

# How bad are the symptoms and bowel dysfunction of patients with the irritable bowel syndrome? A prospective, controlled study with emphasis on stool form

K W Heaton, S Ghosh, F E M Braddon

## Abstract

Since it is not known whether the symptoms and bowel function of patients with the irritable bowel syndrome are truly abnormal we used diaries and frequent telephone interviews over a 31 day period to assess symptoms, defecation, and stool types in 26 unselected female hospital patients with the irritable bowel syndrome, 27 women who admitted to recurrent colonic pain but had not consulted a doctor (non-complainers), and 27 healthy control subjects. Unexpectedly, abdominal pain and bloating occurred in most of the control subjects. Pain, however, was six times more frequent in the patients and was more often considered severe. Bloating occurred three times more often. Defecation was more frequent, more erratic in timing and stool form, and more likely to produce stools of extreme forms, indicating rapid fluctuations in intestinal transit time. Urgency was four times more prevalent in patients than control subjects. Straining to finish defecating was nine times more prevalent and was often accompanied by feelings of incomplete evacuation – a combination which could lead to the misdiagnosis of constipation. The normal relation between stool form and the above symptoms was distorted, possibly due to rectal irritability. Non-complainers were intermediate between patients and control subjects in almost every parameter but were closer to control subjects than to patients. Patients with the irritable bowel syndrome have real cause for complaint and their bowel function is truly abnormal.

The nature of the irritable bowel syndrome is controversial. Patients complain of many symptoms<sup>1-3</sup> but objective abnormalities are elusive and no diagnostic test is available.<sup>4-8</sup> Many healthy people suffer symptoms of the irritable bowel syndrome from time to time,<sup>9-14</sup> and people who have such symptoms but do not trouble their doctors are less anxious and better at coping with the problems of life than hospital patients.<sup>15,16</sup> Patients commonly complain of erratic bowel habits, but bowel function varies from day to day in healthy people<sup>17</sup> and it has not been shown to vary more in patients. Thus it is not surprising that some doctors regard the irritable bowel syndrome as a preoccupation with and excessive concern about normal intestinal events rather than a deviation from normal function.<sup>18</sup> As an expert group put it recently: 'it

is still unclear to what extent irritable bowel syndrome is normal perception of abnormal events or abnormal perception of normal events.'<sup>19</sup>

To try to settle these points we carried out a prospective study of defecation, stool form, and certain symptoms of the irritable bowel syndrome in three groups of subjects: normal people, hospital patients, and non-complainers. We also examined the relation between stool form and defecatory symptoms.

## Subjects and methods

We restricted our studies to young women because an epidemiological survey gave us access to representative groups of young women among whom to recruit healthy subjects and non-complainers. Young women are in fact the commonest age and sex group of patients with the irritable bowel syndrome in England.<sup>20</sup> We aimed to study 30 people in each group as this was the most we could manage in the time available. Subjects ate their usual diets and continued their normal activities. All gave informed consent and the study was approved by the district ethical committee.

### HOSPITAL OUTPATIENTS ('PATIENTS')

Thirty women with the irritable bowel syndrome from the hospital outpatient clinics of two gastroenterologists were invited to participate. They were unselected apart from age and adequate intelligence. The diagnosis was based on standard, internationally agreed criteria.<sup>19</sup> Abdominal pain is not necessary to the diagnosis but was in fact a feature in all the patients. All had normal blood count, viscosity, plasma C reactive protein and rigid sigmoidoscopy and negative faecal occult blood. Most patients underwent a rectal biopsy which was normal, as were barium studies and other investigations when requested. Twenty seven patients agreed to participate, of whom 26 completed the study with satisfactory records (mean age 30 years, range 20-44 years).

### HEALTHY SUBJECTS ('CONTROLS')

Thirty two healthy women among those attending a population survey of gall stones and bowel symptoms in East Bristol were asked to join the study. The criterion for selection was that, in responding to the survey questionnaire, they denied any abdominal pain other than period

University Department of  
Medicine, Bristol Royal  
Infirmary, Bristol  
BS2 8HW  
K W Heaton  
S Ghosh  
F E M Braddon

Correspondence to:  
Dr K W Heaton.

Accepted for publication  
19 February 1990

pains in the past year. They were otherwise selected only on the basis of their age, of having stone-free gall bladders on ultrasonography, and of denying laxative use. Thirty agreed to participate but three were excluded because of incomplete records. The 27 subjects studied were aged 21–38 years, mean 29 years.

#### NON-REPORTERS OF THE IRRITABLE BOWEL SYNDROME ('NON-COMPLAINERS')

These were women who were attending the same survey who admitted to more than six episodes of abdominal pain relieved by defecation in the past year and denied having consulted a doctor about this. They were otherwise selected only on the basis of their age, of being free of gall stones, and of denying laxative use. Of the 35 women approached, 29 agreed to participate but two were excluded because of incomplete records. The 27 subjects studied were aged 21–38 years, mean 28 years.

