

Normal Bowel Habits and Prevalence of Functional Bowel Disorders in Singaporean Adults – Findings from a Community Based Study in Bishan

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ABSTRACT

Background/Aim of Study: Data on the epidemiology of bowel frequency and functional bowel disorders in the East are limited. The aims of this study were to determine the most common bowel frequency and the prevalence of functional bowel disorders in Singaporean adults.

Methods: A cross sectional study, using a reliable and valid questionnaire was carried out in a random sample of residents aged 16 years and above in Bishan, 68% responded (n=271).

Results: The most common ($59.0 \pm 6.5\%$) bowel frequency was once a day with $96.8 \pm 5.6\%$ of individuals having bowel frequency between 3 times/week and 3 times/day. The prevalences of irritable bowel syndrome, chronic constipation and chronic diarrhoea were $3.2 \pm 2.3\%$, $7.3 \pm 3.5\%$ and $6.9 \pm 3.4\%$, respectively. Women were found to have a lower bowel frequency ($p < 0.001$) and a higher prevalence of chronic constipation ($11.3 \pm 6.0\%$ vs. $3.6 \pm 3.5\%$, $p < 0.05$) than men.

Conclusions: Normal bowel frequency may be defined as bowel movements between 3 times per week and three times per day. The prevalence of irritable bowel syndrome in the general population of Singapore was low compared with those reported in the West.

Keywords: bowel frequency, functional bowel disorder, irritable bowel syndrome, constipation, diarrhoea

Singapore Med J 2000 Vol 41(6):255-258

INTRODUCTION

Functional bowel disorders are common in the West. Depending on the criteria used, irritable bowel syndrome (IBS) has been reported in 17-22% of the healthy population⁽¹⁻³⁾, chronic constipation in

3-17%^(3,4) and chronic diarrhoea in 2-18%^(3,4). The data on the prevalence of functional bowel disorders in Asia are limited. Two studies – one in Thailand and one recently in Singapore have reported the prevalence of IBS to be lower than those reported in the West^(5,6).

Studies on bowel function have focused mainly on specific bowel disorders rather than on establishing the characteristics of bowel habits in the general population. A previous study in the West reported 99% of the population having bowel frequency between three times per week and three times per day⁽⁷⁾. Corresponding data on the bowel frequency of the general population in Asia are limited.

The aims of this study are twofold: firstly, to define the most common bowel frequency in the general population of Singapore and secondly, to determine the prevalence of functional bowel disorders in Singapore.

METHODS

Questionnaire

The survey instrument was a standardised questionnaire, based on the reliable and locally validated “Gastrointestinal Symptoms Questionnaire” supplied by Ho et al⁽⁸⁾. Our modified version contained a total of 53 questions, of which 22 were directed at bowel habits and 11 questions were concerned with socio-demographic characteristics. Other questions covered included those dealing with prior medical problems, dietary habits and exercise profile. Most of the questions were closed and anticipated responses that could be coded numerically. The questionnaire was translated into the Malay and Chinese languages.

Pilot study

One month before the actual survey, a pilot study of 50 randomly selected households was conducted in the same study area to establish the non-response rate, to test out the questionnaire and to estimate the prevalence of functional bowel disorders. Proportional sampling was carried out according to the type of housing unit. As data from the pilot study were preliminary, they were not used for subsequent discussion of findings from the present study.

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Subjects

More than 85% of Singaporean households live in government subsidised high rise apartments and the remaining 15% live in private apartments or houses. Bishan was chosen for the study as it typifies the rest of the country in comprising mostly public housing. From a sampling frame of all listed housing units in Bishan, 192 household units were chosen by way of housing-unit-stratified disproportionate random sampling procedure. The figure was obtained based on an estimated IBS prevalence of 10%, an estimated response rate of 65% and an error margin of 4.5%. We also assumed that there were 1.5 individual responses per household unit. We used the sampling procedure to ensure an accurate representation of the housing unit makeup of Bishan. All residents aged 16 years and above were eligible for inclusion into the study.

