

Prevalence of irritable bowel syndrome: a community survey

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SUMMARY

Background: Irritable bowel syndrome (IBS) is a common health problem affecting a substantial proportion of the population. Many individuals with symptoms of IBS do not seek medical attention or have stopped consulting because of disillusionment with current treatment options. Such patients may choose to re-consult with the advent of new therapies with a resulting impact on health services.

Aim: To generate reliable estimates of the prevalence of IBS by age, sex and symptom group.

Design of study: Postal survey.

Setting: Patients selected from registers of eight general practices in north and west Birmingham.

Method: Eight thousand six hundred and forty-six patients aged ≥ 18 years were randomly selected from practice lists. Selected patients received a questionnaire, which included diagnostic criteria for IBS. A second questionnaire, seeking more detailed information, was sent to those whose responses indicated the presence of IBS symptoms.

Results: Of the 8386 patients surveyed 4807 (57.3%) useable replies were received. The community-based prevalence of IBS was 10.5% (6.6% of men and 14.0% of women). Overall the symptom profiles were characterised by diarrhoea (25.4%), constipation (24.1%) and alternating symptoms (46.7%). Over half (56%) of all patients had consulted their general practitioner within the past 6 months and 16% had seen a hospital specialist. A quarter of patients consulted more than twice and 16% were referred to secondary care; almost half were on prescribed medication. However, the majority of patients were self-treated. Less than half of those currently reporting symptoms of IBS according to the Rome II criteria had received a diagnosis of IBS. Reduced quality of life and a previous diagnosis of a stomach ulcer were identified as predictors of consultation.

Conclusion: Quality of life was significantly reduced in patients with IBS. There is a substantial burden on primary healthcare services despite over half of those with symptoms also self-medicating. The Rome II diagnostic criteria identified those most affected by their symptoms and are a valid clinical tool. Population-based health surveys will need to supplement the Rome criteria with questions aiming to identify patients formally diagnosed but whose symptoms are currently under control if prevalence is to be reliably estimated.

Keywords: irritable bowel syndrome; prevalence; quality of life.

Introduction

IRRITABLE bowel syndrome (IBS) is a common health problem affecting a substantial proportion of the population; point prevalence estimates usually range from 12–30%.^{1–7} Prevalence rates vary significantly between countries and depend on the diagnostic criteria used.^{6,8}

IBS causes reduced quality of life^{6,9} and has been reported as resulting in the same degree of impairment as congestive heart failure.¹⁰ People with IBS are more likely to be unable to work and to have visited their doctor than the general population.⁴ The condition generates a substantial workload in both primary and secondary care.^{6,11} A minority (10–50%)^{5,7} of those experiencing symptoms consult their general practitioner (GP). However, a substantial proportion (17–30%)^{12,6} of those who do present to primary care require referral to a specialist. IBS accounts for 20–50% of referrals to gastroenterology clinics.^{13–15} Costs associated with IBS are therefore substantial; it has an impact on the individual, industry and commerce and the health service.^{4,5,16}

Patients who come to medical attention tend to have a greater number of symptoms¹⁷ and are more anxious and depressed.¹⁸ Little is known of the coping strategies used by the large number of IBS sufferers who do not seek medical attention,²² or which patients have significantly reduced quality of life and absenteeism from work. A proportion of patients stop consulting because of disenchantment with current therapy¹⁹ and some seek complementary therapy.^{20,21}

The current diagnostic criteria for IBS are based on the Manning criteria,²³ which have been demonstrated to have applicability to both sexes and different ethnic groups.²⁴ A number of studies have aimed to better identify symptom clusters that are predictive of IBS.^{24–26} The current diagnostic criteria (Rome II)¹² for IBS are detailed in Box 1.