#### DESIGN OF STUDY

Because bowel function and the symptoms of the irritable bowel syndrome vary with time and might vary with the menstrual cycle we studied our subjects for a full calendar month (31 days). Data were collected prospectively for bowel movements and associated symptoms and retrospectively by frequent interviews for abdominal pain and bloating. Subjects were asked not to take any drugs except the contraceptive pill during the study. In four patients this entailed stopping an antispasmodic or bulking agent.

Each subject was given a specially printed, pocket sized booklet in which to record all her bowel movements. Each double page spread provided space to write down the details of 12 bowel movements: date, time, and form of each stool on a scale of 1–7 (Table I). This scale has been validated as being correlated with whole gut transit time.<sup>21</sup> The subject was told to inspect the stool before it was covered with toilet paper and, as soon as she had washed her hands, to fill in the booklet, ringing her answers to four questions: (1) Was the call to stool ('the feeling you need to open your bowels') urgent ('can't wait')? (2) Did you strain ('hold your breath and push') to start passing the stool? (3) Did you strain to finish passing the stool? (4) Afterwards did you have 'the feeling in your back passage that you had not emptied it completely'?

To ensure complete and accurate recordings, subjects were instructed and regularly reminded to write down dates on which they did not open their bowels and any on which they forgot to record a bowel movement. If more than three entries were forgotten the subject was excluded.

Subjects were telephoned (by SG) at 3, 10, 17, 24, and 31 days to check and maintain com-

pliance and to ask about episodes of abdominal pain and bloating or distension. Premenstrual bloating was ignored. Each pain was graded on a four point scale: (1) mild – not interfering with activity, can be ignored; (2) moderate – some distraction from work or leisure; (3) severe – making her stop what she was doing; (4) incapacitating – forcing her to lie down. Other symptoms common in the irritable bowel syndrome<sup>2,3</sup> were not inquired into.

At the end of the month each subject filled in the Hospital Anxiety and Depression questionnaire.<sup>22</sup>

#### DATA ANALYSIS

The data in the booklets were entered into a computer which calculated the times between defecations and their coefficient of variation. Variability of stool form was assessed by computing the range of stool types, but we excluded any type passed on less than 5% of occasions as being a 'freak' event. Stools of types 1, 6, and 7 were classed as abnormal, reflecting common clinical practice.

With the symptoms of abnormal defecation recorded in the booklet (urgency, straining to start, straining to finish, and incomplete evacuation) we calculated the percentage of defecations accompanied by the symptom as well as counting occurrences of the symptom to avoid bias in people with frequent defecation.

Records of the five telephone interviews were used to enumerate episodes of abdominal pain and of bloating during the month. To obtain an index of total pain experienced we calculated a weighted score by adding together the following: the number of mild episodes, twice the number of moderate episodes, three times the number of severe episodes, and four times the number of incapacitating episodes.

As a crude assessment of the total load of intestinal symptoms an 'intestinal suffering index' was calculated for each subject by adding together the weighted pain score, the number of episodes of bloating, and the number of defecations which were urgent or accompanied by incomplete evacuation or both of these.

The three groups of subjects were compared using Kruskal-Wallis tests, Mann Whitney U-tests, analysis of variance, *t* tests, and  $\chi^2$  tests as appropriate. Associations between defecatory symptoms were sought by comparing the prevalence of one symptom in the presence and absence of another using  $\chi^2$  tests. Relations between stool form and defecatory symptoms were studied by computing how often each symptom occurred when each of the seven stool forms was passed. Associations between symptoms and measures of bowel dysfunction on the one hand and Hospital Anxiety and Depression scale scores on the other were sought by calculating Spearman's rank correlation coefficients.

## Results

### BOWEL FUNCTION

Analysis of the 3007 bowel actions recorded by

TABLE I *The Bristol stool form scale*<sup>21</sup>

Type 1	Separate hard lumps, like nuts
2	Sausage shaped but lumpy
3	Like a sausage or snake but with cracks on its surface
4	Like a sausage or snake, smooth and soft
5	Soft blobs with clear cut edges
6	Fluffy pieces with ragged edges, a mushy stool
7	Watery, no solid pieces

TABLE II Quantitative aspects of bowel function as recorded in the booklets (mean (SEM))

	Patients	Non-complainers	Control subjects
No of defecations in 31 days	49.5 (4.1)*†	34.2 (3.1)	29.5 (2.0)
Interval between stools (hours)	17.4 (1.4)*†	28.3 (3.4)	28.3 (2.4)
Coefficient of variation for interval between stools	0.82 (0.03)*‡	0.56 (0.04)§	0.44 (0.03)

\* $p < 0.001$  v control subjects; † $p < 0.01$  v non-complainers; ‡ $p < 0.001$  v non-complainers; § $p < 0.01$  v controls.

