs. 5.2% [95% CI: 2.2-10.0]). Multivariate analysis provided odds ratios (OR) indicating that low stool volume (OR:11.3, 95%CI:2.2-58.5) and prevalence of hard and pelleted stool (OR: 6.8, 95% CI: 2.4-19.2) are the important clinical symptoms. Stool frequency, not having sufficient time to defecate in the morning, and not having a way of relieving stress were also found to be important risk factors. The characteristics described in the present study should be taken into consideration when investigating bowel habits among the general population.

Key Words : Constipation, Lifestyle, Cross-Sectional Study

Received on August 1, 2000 ; Accepted on January 29, 2001

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Introduction Although functional constipation is the most common digestive ailment and has a large economic impact^{1,2}, the definition of constipation and lifestyles that lead to the condition are still unclear. The condition is not characterized by a single symptom and the prevalence changes according to age, gender, race³⁻⁶ and various aspects of lifestyle such as exercise^{7,8}, eating habits⁹⁻¹², or stressful events¹³. To better define the prevalence and the characteristics of self-reported constipation we conducted a cross-sectional survey on bowel habits among a limited population. The clinical symptoms and lifestyle habits on which we focused were: frequency of bowel movement, abdominal pain, incomplete defecation¹⁴, eating habits such as skipping breakfast, suppressing bowel movements, grade of stress, hours of sleep, and frequency of exercise.

Methods We conducted a survey on 411 students from the first to the fourth at Meiji University of Oriental Medicine, Kyoto, Japan in June 1999. Of those individuals given the questionnaire, 316 (76.9%) completed all of the questions considered to be necessary for the analysis. The subjective symptoms we asked about included: (1) average frequency of bowel movements per week (used to calculate average interval between stools), (2) stool hardness (hard, not hard), (3) stool volume (small, not small), (4) presence of hard and pelleted stool (yes, no), (5) feeling of incomplete defecation (yes, no), (6) presence of abdominal pain prior to the defecation (yes, no). Aspects of lifestyle on which we focused in the questionnaire were: (1) eating habits at breakfast (do not have, occasionally skip, have everyday), (2) sufficient time to defecate in the morning

(yes, no), (3) need to defecate in the morning (yes, no), (4) habit of suppressing morning bowel movements, (5) exercise (times per week), (6) sleep (hours per day), (7) stress (severely stressed, moderately stressed, not stressed), and (8) having

a way of relieving stress (yes, no). The presence of constipation was determined based on the subjects' response to the question asking whether or not they considered themselves to be constipated.

Table 1. Prevalence of Self-Reported Constipation by Sex and Age

Group	No.	%Constipated [†]	95% CI [‡]
overall	316	15.5	11.1-20.6
gender			
female	125	31.2	22.0-41.1
male	191	5.2	2.2-10.0
age(yr)			
≤20	174	16.7	10.7-23.8
21-25	122	14.8	8.1-23.2
26-30	12	8.3	0.0-41.1
>30	8	12.5	0.0-55.5

[†] proportion of the subject who reported constipation in terms of the definition

[‡] 95%CI indicates ninety-five percent confidence intervals

Table 2. Prevalence of Self-Reported Constipation by Reported Stool Frequency

Stool Frequency [†]	No.(%) [‡]	%Constipated [§]	95% CI
<2/week	16(5.1)	75.0	41.4-93.3
2-3/week	80(25.3)	36.3	24.1-49.0
4-6/week	10(3.2)	10.0	0.0-47.3
≥7/week	210(66.5)	3.4	1.1- 7.2

Cochran's Linear Trend Chi-Square Value=88.3,P<0.001

[†] based on the question; 'How often do you have a bowel movement?'

[‡] total percentage will not be 100 because of rounding

[§] proportion of the subject who reported constipation in terms of the definition

Table 3. Prevalence of Self-Reported Constipation among Subjects with Related Symptoms

Definition	Total No. [†]	%Constipated [‡]	95% CI
low volume	16	62.5	30.0-85.9
pelleted stool	39	61.5	41.5-77.8
abdominal fullness	39	48.7	29.6-66.6
incomplete defecation	98	32.7	22.1-44.0
hard stool	37	24.3	9.9-42.9

[†] total number of the subject who reported the symptom in definition

[‡] proportion of the subject who reported constipation in terms of the definition

Statistical Analyses Since two or more factors are related to the presence of self-reported constipation, we applied the logistic regression procedure to identify the symptoms that characterize self-reported constipation¹⁵. Odds ratios (ORs) with 95% confidence intervals (95% CIs) were calculated to determine the magnitude of influence various factors have on self-reported constipation. For dichotomous tables, the chi-square test was used with supporting Cochran's linear trend analysis, where necessary¹⁶. All analyses were performed using SYSTAT 8.0 (SPSS Inc.). The null hypothesis was rejected when type I error was estimated to be less than five percent.