Development of new therapies for IBS that may offer benefit to only one sex or certain disease subgroups^{27,28} requires reliable estimates of prevalence and disease by symptom type. Individuals with symptoms of IBS who have never presented to the NHS or have stopped consulting¹⁹ may choose to consult with the advent of new therapies, and this would ultimately have an impact on health services. This study aimed to utilise a postal survey of 8646 adults to determine the prevalence of IBS, its impact on the population and whether patient and disease characteristics are sufficient to determine the characteristics of those who choose to consult a healthcare practitioner.

Method

Participants

Eight general practices were recruited and approval was granted by West and North Birmingham Local Research Ethics Committees. Practices were selected from each of

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HOW THIS FITS IN

What is known already

Irritable bowel syndrome (IBS) is a common condition, although estimates of prevalence vary from 12–30%. The condition generates a substantial workload in primary and secondary care. IBS has a considerable impact and causes reduced quality of life.

What this paper adds

The prevalence of IBS is slightly lower than previous estimates suggest. Rome II criteria are a useful way of identifying those whose quality of life is most severely affected. Fifty per cent of patients have consulted their GP within the past 6 months and the decision to consult is associated with reduced quality of life rather than pain severity or duration

the four quartiles of the Townsend deprivation scores of the West Midlands to enable adequate sampling in each socioeconomic group.

Random lists of addresses were generated from practice registers, and individuals aged 18 years or over were randomly selected from these addresses until the required number of patients was identified. A total of 1150 patients were sought from each practice. Where the practice was unable to provide this number (because of a small list size) all patients available were included. Only those patients whom the GP indicated would be inappropriate were excluded; for example, patients known to be terminally ill or those with a severe learning disability.

Sample size

A sample of 8646 patients was identified as sufficient to estimate the prevalence of IBS with 1.3% precision and 95% confidence. This calculation assumed a prevalence of 25%⁷ and a response rate of 60%.

Intervention

The questionnaire was presented as a general health questionnaire to minimise responder bias. A covering letter sent in the joint names of the university and the general practice explained that the research project aimed to determine the number of patients affected by certain conditions and the impact on quality of life. Questionnaires had three sections; (i) personal and demographic details, including personal and family medical history; (ii) the SF-12 (12-item short-form health survey),²⁹ a validated generic quality of life measure; (iii) a questionnaire version of the Rome II diagnostic criteria for IBS.¹² A pre-paid envelope was enclosed and subjects were notified that return of a blank questionnaire would result in no further contact. One reminder was sent to non-responders. Questionnaires were not translated into other languages.

A second postal questionnaire was sent to collect more detailed information from those identified as having IBS relating to symptoms, disease-specific quality of life, consulting behaviour, and current treatment. This questionnaire incorporated the general health questionnaire³⁰ and an IBS-specific quality of life questionnaire.³¹ These questionnaires have been validated in studies of IBS and enable comparison with

At least 12 weeks or more, which need not be consecutive, in the preceding 12 months of abdominal discomfort or pain that has two out of three features:

- Relieved with defecation; and/or
- Onset associated with a change in frequency of stool; and/or
- Onset associated with a change in form (appearance) of stool

Symptoms that cumulatively support the diagnosis of irritable bowel syndrome:

- Abnormal stool frequency (for research purposes 'abnormal' may be defined as greater than three bowel movements per day and less than three bowel movements per week)
- Abnormal stool form (lumpy/hard or loose/watery stool)
- Abnormal stool passage (straining, urgency, or feeling of incomplete evacuation)
- Passage of mucus
- Bloating or feeling of abdominal distension

Box 1. Diagnostic criteria for IBS (in the absence of structural or metabolic abnormalities to explain the symptoms).¹²

other published series. No previously validated disease-specific symptom score could be identified; a score, based on the Rome II diagnostic criteria, was therefore developed for this study. Severity of symptoms was scored from 0–100; increasing scores denoting more severe symptoms.

Since the Rome II diagnostic criteria were designed for use in face-to-face consultations it was considered possible that a questionnaire-based version might fail to identify all people with IBS. The second questionnaire was, therefore, sent to all who reported two or more symptoms associated with IBS even if they did not meet the Rome II criteria.