TABLE III Number of subjects with abnormal bowel function and frequent defecatory symptoms (per cent in parentheses)

	Patients (n=26)	Non-complainers (n=27)	Control subjects (n=27)
Excessively frequent defecation:			
>50 bowel movements in 31 days*	13 (50)†‡	5 (19)	2 (7)
Days with $\geq 4$ bowel movements	15 (58)§	4 (15)	1 (4)
>1 interval of <3.1 hours between stools*	24 (92)	11 (41)	4 (15)
Irregularity:			
Coefficient of variation for interval between stools of >0.72*	19 (73)§	7 (26)	0 (0)†
Infrequent defecation:			
Spells of >72 hours with no bowel movement	7 (27)	8 (30)	5 (19)
Defecation urgent $\geq 25\%$ of bowel movements	17 (65)§	7 (26)	3 (11)
Straining to start $\geq 25\%$ of bowel movements	18 (69)	15 (56)	17 (63)
Straining to finish $\geq 25\%$ of bowel movements	16 (62)§	4 (15)	3 (11)
Incomplete evacuation $\geq 25\%$ of bowel movements	19 (73)§	7 (26)	4 (15)

\*Limits of normal taken as 2 SD from mean in control subjects; † $p < 0.05$  v non-complainers; ‡ $p < 0.01$  v control subjects; § $p < 0.01$  v non-complainers; || $p < 0.001$  v control subjects; ||| $p < 0.001$  v non-complainers.

TABLE IV Number of subjects in each group passing any stools of the seven types and number of such stools for the whole group

Type	Patients (n=26)		Non-complainers (n=27)		Control subjects (n=27)	
	Subjects	Stools (%)	Subjects	Stools (%)	Subjects	Stools (%)
1	20	158 (12.3)	15	98 (10.6)	13	37 (4.6)
2	21	122 (9.5)	25	158 (17.1)	25	150 (18.8)
3	22	200 (15.5)	25	175 (18.9)	27	192 (24.1)
4	26	262 (20.4)	23	210 (22.7)	24	241 (30.3)
5	22	175 (13.6)	19	129 (14.0)	21	109 (13.7)
6	23	303 (23.5)	20	139 (15.0)	15	60 (7.5)
7	11	67 (5.2)	9	15 (1.6)	4	7 (0.9)
All types		1287 (100)		924 (100)		796 (100)

Significant differences between groups of subjects as follows – type 1: patients v controls  $p < 0.01$ , patients v non-complainers  $p < 0.05$ ; type 6: patients v control subjects  $p < 0.001$ , patients v non-complainers and control subjects v non-complainers  $p < 0.05$ ; type 7: patients v control subjects  $p < 0.05$ .

TABLE V Frequency of defecatory symptoms (median with range in brackets)

	Patients	Non-complainers	Control subjects
Urgency:			
No of episodes per subject	13 (0–67)*†	6 (0–35)‡	3 (0–20)
% of defecations	42 (0–84)*†	20 (0–60)‡	10 (0–39)
Straining to start:			
No of episodes per subject	19 (5–65)*§	7 (2–53)	8 (0–17)
% of defecations	48 (9–100)‡	26 (3–100)	31 (0–69)
Straining to finish:			
No of episodes per subject	17.5 (0–68)*§	2 (0–53)	1 (0–11)
% of defecations	35 (0–97)*§	4 (0–100)	4 (0–38)
Incomplete evacuation:			
No of episodes per subject	21.5 (0–88)*§	7 (0–22)	4 (1–21)
% of defecations	52 (0–100)*§	15 (0–90)	11 (3–49)

\* $p < 0.001$  v control subjects; † $p < 0.01$  v non-complainers; ‡ $p < 0.05$  v control subjects; § $p < 0.001$  v non-complainers; || $p < 0.05$  v non-complainers.

the 80 subjects showed many differences, both objective and subjective, between the bowel function of the patients and that of the other two groups.

#### FREQUENCY AND TIMING

The patients defecated more frequently than the non-complainers and control subjects, who did not differ from each other (Table II). All the

patients had excessive frequency of defecation by one definition or another. Days with four or more bowel movements occurred in over half the patients (Table III), but they did not occur often – only once in the month in six patients, twice in five patients, and more often in only four patients. Days with five or more bowel actions occurred in 23% of the patients but in no control subjects and in only one non-complainer. Abnormally short intervals between stools (defined as more than two standard deviations below the mean of the control subjects) occurred in all 26 patients, in 17 of the non-complainers (63%), and in 13 control subjects (48%). For such intervals to occur more than once was rare in the control subjects but almost universal in the patients (Table III).