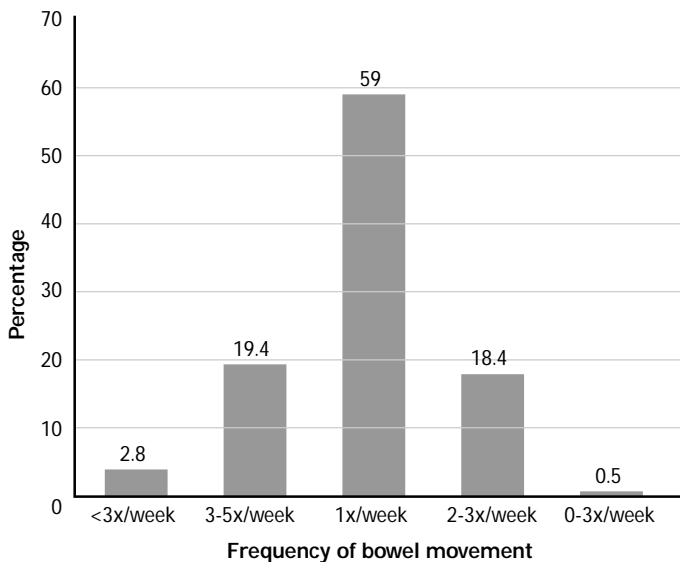


Fig. 1 Frequency of bowel movement in our sample population.

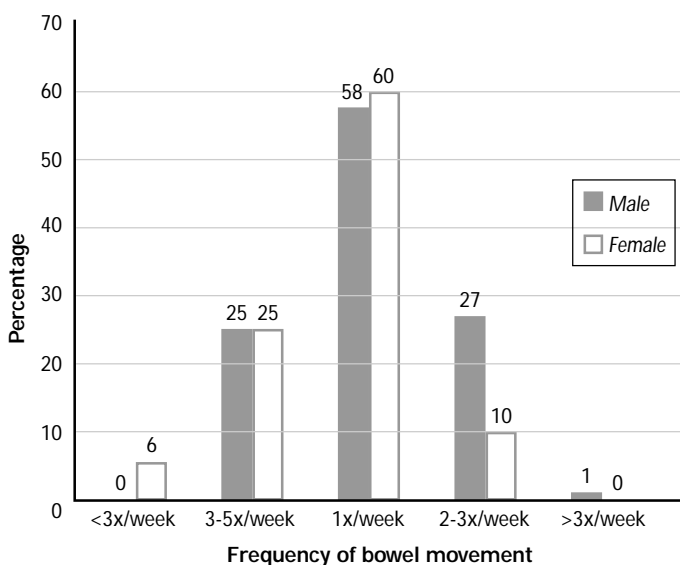


Fig. 2 Frequency of bowel movement by gender.

Survey design

Before the survey, a letter was sent to all eligible individuals stating the objectives of the study and requesting their cooperation. All respondents were interviewed at their houses by a team of 24 third year medical students. We administered the questionnaire in the languages usually understood and spoken by the responses and since English is commonly used in Singapore most interviews could be effectively conducted in English.

Definitions

The following definitions were used. Chronic abdominal pain was defined as any sort of abdominal pain (excluding menstrual cramps) occurring more than six times in the last year. The diagnosis of IBS was based on the presence of chronic abdominal pain in combination with 2 or more of the following symptoms: a) pain that was relieved by bowel movement > 25% of the time; b) looser stools at the onset of pain > 25% of the time; c) more frequent stools when pain began > 25% of the time; d) abdominal distension > 25% of the time; e) a feeling of incomplete evacuation > 25% of the time, and f) passing mucus in the stools.

Subjects who strained at the stools and passed hard stools or those who passed < 3 stools per week > 25% of the time were defined as having chronic constipation. Subjects who passed loose or watery stools or whose stool frequency was > 3 times per day > 25% of the time were considered to have chronic diarrhoea.

Statistical analysis

All results were given as mean ± SD unless otherwise stated. Comparison of data was performed using χ^2 test or Fisher's exact test as appropriate. Multivariate analysis was performed using logistic regression. All p values were two tailed with the level of significance at 0.05.

RESULTS

Response rate

Among the 191 selected households, 23 could not be contacted despite attempts on at least three separate occasions. Of the contactable households, subjects in 35 refused to participate, while some or all of the eligible members in the remainder (n=133) participated, giving a household response rate of 70%. Of the responding households, 127 eligible individuals declined the interview, leaving 271 eligible subjects who were successfully interviewed (individual response rate=68%). Non-responders were analysed with reference to age, gender and ethnicity and were found not to differ significantly from responders.

Demographics

The demographic characteristics of the responders are presented in the Table. These were generally in line with those of the Singaporean general population⁽⁶⁾. However, compared with the Singaporean population, our sample contained a larger proportion of people in the 16-59 years age group. This discrepancy is due to our exclusion of the <16 years age group from our sample.