Statistical methods

Prevalence rates were estimated using the observed age- and sex-specific proportions and directly standardised, by age, sex and deprivation score, to the West Midlands population.³² Ninety-five per cent confidence intervals (CIs) were calculated using the exact binomial method. Logistic regression models were used to estimate the odds of having IBS for potential risk factors and to determine the predictors of seeking health care.

Symptom and quality of life scores were compared between those with IBS, according to the Rome II criteria, and those with symptoms but not meeting the Rome criteria. Individuals were grouped by symptom profile into constipation predominant, diarrhoea predominant and alternating symptoms. Validation of symptom scores (factor analysis) determined symptom dimensions as pain, constipation and diarrhoea.

SF-12 scores were skewed, therefore Kruskal–Wallis tests were used to compare the SF-12 mental (MCS12) and physical (PCS12) dimension scores for different groups of responders. Multiple paired comparisons were made with Wilcoxon rank sum tests and *P*-values adjusted using the Bonferroni method. IBS-specific symptom and quality of life scores were non-normally distributed; two-group comparisons were made with Wilcoxon rank sum tests and three-group comparisons

with Kruskal-Wallis tests. Multiple regression analysis was used to determine the predictors of reduced quality of life. Parsimonious models were identified using a backward elimination method. Data were analysed using SAS version 8.01.

Results

Response rates

Questionnaires were sent to 8646 patients and 260 questionnaires marked 'not at address' were returned. Of the 8386 patients who formed the study sample 5221 (62.4%) responded, although 414 of these returned blank questionnaires, and in total 4807 useable replies were received (Figure 1). Three hundred and ninety-eight responders reported having those symptoms required for a diagnosis of IBS as defined by the Rome II criteria and a further 753 reported two or more symptoms and were thus eligible for the sec-