The interval between bowel actions was more variable in patients than in non-complainers or control subjects. The coefficient of variation for this interval was much higher in patients than in control subjects and slightly higher in the non-complainers (Table II). Irregularity, defined as an abnormally variable interval between stools, was a feature of most patients but of no control subject (Table III). This irregularity was not due to the patients being especially prone to long intervals between stools (Table III). The mean number of days without a defecation was similar in the three groups: patients 4.3, non-complainers 6.9, control subjects 5.2.

#### STOOL FORM

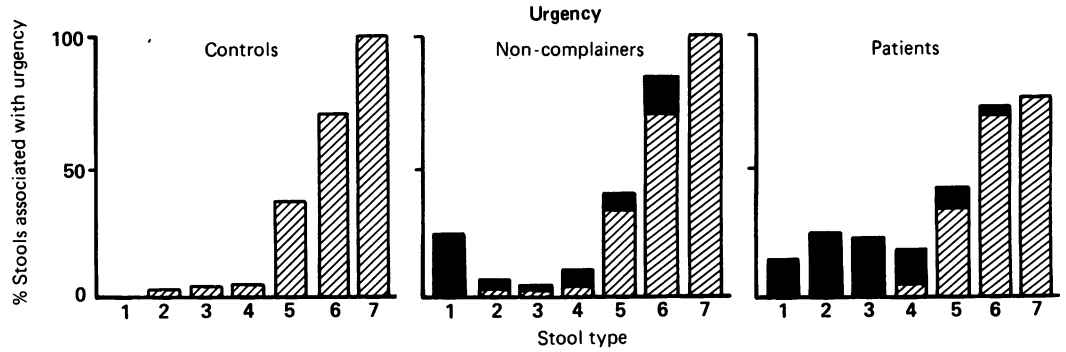
Stools of every type were passed by some or all of the subjects in each group (Table IV). Patients passed abnormal stools (types 1, 6, and 7) in excessive numbers but normal stools in normal numbers. Stools were abnormal on at least 25% of occasions in 85% of patients but in only 15% of control subjects ( $p < 0.001$ ) and 52% of the non-complainers ( $p < 0.05$ ). Stool form was erratic in the patients, as shown by a greater range of types passed – namely mean (SEM) 5.2 (0.3) v 4.2 (0.2) in each of the other groups ( $p < 0.01$  v control subjects,  $p < 0.05$  v non-complainers).

#### DEFECATORY SYMPTOMS

Every subject in the study experienced one or more of the four symptoms but three symptoms were much commoner in the patients. The number of urgent defecations per subject, the percentage of defecations that were urgent (Table V), and the number of subjects who had urgency often (Table III) were all greater in the patients. Straining to start was only slightly commoner in patients, but straining to finish was much more prevalent (Table V) and was a frequent event in most patients (Table III). Similarly, the feeling of incomplete evacuation was much commoner in patients, occurring after half their bowel movements (Table V). Again, most patients had this symptom often (Table III).

'Comfortable defecation' – that is, no urgency, straining to finish, or incomplete evacuation – was rare in patients: 11% of bowel movements v 61% in non-complainers and 75% in control subjects.

Figure 1: Percentage of stools of the seven types associated with urgency of defecation. Black shading indicates excess of this symptom over its prevalence in the healthy controls – that is, inappropriate rectal symptoms.



ASSOCIATIONS BETWEEN PAIRS OF DEFECATORY SYMPTOMS

In all three groups of subjects straining to start was negatively associated ( $p < 0.001$ ) with urgency and positively associated ( $p < 0.001$ ) with straining to finish and with rectal dissatisfaction. The last two symptoms were strongly associated with each other ( $p < 0.001$ ).

RELATIONS BETWEEN DEFECATORY SYMPTOMS AND STOOL FORM

The control subjects experienced urgency with all type 7 stools but with no type 1 stools (Fig 1). Conversely, they never strained to start passing a type 7 stool but did strain with most type 1 stools (68%) (Fig 2). With types 2 to 7 they experienced, stepwise, more urgency and less straining. These trends were highly significant ( $p < 0.001$ ). The non-complainers were similar to the control subjects except that they had urgency with some type 1 stools and were a little more prone to strain. In the control subjects and non-complainers type 4, which is the commonest stool form, was seldom associated with urgency or straining to start (6.7% and 8.9% respectively).

In contrast, patients experienced urgency with type 4 stools on 35.1% of occasions and strained to start passing these most normal of stools on 38.9% of occasions ( $p < 0.001$  v other two groups). They had urgency even with firm and lumpy stools (23.0% of type 3, and 32.8% of type 2;  $p < 0.001$ ). Conversely, they often strained inappropriately to pass soft and loose stools (types 5, 6, and 7).

Straining to finish defecating was unusual in the healthy control subjects. In them and the non-complainers it occurred only with constipated stools (types 1 and 2), with rare exceptions. In contrast, the patients strained to finish passing all types, including 30–50% of poorly formed and unformed stools (types 5 and 6) (Fig 3).