Results Overall, 15.5% of subjects (95% CI:11.1-20.6) reported constipation (Table 1). Self-reported

constipation was more common among women (31.2%, 95% CI: 22.0-41.1) than among men (5.2%, 95% CI:2.2-10.0). There was a significant relationship between reported stool frequency and self-reported constipation (Table 2). Among subjects reporting less than 2, 2-3, 4-6, and equal to or more than 7 stools per week, 75.0%, 36.3%, 10.0% and 3.4%, respectively, considered themselves constipated. This shows a significant linear trend (Cochran's Linear Trend chi-square value=88.3, p<0.001). The prevalences of self-reported constipation among subjects who had certain clinical symptoms are shown in Table 3. The prevalence of self-reported constipation was significantly higher among students who reported having a related symptom (with the exception of hard stool [$\chi^2_{1df}=2.49, p=0.115$]), than among

Table 4. Prevalence of Self-Reported Constipation in Relation to Lifestyle Habits

Definition	Total No. †	%Constipated ‡	95% CI
often suppress morning bowel movement	17	35.3	10.8-63.6
stress			
no	48	10.4	2.5-24.0
moderate	189	13.2	8.1-19.6
severe	79	24.1	13.8-36.2
having no way of relieving stress	92	30.4	19.8-42.1
sleep			
≥7 hrs/day	105	15.2	8.1-24.6
5-6 hrs/day	193	14.5	9.1-21.0
<5 hrs/day	18	27.8	7.0-55.6
do not need to defecate in the morning	127	23.6	15.5-33.0
not having sufficient time to defecate in the morning	149	22.8	15.4-31.3
breakfast			
have everyday	199	19.6	13.5-26.6
skipping	61	4.9	0.5-14.8
don't have	56	12.5	4.1-25.4
exercise			
≥7 times/wk	48	10.4	2.5-24.0
3-6 times/wk	75	12.0	4.7-22.7
<3 times/wk	193	18.1	12.2-25.1

† total number of the subject who reported the symptom in definition

‡ proportion of the subject who reported constipation in terms of the definition

Table 5. Multivariate Logistic Regression Analysis of Clinical Symptoms

Variables	Estimated Coefficient	Odds Ratio(95%CI)	p-value
gender(female)	0.821	2.27(1.40-3.68)	0.001
interval between stools	0.666	1.95(1.37-2.77)	<0.001
presence of hard and pellet stool	1.917	6.80(2.41-19.20)	<0.001
low stool volume	2.424	11.30(2.18-58.48)	0.004

Table 6. Multivariate Logistic Regression Analysis of Lifestyle Habits

Variables	Estimated Coefficient	Odds Ratio(95%CI)	p-value
gender(female)	0.900	2.46(1.67-3.63)	<0.001
having breakfast everyday	0.934	2.54(1.09-5.96)	0.032
not to having a way of relieving stress	0.539	1.72(1.21-2.43)	0.002
not to having sufficient time to defecate in the mornig	0.576	1.78(1.22-2.59)	0.003

those who reported not having the symptom. The univariate relationships between self-reported constipation and lifestyle habits are shown in Table 4. With the exception of sleep and exercise, all lifestyle habits investigated showed a significant influence on the presence of self-reported constipation. Table 5 shows the results of the logistic regression of related symptoms. The factors considered to have a significant influence on the development of self-reported constipation include female gender (OR: 2.27, 95% CI: 1.40-3.68), interval between stools (OR: 1.95, 95% CI: 1.37-2.77), presence of hard and pelleted stool (OR: 6.80, 95% CI: 2.41-19.20) and low stool volume (OR: 11.30, 95% CI: 2.18-58.48). The results of logistic regression analysis of lifestyle habits are shown in Table 6. The lifestyle habits shown to have a significant influence on the development of self-reported constipation include: having breakfast everyday (OR: 2.54, 95% CI: 1.09-5.96), not having a way of relieving stress (OR: 1.72, 95% CI: 1.21-2.43), and not having sufficient time to defecate in the morning (OR: 1.78, 95% CI: 1.22-2.59).