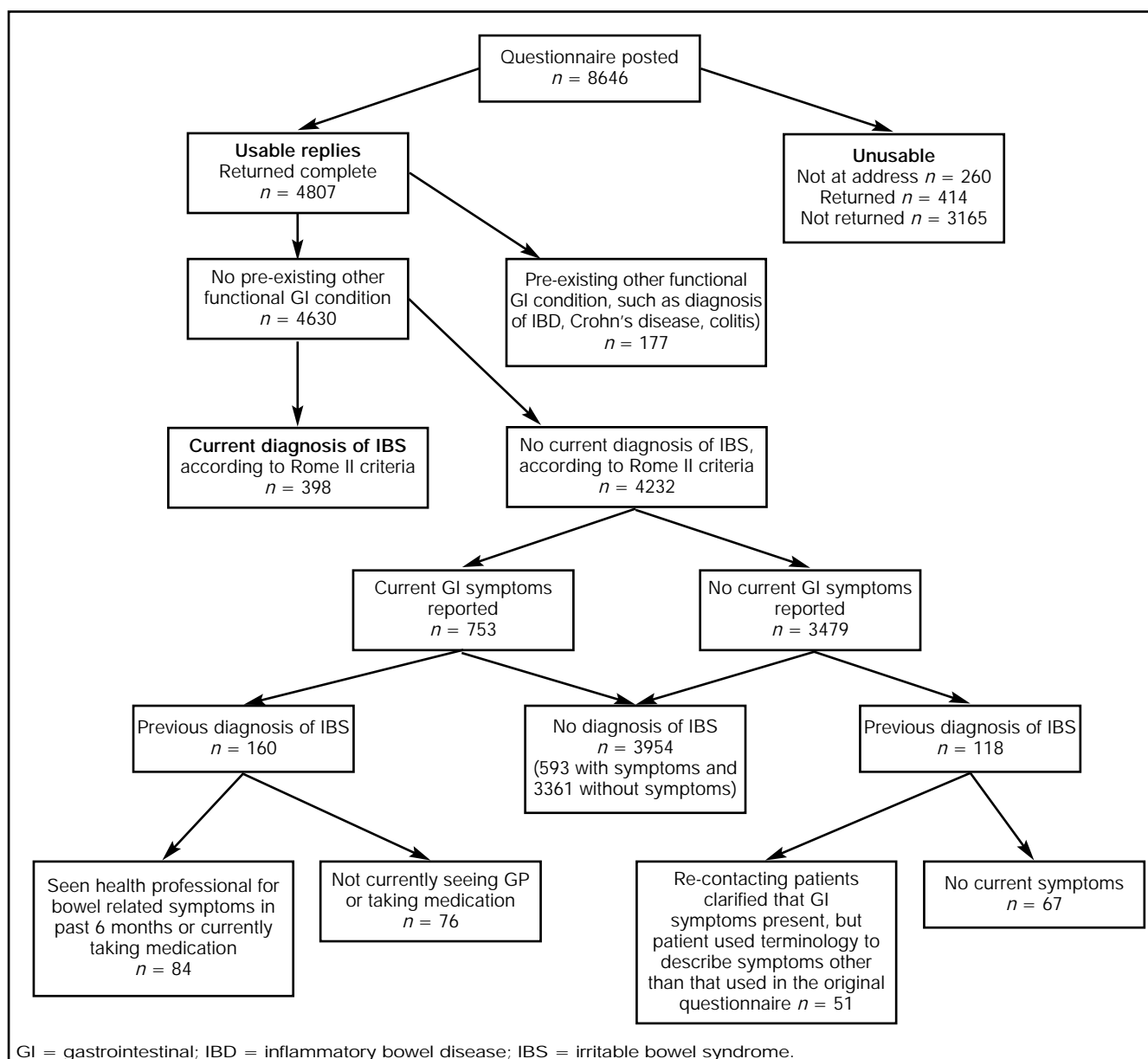
ond questionnaire. From these 1151 responders 892 (77.5%) who were sent the second questionnaire responded. Not all responders completed all items of the questionnaires. The numerators for various factors of interest therefore vary and are presented at the beginning of each section for clarity.

Defining the prevalence of IBS

Initial analyses aimed to establish the subgroup of the sample that should form the numerator when estimating the prevalence of IBS. Responders were grouped into categories:

- Currently meeting the Rome II diagnostic criteria ($n = 398$)
- Not meeting the Rome II criteria, but currently having some gastrointestinal symptoms:
- a diagnosis of IBS and reporting recent treatment (84

Figure 1. Study population.



had seen a health professional and 51 reported current symptoms, but used their own terminology = 135)

- no diagnosis of IBS but reported some symptoms of IBS although these symptoms did not require recent treatment (593 had no diagnosis of IBS and 76 had a previous diagnosis of IBS but no current treatment = 669)
- Not meeting the Rome II criteria, and not reporting any gastrointestinal symptoms (3361 had no previous diagnosis of IBS and 67 had a previous diagnosis of IBS).

A 'diagnosis' was defined as being made by any clinician and 'recent treatment' was defined as current medication or a consultation with a health professional within the past 6 months for IBS.

SF-12 data were available for 84% (4057) of responders. A comparison of median SF-12 scores between those identified as currently having IBS according to the Rome II criteria, those with a diagnosis of IBS and those without IBS demonstrated a significantly reduced quality of life for those with IBS (Table 1). On both the mental and physical scales, quality of life was worst for those currently meeting the Rome criteria. Those patients with a diagnosis of IBS and reporting some symptoms, although not meeting the Rome criteria, also had significantly worse quality of life than those without IBS.

Disease-specific quality of life and symptom scores were examined to determine whether those reporting some symptoms of IBS but not meeting the Rome criteria were affected to the same degree as those meeting these diagnostic criteria. Data were available for 892 responders (295/398 meeting Rome II criteria and 597/753 reporting some symptoms but not meeting the Rome criteria). Quality of life was significantly reduced, and symptom scores were significantly higher, for

those who had IBS according to the Rome criteria (Table 2).