Feelings of incomplete evacuation were quite common in the controls and non-complainers after passing stools of extreme types – that is, with true constipation and true diarrhoea – but such feelings were rare with types 3 and 4, so that in both groups the prevalence histogram was clearly U shaped (Fig 4). The patients showed no such relation, there being no significant difference in the prevalence of this symptom across the seven stool types.

In a given patient the association of a symptom with a stool type was inconstant. For example, of 11 type 4 stools in one patient, six were urgent and five were not, while nine were associated with incomplete evacuation and two were not.

PAIN

Nearly all the patients and non-complainers experienced abdominal pain and, unexpectedly, so did most of the control subjects. Pain, however, occurred much more frequently in the patients (Table VI). Grade 3 or 4 pain occurred in some control subjects but it was much commoner in the patients. Consequently, the weighted pain score was eight times higher in the patients, with the non-complainers intermediate but nearer the control subjects.

BLOATING

Bloating was experienced by nearly everyone. It occurred more frequently, however, in patients than control subjects, with the non-complainers intermediate (Table VI).

'INTESTINAL SUFFERING INDEX'

The median intestinal suffering index was 88 in patients, 27 in non-complainers, and 17 in control subjects, all differences being highly significant. There was overlap between patients

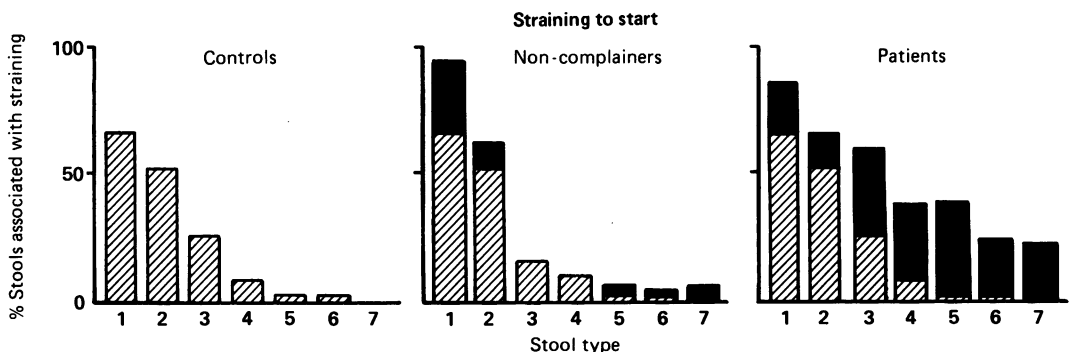
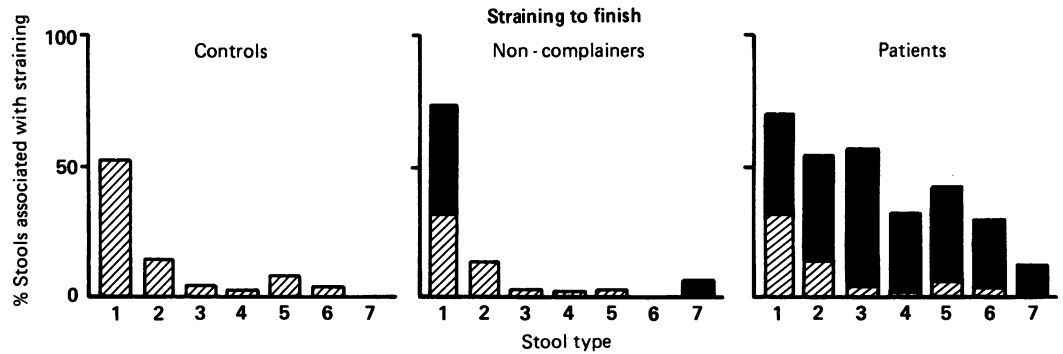


Figure 2: Percentage of stools of the seven types associated with straining to start defecating. For key see Figure 1.

Figure 3: Percentage of stools of the seven types associated with straining to finish defecating. For key see Figure 1.



and non-complainers and between non-complainers and control subjects but not between patients and control subjects (Fig V).

**ANXIETY AND DEPRESSION SCORES**

The median score for anxiety was 11 in patients, 9 in non-complainers, and 5 in control subjects. Each group was significantly different from the others (patients *v* control subjects  $p < 0.001$ , patients *v* non-complainers  $p < 0.05$ , non-complainers *v* control subjects  $p < 0.01$ ). The anxiety score was frankly abnormal – that is, 11 or over – in 13 (50%) patients, in eight (30%) non-complainers, and in three (11%) control subjects.

The median score for depression was 6 in the patients, which was significantly higher than in the control subjects (3) and the non-complainers (3) ( $p < 0.01$  and  $< 0.05$  respectively). The depression score was frankly abnormal in three patients but in none of the others.