Discussion Although many researchers have reported demographic determinations of constipation all over the world, the studies were handicapped by lack of a standard definition of the condition. Based on a survey of the bowel habits of 1,055 individuals from an industrial community, not seeking medical advice, Connell et al¹⁷ defined constipation as fewer than three stools per week. However, while physicians and investigators tend to define constipation by stool frequencies that lie below the usual range, healthy subjects tend to define constipation in terms of function (straining) and stool consistency (hard stools)¹⁸. The reported prevalences of constipation vary over a wide range³⁻⁶ because of the lack of a definition of the condition, because bowel habits change with time, and because constipation varies with age and gender. In the present study we investigated the prevalence and characteristics of self-reported constipation among a limited population of university students, and results are intended for eventual use in studies on the effect of acupuncture on bowel movements. The overall prevalence of constipation among students in this study was 15.5% (95% CI: 11.1

-20.6). Women are more likely to be constipated than men (31.2% [95% CI: 22.0-41.1] vs. 5.2% [95% CI: 2.2-10.0]). These rates are higher than those reported by Sandler et al.⁴ No statistically significant differences for the prevalence of constipation were found between groups stratified by age. A linear relationship was seen between increasing prevalence of self-reported constipation and decreasing stool frequency. This indicates that stool frequency is one of the important factors defining constipation. According to a study concerning the pattern of bowel habits among young adults not seeking health care¹⁸, clinical subjective symptoms such as straining, hard stools, abdominal discomfort, or incomplete defecation were seen to have a strong relationship to self-reported constipation. Other researchers reported stool characteristics such as hardness or pellet shape, as important factors for individuals to consider themselves to be constipated¹⁹. Results from both investigators cited above support our results showing that the presence of low stool volume, hard and pelleted stool, abdominal fullness, and incomplete defecation are significantly related to self-reported constipation. Lifestyle habits as risk factors leading to constipation have been widely discussed. Certain lifestyle habits such as stressful events¹³, exercise^{7, 8}, dietary fiber intake⁹⁻¹¹, total caloric intake and annual income⁴ are important. Our research showed that stress is an important risk factor for constipation, which is consistent with previous work, but frequency of exercise did not show a statistically significant association with the presence of self-reported constipation. This indicates the necessity for further research into the quality of exercise (recreational or not) or daily physical activities that are taken into account. Since two or more factors are related to the presence of self-reported constipation, multivariate approaches such as logistic regression were necessary. Results of logistic regression analysis showed duration between stools, presence of hard and pelleted stool, and low stool volume to be significant subjective symptoms. Having breakfast everyday, not having a way of relieving stress, and not having sufficient time to defecate in the morning are lifestyle habits shown here to have a significant influence on the presence of self-reported constipation. In summary, constipation is characterized by synthetic feeling of the subject which is attributable to symptoms as infrequent bowel movement, low stool volume, hard and pelleted stool, abdominal fullness, and incomplete

defecation, and it can be influenced by lifestyles such as stress, eating habits, and timing of defecation. It is also important to ask about ideal bowel habits to the individuals because feeling of constipation can be influenced by the subjects' satisfaction to the bowel habits.

Conclusion We investigated the prevalence and characteristics of self-reported constipation among students at Meiji University of Oriental Medicine. The symptoms which have much influence on the presence of self-reported constipation were: infrequent bowel movement, low stool volume, hard and pelleted stool, abdominal fullness, and incomplete defecation. The lifestyle habits shown to have a significant influence on the development of self-reported constipation include: having breakfast everyday, not having a way of relieving stress, and not having sufficient time to defecate in the morning.

References

- 1) Sonnenberg A, Koch TR: Epidemiology of constipation in the United States. *Dis Colon Rectum*, 32: 1-8, 1989.
- 2) Everhart JE, Go VLW, Johannes RS, et al: A longitudinal survey of self-reported bowel habits in the United States. *Dig Dis Sci*, 34: 1153-1162, 1989.
- 3) Sonnenberg A, Koch TR: Physician Visits in the United States for Constipation: 1958 to 1986. *Dig Dis Sci*, 34: 606-611, 1989.
- 4) Sandler RS, Jordan MC, Shelton BJ, et al: Demographic and Dietary Determinants of Constipation in the US population. *Am J Public Health*, 80: 185-189, 1990.
- 5) Harari D, Gurwitz JH, Avorn J, et al: Bowel habit in relation to age and gender. Findings from the National Interview Survey and Clinical Implications. *Arch Intern Med*, 12: 315-320, 1996.
- 6) Wong ML, Wee S, Pin CH, et al: Sociodemographic and lifestyle factors associated with constipation in an elderly Asian community. *Am J Gastroenterology*, 94: 1283-1291, 1999.
- 7) Meshkinpour H, Kemp C, Fairshier R: Effect of aerobic exercise on mouth-to-cecum transit time. *Gastroenterology*, 97: 1389-1399, 1989.
- 8) Bingham SA, Cummings JH: Effect of exercise and physical fitness on large intestinal function. *Gastroenterology*, 97: 1389-1399, 1989.
- 9) Tucker DM, Sandstead HH, Logan GM: Dietary fiber and personality factors as determinants of