Usefulness of a postal version of Rome II questionnaire for measuring prevalence

Of the 533 patients identified with IBS, 398 (74.7%) exhibited current symptom profiles that were identified by the Rome II based questionnaire, 135 (25.3%) had a diagnosis of IBS but would not have been identified by the postal version of the Rome II questionnaire alone as 84 (15.6%) exhibited no symptoms with their disease being controlled by current therapy, and 51 (9.7%) reported symptoms but used terminology other than that used on the questionnaire. Only 184 (46%) of the 398 patients currently reporting symptoms of IBS according to the Rome II criteria had received a diagnosis of IBS.

Prevalence rates

Three hundred and ninety-eight responders currently had IBS according to the Rome II criteria, giving a crude prevalence rate of 8.3% (95% CI = 7.5% to 9.1%) and a standardised prevalence rate of 8.1% (95% CI = 7.1% to 9.1%). When we also included those patients who had a diagnosis of IBS and were reporting some symptoms ($n = 533$; 387 women) the standardised prevalence rate rose to 10.5% (6.6% of men and 14.0% of women) (Table 3). A further 669 people reported having two or more symptoms associated with IBS but either did not meet the Rome II criteria or, although they had an existing diagnosis of IBS, had not seen their primary care practitioner or taken any medication within the past 6 months.

The probability of having IBS (adjusted odds ratio [OR]) varied by sex and age group. For example, women aged 30 years were nearly three times as likely as men to have

Table 1. SF-12 general health questionnaire scores by patient group.

SF-12	IBS according to Rome II criteria group 1 ($n = 341$)	Diagnosis of IBS (some symptoms but not Rome II) group 2 ($n = 109$)	No IBS group 3 ($n = 3607$)	Kruskal-Wallis test
PCS12				
Median (IQR)	42.4 (30.8–53.1)	48.4 (38.6–54.8)	52.5 (43.4–55.9)	$P < 0.0001$
MCS12				
Median (IQR)	41.7 (32.5–51.3)	49.9 (35.9–55.4)	52.6 (44.2–57.2)	$P < 0.0001$

All paired comparisons (Bonferroni corrected) are significantly different: group 1 versus group 2: PCS12 $P < 0.01$, MCS12 $P < 0.001$; group 1 versus group 3: PCS12 and MCS12 $P < 0.0001$; group 2 versus group 3: PCS12 and MCS12 $P < 0.0001$. IQR = interquartile range; IBS = irritable bowel syndrome; SF-12 = 12-item short-form health survey; PCS12 = 12-item physical component summary; MCS12 = 12-item mental component summary.

Table 2. Irritable bowel syndrome (IBS)-specific symptom and quality of life scores by patient group.

Symptom score	IBS Rome II ($n = 295$)	Some symptoms of IBS but not meeting Rome II ($n = 597$)	z-statistic ^a	P-value
Pain dimension				
Median (IQR)	33.3 (20.0–46.7)	20.0 (6.7–33.3)	9.7	< 0.0001
Constipation				
Median (IQR)	33.3 (13.3–53.3)	20.0 (6.7–40.0)	4.6	< 0.0001
Diarrhoea				
Median (IQR)	20.0 (10.0–32.0)	12.0 (4.0–24.0)	6.5	< 0.0001
Total				
Median (IQR)	30.0 (22.9–41.4)	18.2 (10.9–27.3)	9.6	< 0.0001
Quality of Life				
Median (IQR)	80.1 (62.5–91.2)	91.9 (81.6–97.1)	9.3	< 0.0001

^az approximation from Wilcoxon rank sum test. IQR = interquartile range.

Table 3. Prevalence rates of irritable bowel syndrome (IBS) per 100 population.