**CORRELATION BETWEEN SYMPTOMS, MEASURES OF BOWEL FUNCTION, AND PSYCHOLOGICAL STATE**

None of the correlations were consistent across all three groups of subjects. This was due mainly to the lack of significant correlations in the control subjects, which may reflect the narrow range of anxiety and depression scores in them. When they were excluded on this account, one symptom – bloating – was consistently correlated with both anxiety and depression (with anxiety  $r = 0.63$  and  $0.33$  in patients and non-complainers,  $p < 0.001$  and  $p < 0.05$  respectively; with depression  $r = 0.54$  and  $0.47$  respectively,  $p < 0.01$  in both groups).

**Discussion**

This study shows that the bowel function of women with the irritable bowel syndrome is objectively abnormal. Most of our patients had

episodes of abnormally frequent defecation and were prone to pass stools of abnormally loose consistency (types 6 and 7). In other words, they did have diarrhoea. This was, however, episodic and the episodes were relatively infrequent. Moreover, some episodes of frequent defecation occurred with solid stools. This has been described before<sup>7,21</sup> and called pseudodiarrhoea<sup>21</sup>

Patients with the irritable bowel syndrome commonly complain that their bowel habits are erratic. They are correct. Our patients had abnormally variable intervals between stools and abnormally variable stool form. Since stool form correlates with whole gut transit time<sup>21,23</sup> we conclude that intestinal transit time is abnormally variable in patients with the irritable bowel syndrome.

Our data confirm the common experience that loose stools evoke an urgent call to defecate and that hard, lumpy ones usually require straining to pass. The data also show that in patients with the irritable bowel syndrome urgency and straining do not necessarily indicate that the stool is loose and hard respectively. Perfectly normal stools (types 3 and 4) evoked urgency and straining on 35–60% of occasions. Similarly, the data show that normal women strain to finish defecating only when their stools are lumpy, and even then not often, but this behaviour is common in patients with the irritable bowel syndrome. Straining to finish passing normal stools is almost limited to such patients, and this symptom may be worth investigating as an aid to diagnosis. Organic causes like proctitis, haemorrhoids, and rectal prolapse are easily excluded.

Feelings of incomplete evacuation are shown here to be common in normal women when they develop true constipation or true diarrhoea but to be uncommon when their stools are normal. In contrast, patients with irritable bowel syndrome have this symptom with about half their defecations, whatever form the stools take. It seems

Figure 4: Percentage of stools of the seven types associated with feelings of incomplete evacuation. For key see Figure 1.

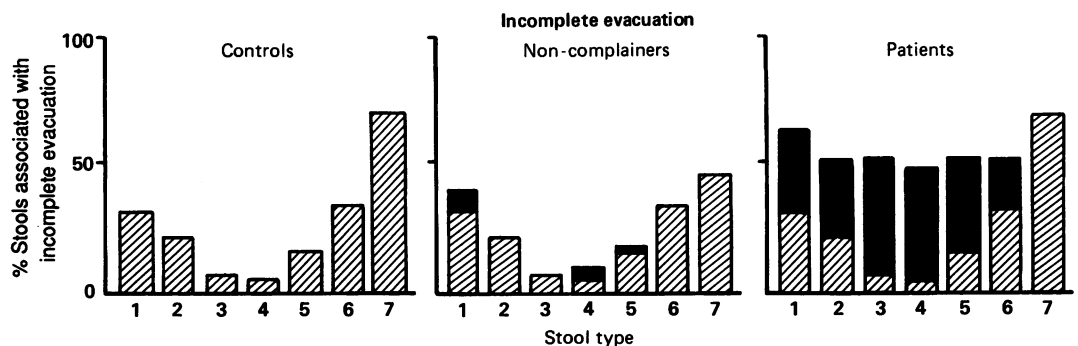


TABLE VI Abdominal pain and bloating

	Patients	Non-complainers	Control subjects
No of subjects having any pain (%)	25 (96)	26 (96)	22 (81)
Pain episodes per subject who had pain; median (range)	13 (5-35)*†	5 (2-12)‡	3 (1-10)
No with grade 3 or 4 pain (%)	24 (92)†‡	16 (59)	11 (41)
Episodes of grade 3 or 4 pain per subject; median (range)	5.5 (1-17)*†	1.5 (1-6)	1 (1-5)
Weighted pain score; median (range)	32.5 (0-87)*†	10 (0-28)‡	4 (0-23)
No with bloating (%)	25 (96)	27 (100)	25 (93)
Bloating episodes per subject; median (range)	15 (3-28)*†	7 (1-24)§	4 (1-16)

\* $p < 0.001$  v non-complainers; † $p < 0.001$  v control subjects; ‡ $p < 0.05$  v non-complainers; § $p < 0.01$  v control subjects.

that rectal symptoms are largely dissociated from rectal contents in the irritable bowel syndrome. This inability of the rectum to discriminate between stools of different type may in part be a result of its supersensitive or irritable state, but another factor might be learned 'misbehaviour' at the conscious or unconscious level.