- stool output. *Gastroenterology*; 81: 879-883, 1981.
- 10) Burkitt D: Fiber as protective against gastrointestinal diseases. *Am J Gastroenterology*, 79:249-252, 1984.
 - 11) Klurfeld DM: The role of dietary fiber in gastrointestinal disease. *J Am Dietetic Association*, 87: 1172-1177, 1987.
 - 12) Vaisman N, Voet H, Akivis A, et al: Effect of breakfast timing on the cognitive functions of elementary school students. *Arch Pediatr Adolesc Med*, 150: 1089-1092, 1996.
 - 13) Whitehead WE, Crowell JC, Robinson JC, et al: Effects of stressful life events on bowel symptoms: subjects with irritable bowel syndrome compared with subjects without bowel dysfunction, *Gut*, 33: 825-830, 1992.
 - 14) Thompson WG, Heaton KW: Functional bowel disorders in apparently healthy people. *Gastroenterology*, 79: 283-288, 1980.
 - 15) Fisher LD, Belle GV: Discrimination and Classification In: *Biostatistics*. New York: John Wiley & Sons Inc. pp 630-643, 1993.
 - 16) SPSS Inc. SYSTAT 8.0 User's Guide Statistics, SPSS Inc. 1998.
 - 17) Connell AM, Hilton C, Irvine G, et al: Variation of bowel habit in two population samples, *Br Med J*, 2: 1095-1099, 1965.
 - 18) Sandler RS, Drossman, DA: Bowel habits in young adults not seeking health care. *Dig Dis Sci*, 32:841-845, 1987.
 - 19) Aichbichler BW, Wenzl HH, Santa Ana CA, et al: A comparison of stool characteristics from normal and constipated people. *Dig Dis Sci*, 43:2353-2362, 1998.

明治鍼灸大学の学生における自覚的便秘の特徴に関する横断研究

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[目的] 便秘は単に排便頻度のみによって定義することは困難であり、その有症率も性別や年齢、人種などにより幅広く異なる。そこで便秘に関する研究においてその母集団の便秘の特徴を把握することは有用である。今回我々は、便秘に対する鍼灸治療効果の指標を検討する目的で、母集団となる明治鍼灸大学の学生を対象に排便習慣についてアンケート調査を行った。

[方法] 明治鍼灸大学学生411名を対象に、排便習慣および生活習慣に関するアンケート調査を行った。主な調査項目は、排便習慣として排便頻度、便の硬さ、排便量、兔糞状便の有無、残便感であり生活習慣として、朝食の習慣、朝の便意および排便時間の有無、睡眠状態、ストレスの有無およびストレス解消手段の有無であった。

[結果] 調査対象となった411名の学生のうち、316名(76.9%)の回答が解析に有効であった。自覚的便秘を有する者は全体で15.5%で、男性に比較して女性に多く (5.2% vs. 31.2%)、排便頻度が少ないほど便秘を自覚する者が多かった。性別および年齢を考慮したロジスティック回帰分析においては、自覚症状では排便頻度の他に排便量 (OR[95%CI]; 11.30[2.18 - 58.48]) および兔糞便の有無 (OR[95%CI]; 6.80[2.41 - 19.20]) が、生活習慣では朝食を毎朝取る (OR[95%CI]; 2.54[1.09 - 5.96])、ストレス解消手段を持たない (OR[95%CI]; 1.75[1.21 - 2.43])、朝に排便する時間的余裕がない (OR[95%CI]; 1.78[1.22 - 2.59]) などの因子が便秘の自覚に影響を及ぼすことが明らかとなった。

[考察] 今回の解析で得られた結果は今後の便秘に関する研究において考慮されるべきであると考えられた。

キーワード：便秘、生活習慣、横断研究