	Men <i>n</i> = 1986 (95% CI)	Women <i>n</i> = 2820 (95% CI)	Overall <i>n</i> = 4807 (95% CI)
Prevalence of IBS			
Crude rate (<i>n</i> = 533)	7.4 (6.2 to 8.6)	13.7 (12.5 to 15.0)	11.1 (10.2 to 12.0)
Standardised rate ^a	6.6 (5.3 to 8.0)	14.0 (12.4 to 15.7)	10.5 (9.4 to 11.6)
Age groups			
<30 years (<i>n</i> = 52)	3.6 (1.5 to 7.2)	13.2 (9.8 to 17.3)	9.7 (7.3 to 12.5)
30–39 years (<i>n</i> = 133)	8.2 (5.5 to 11.7)	17.5 (14.6 to 20.8)	14.2 (12.1 to 16.6)
40–49 years (<i>n</i> = 87)	7.0 (4.6 to 10.1)	15.3 (12.0 to 19.2)	11.4 (9.2 to 13.9)
50–59 years (<i>n</i> = 95)	8.4 (5.7 to 12.0)	17.9 (14.1 to 22.1)	13.4 (11.0 to 16.2)
60–69 years (<i>n</i> = 79)	8.6 (6.0 to 12.0)	11.4 (8.5 to 14.8)	10.1 (8.1 to 12.4)
70–79 years (<i>n</i> = 61)	7.4 (4.7 to 11.0)	9.0 (6.5 to 12.1)	8.4 (6.5 to 10.6)
>80 years (<i>n</i> = 26)	4.8 (1.6 to 10.9)	8.4 (5.3 to 12.6)	7.4 (4.9 to 10.6)
Deprivation score (Townsend score)			
Very deprived (<i>n</i> = 253)	9.0 (7.2 to 11.1)	15.0 (13.0 to 17.1)	12.5 (11.1 to 14.0)
Moderately deprived (<i>n</i> = 80)	5.3 (3.1 to 8.3)	13.3 (10.4 to 16.7)	10.1 (8.0 to 12.4)
Moderately affluent (<i>n</i> = 88)	7.7 (4.9 to 11.3)	12.9 (10.1 to 16.1)	10.9 (8.9 to 13.3)
Very affluent (<i>n</i> = 107)	5.9 (4.0 to 8.3)	12.5 (10.0 to 15.3)	9.6 (7.9 to 11.4)
Symptom type ^b			
Constipation predominant IBS (<i>n</i> = 111)	1.2 (0.8 to 1.8)	3.1 (2.5 to 3.8)	2.3 (1.9 to 2.8)
Diarrhoea predominant IBS (<i>n</i> = 117)	2.2 (1.6 to 3.0)	2.6 (2.0 to 3.2)	2.4 (2.0 to 2.9)
Alternating predominant (<i>n</i> = 215)	2.7 (2.0 to 3.5)	5.7 (4.9 to 6.7)	4.5 (3.9 to 5.1)
Other (<i>n</i> = 17)	0.3 (0.1 to 0.7)	0.4 (0.2 to 0.7)	0.4 (0.2 to 0.6)

^adirectly standardised to the West Midlands Population (2001); ^bof those classifiable (*n* = 460).

IBS; at age 50 years, they were just over twice as likely; and, at age 70 years, 1.5 times as likely. Bivariate analysis suggested higher rates of IBS in females, black ethnic groups, moderate and heavy smokers, in more deprived areas and among those who were unable to work due to health reasons (Table 4). However, logistic regression identified an age–sex interaction and being unable to work due to health reasons as the only significant factors associated with IBS. Those unable to work for health reasons were three times as likely to have IBS (OR = 3.10, 95% CI = 2.34 to 4.09).