Patients with the irritable bowel syndrome commonly complain of constipation, and half of ours did so, but by most measures they were no more constipated than the healthy control subjects. They had no more 'missed' days or long spells without defecating, and were no more prone to strain to start defecating. Perhaps their complaint is provoked by their tendency to strain to finish defecating together with their frequent feelings of incomplete evacuation. These two symptoms often occurred together, presumably because patients strained to try and get rid of the feeling. To strain for this reason is understandable but is a warning to doctors not to take the complaint of constipation at face value.

Most of our patients had frequent urgency as well as frequent feelings of incomplete evacuation. Urgency of defecation can be distressing since it inhibits social activities and can lead to incontinence.<sup>14</sup> Patients with the irritable bowel syndrome are sometimes accused of being obsessed with their bowels. But who can blame them when their defecations start suddenly and

unpredictably and finish slowly and uncertainly?

The data on abdominal pain and bloating are less reliable than those on bowel function since they were obtained retrospectively, though at frequent, short intervals. Nevertheless, some interesting points emerge. Most of the control subjects experienced pain during the month despite having denied, shortly beforehand, suffering pain in the previous year. This suggests that abdominal pain is an occasional experience of most women and is usually forgotten. This does not mean that patients with the irritable bowel syndrome are simply people who remember their pains and complain about them. Our patients had many more episodes of pain than control subjects and their total burden of pain was eight times higher by our scoring system. They also had much more frequent bloating. Nevertheless, there was some overlap in the 'intestinal suffering index' between the patients and the non-complainers, and this is consistent with reports that patients with the irritable bowel syndrome include people with undue health care-seeking behaviour.<sup>13</sup>

The intestinal dysfunction was intermittent in nearly all patients. All passed some normal stools and nearly all had some defecations which were neither urgent nor followed by feelings of incomplete evacuation. Similarly, all had some days without pain or bloating. The intermittency of the abnormality must hold a clue to the nature of the disorder.

Our patients were more anxious and more depressed than the control subjects, as in many other studies.<sup>24</sup> The data, however, do not indicate which came first, the emotional problems or the intestinal ones. If emotional distress caused the intestinal malfunction one might expect to find correlations between psychological scores and occurrence or severity of symptoms. We did not find such correlations, except with bloating. This may be a methodological problem. Comparing people with each other for subjective states is hazardous. There is no doubt that a change in emotional state can provoke a change in intestinal function in normal subjects and patients with the irritable bowel syndrome.<sup>25,26</sup>

The patients had higher anxiety and depression scores than the non-complainers. This does not necessarily mean that they had gone to their doctors because they were anxious or unhappy. In every parameter of bowel dysfunction, and in the frequency of both pain and bloating, the patients were more severely afflicted than the non-complainers. They may have gone to their doctors because their symptoms were particularly severe. Any conclusion must be drawn with caution because the patients in this study had been referred to hospital and they may not be representative of all patients who go to their family doctor.

This study indicates that female patients with the irritable bowel syndrome experience real intestinal dysfunction and the symptoms are worse than those of non-complainers. Some variation in bowel function is normal, as are occasional episodes of abdominal pain and bloating, but these variations and these symptoms are extreme in patients with irritable bowel syndrome.

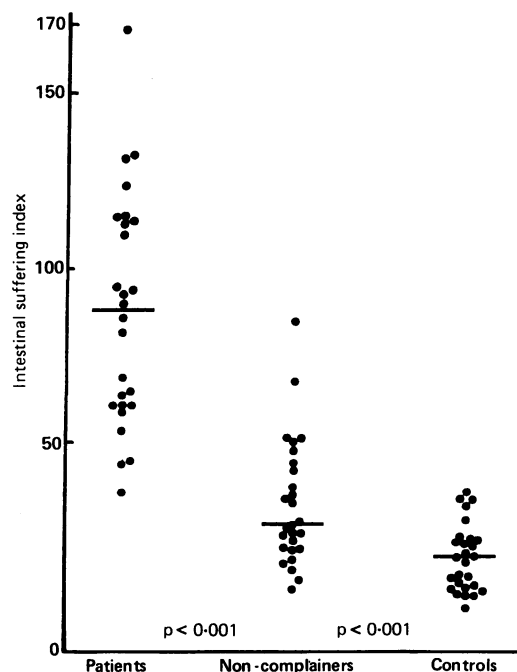


Figure 5: 'Intestinal suffering index' of each subject in the three groups. This was calculated by adding together the weighted pain score, the number of episodes of bloating, and the number of defecations that were urgent or accompanied by rectal dissatisfaction, or both.