Frequency of bowel movement

Stool frequencies between 3 times a week and 3 times a day were seen in $96.8 \pm 5.6\%$ of our respondents (Fig. 1). Most respondents ($59.0 \pm 6.5\%$) reported moving their bowels about once a day. Women had significantly lower bowel frequency compared with men ($p < 0.001$) (Fig. 2).

Irritable Bowel Syndrome

Seven subjects were identified to have IBS giving a prevalence rate of $3.2 \pm 2.3\%$. There was no significant association between IBS and gender, age group or ethnicity.

Chronic constipation

There were 16 subjects with chronic constipation in this study giving a prevalence of $7.3 \pm 3.5\%$. Women had a higher prevalence ($11.3 \pm 6.0\%$) of chronic constipation as compared with men ($3.6 \pm 3.5\%$) ($p < 0.05$). Age or ethnicity did not influence the frequency of chronic constipation.

Chronic diarrhoea

The estimated prevalence rate of chronic diarrhoea was $6.9 \pm 3.4\%$ ($n=15$). There was no gender, age or ethnic difference in the reporting of chronic diarrhoea.

DISCUSSION

The prevalence of bowel symptoms has important implications for the allocation of resources and planning of medical services. Data on stool frequency and bowel function among Singaporeans have been previously obtained using a survey questionnaire in Jurong, a town west of Singapore⁽⁵⁾. These data have been used to define a normal range of bowel frequency and to estimate the prevalence of IBS-type symptoms and other bowel dysfunction symptoms in the general population of Singapore^(5,9). Using a similar questionnaire, we undertook the present cross-sectional survey in Bishan, a town central of Singapore, and found 97% of our respondents reporting stool frequency between 3 and 21 times per week. The prevalences of IBD, chronic constipation and chronic diarrhoea were 3%, 7% and 7%, respectively. These figures are similar to those of the previous study⁽⁵⁾.

Table. Comparison of demographic characteristics of our sample population with those of Singaporean population

	Sample population	Singapore population ⁽⁶⁾
Sex		
Men	128 (47%)	51%
Women	143 (53%)	49%
Ethnicity		
Chinese	233 (86%)	78%
Malay	18 (7%)	14%
Indian	20 (7%)	7%
Others	0	1%
Age group (years)		
<16*	-	23%
16-59	243 (90%)	68%
≥60	28 (10%)	9%

* Only people >16 years old were included in our sample

Studies from western countries have also found stool frequency to fall within the limits of three times a week and three times a day in > 90% of apparently healthy subjects^(7,10-12). The similarity of these cross-cultural results supports the view that a well-defined range of normality exists with respect to bowel habit, and that our definitions of chronic diarrhoea and chronic constipation as bowel frequency lying outside this frequency range are valid.

Women have significantly lower bowel frequency compared with men in this and the previous Asian studies⁽⁵⁾. The prevalence of chronic constipation was also higher in women in both the Asian studies. These results are similar to those of previous studies in the West^(3,4). The absence of geographical differences in gender ratios suggests that genetic factors must be important in influencing colonic transit.

It is widely recognised that IBS symptoms are very common in the West. Large epidemiological surveys in the United States⁽³⁾ and the United Kingdom^(1,2) have reported IBS prevalence of 17-22% when the latter was defined as the presence of abdominal pain on more than six occasions plus 2 or more Manning criteria⁽¹³⁾. Using the same criteria, we have found a much lower prevalence of 3.2%. This result is consistent with the finding of another recent community-based survey in Singapore, which obtained a prevalence rate of 2.3%⁽⁵⁾. In yet another survey conducted among rural villagers and hotel employees in Thailand⁽⁶⁾, only 4.4% of about a thousand people questioned had symptoms of IBS. In the light of all these consistent findings, we believe it is reasonable to assume that the community prevalence of IBS is lower in the East than the West. The reason for this difference is unknown and requires further study.

In conclusion, results from the present study showed that normal bowel frequency might be defined as bowel movements between 3 times per week and

three times per day. The prevalence of IBS in the general population of Singapore was low compared with those reported in the West.

APPENDIX

The participants in the Community Medicine GI Study Group were as follows: KK Yeo, K Loh, BP Chee, LY Chen, CK Chia, MH Chin, TM Chin, I Chua, TW Hau, D Huang, B Koh, A Koh, YH Koh, CC Lee, J Lee, KT Lee, L Lie, M Rosman, SH Neo, BK Puah, SC Quah, SK Wee, R Wong, F Wong and TC Tan (Supervisor).

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