We thank Mr A O Hughes for statistical advice and all the general practitioners who allowed access to their patients. This study was supported by a scholarship (to SG) from the Royal College of Physicians.

- 1 Manning AP, Thompson WG, Heaton KW, Morris AF. Towards positive diagnosis of the irritable bowel. *Br Med J* 1978; 2: 653-4.
- 2 Svedlund J, Sjödin I, Dotevall G, Gillberg R. Upper gastrointestinal and mental symptoms in the irritable bowel syndrome. *Scand J Gastroenterol* 1985; 20: 595-601.
- 3 Whorwell PJ, McCallum M, Creed FH, Roberts CT. Non-colonic features of irritable bowel syndrome. *Gut* 1986; 27: 37-40.
- 4 Thompson WG. The irritable bowel. *Gut* 1984; 25: 305-20.
- 5 Drossman DA, Lowry BC. Irritable bowel syndrome: epidemiology, diagnosis and treatment. *Clin Gastroenterol* 1985; 14: 559-73.
- 6 Oettlé GJ, Heaton KW. "Rectal dissatisfaction" in the irritable bowel syndrome. A manometric and radiological study. *Int J Colorect Dis* 1986; 1: 183-5.
- 7 Oettlé GJ, Heaton KW. Is there a relationship between symptoms of the irritable bowel syndrome and objective measurements of large bowel function? A longitudinal study. *Gut* 1987; 28: 146-9.
- 8 Read NW. Irritable bowel syndrome (IBS) - definition and pathophysiology. *Scand J Gastroenterol* 1987; Supp 130: 7-13.
- 9 Thompson WG, Heaton KW. Functional bowel disorders in apparently healthy people. *Gastroenterology* 1980; 79: 283-8.
- 10 Drossman DA, Sandler RS, McKee DC, Lovitz AJ. Bowel patterns among subjects not seeking health care. Use of a questionnaire to identify a population with bowel dysfunction. *Gastroenterology* 1982; 83: 529-34.
- 11 Johnsen R, Jacobsen BK, Førde OH. Associations between symptoms of irritable colon and psychological and social conditions and lifestyle. *Br Med J* 1986; 292: 1633-5.
- 12 Bommelaer G, Rouch M, Dapoigny M, et al. Epidémiologie des troubles fonctionnels intestinaux dans une population apparemment saine. *Gastroenterol Clin Biol* 1986; 10: 7-12.
- 13 Sandler RS, Drossman DA, Nathan HP, McKee DC. Symptom complaints and health care seeking behavior in subjects with bowel dysfunction. *Gastroenterology* 1984; 87: 314-8.
- 14 Drossman DA, Sandler RS, Broom CM, McKee DC. Urgency and fecal soiling in people with bowel dysfunction. *Dig Dis Sci* 1986; 31: 1221-5.
- 15 Drossman DA, McKee DC, Sandler RS, et al. Psychosocial factors in the irritable bowel syndrome. A multi-variate study of patients and nonpatients with irritable bowel syndrome. *Gastroenterology* 1988; 95: 701-8.
- 16 Whitehead WE, Bosmajian L, Zonderman AB, Costa PT, Schuster MM. Symptoms of psychologic distress associated with irritable bowel syndrome. Comparison of community and medical clinic samples. *Gastroenterology* 1988; 95: 709-14.
- 17 Wyman JB, Heaton KW, Manning AP, Wicks ACB. Variability of colonic function in healthy subjects. *Gut* 1978; 19: 146-50.
- 18 Ford MJ. Invited review: the irritable bowel syndrome. *J Psychosom Res* 1986; 30: 399-410.
- 19 Thompson WG, Dotevall G, Drossman DA, Heaton KW, Kruis W. Irritable bowel syndrome: guidelines for the diagnosis. *Gastroenterol Int* 1989; 2: 92-5.
- 20 Chaudhary NA, Truelove SC. Irritable colon syndrome. A study of the clinical features, predisposing causes, and prognosis in 130 cases. *Q J Med* 1962; 31: 307-22.
- 21 O'Donnell LJD, Heaton KW. Pseudo-diarrhoea in the irritable bowel syndrome: patients' records of stool form reflect transit time while stool frequency does not. [Abstract]. *Gut* 1988; 29: A1455.
- 22 Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983; 67: 361-70.
- 23 Davies GJ, Crowder M, Reid B, Dickerson JWT. Bowel function measurements of individuals with different eating patterns. *Gut* 1986; 27: 164-9.
- 24 Creed F, Guthrie E. Psychological factors in the irritable bowel. *Gut* 1989; 28: 1307-18.
- 25 Almy TP. Experimental studies on the irritable colon. *Am J Med* 1951; 10: 60-7.
- 26 Whitehead WE. Effects of psychological factors on gastrointestinal function. In: Snape WJ, ed. *Pathogenesis of functional bowel disease*. New York: Plenum, 1989: 37-53.