Symptom profiles

Four hundred and sixty questionnaires (382/398 meeting Rome II and 78/84 with a diagnosis of IBS and still reporting some symptoms) were available for analysis. Overall the symptom profiles were characterised by diarrhoea (25.4%), constipation (24.1%) and alternating symptoms (46.7%). Diarrhoea predominant symptoms were more common in men than women: 34.7% and 21.9%, respectively. The most common symptom profile for both sexes and in all age groups was alternating symptoms, except in those aged over 80 years where constipation predominant symptoms were more commonly (65%) reported. Unsurprisingly, those responders reporting alternating symptoms had higher symptom scores than the other two groups (symptom scores: alternating = 32.5, diarrhoea = 25.5, constipation = 27.3, $\chi^2 = 11.3$, $P = 0.004$).

Quality of life

Quality of life scores were significantly reduced in those patients with IBS (Tables 1 and 2). IBS-specific quality of life varied only slightly by symptom profile; although there was a tendency for people with alternating symptoms to have lower quality of life scores, this difference was not significant

($\chi^2 = 3.5$, $P = 0.17$).

The majority of responders (66.0%) had had at least 1 day off work due to their IBS in the previous 6 months. The average (median) time off work in the 6-month period was 4 days (range = 0–130 days).

Multiple regression analysis identified several factors associated with reduced quality of life. Relevant symptoms included abdominal pain, pain after eating, frequency of leaking or soiling, feeling of urgency and passage of mucus ($P < 0.001$). Being employed part-time, retired or unable to work for health reasons were also negatively associated with quality of life (Table 5).

Use of healthcare resources

Three hundred and seventy-nine questionnaires (295/398 meeting Rome II and 84/84 with a diagnosis of IBS and reporting some symptoms) were available for analysis. Data were collected on IBS-related healthcare utilisation in the previous 6-month period (Table 6); 56% of patients with IBS (*n* = 214) consulted their GP about their symptoms, 16% (*n* = 61) saw a hospital specialist and 6% (*n* = 22) saw a practice nurse, 97 patients (25.6%) consulted more than twice and 61 (16.1%) were referred to secondary care. Consultation patterns and rates did not vary by sex or age group.

Almost half of the patients (46.7%, *n* = 177) were on prescribed medication for IBS. However, the majority of patients (56%, *n* = 213) used some form of self-treatment; predominantly over-the-counter (OTC) medication (43.5%, *n* = 159) and alternative therapies (4.0%, *n* = 15). Women were more likely than men to self-treat (62% versus 39%, $P < 0.0001$). Self-treatment rates did not vary by age group or symptom profile. Over half (55.9%, *n* = 99) of the patients on prescribed medication were also self-treating.

The most commonly reported OTC remedies used were antacids (*n* = 43, 11%), laxatives (*n* = 41, 10%) and antidiar-

Table 4. Factors associated with irritable bowel syndrome (IBS) (bivariate analyses).

	IBS (n = 533) %	Non-IBS (n = 4274) %	Crude OR (95% CI)
Women	72.6	56.9	2.00 (1.64 to 2.45)
Townsend group			
Very affluent (referent)	20.2	24.0	
Moderately affluent	16.7	17.0	1.16 (0.86 to 1.57)
Moderately deprived	15.2	17.0	1.06 (0.78 to 1.43)
Very deprived	47.9	42.1	1.35 (1.06 to 1.71)
Smokers			
Not at all (referent)	68.2	72.6	
Occasional	5.3	6.4	0.88 (0.59 to 1.32)
Moderate	21.7	18	1.29 (1.03 to 1.61)
Heavy	4.8	3	1.68 (1.08 to 2.62)
Alcohol			
Not at all	20.4	18.0	1.06 (0.83 to 1.35)
Moderate drinkers	25.2	31.4	0.75 (0.60 to 0.93)
Heavy drinkers	1.4	1.3	1.05 (0.47 to 2.35)
Occasional (referent)	53.0	49.4	
Ethnic group			
White (referent)	88.8	90.6	
Black	6.3	4.2	1.53 (1.04 to 2.24)
Asian	4.4	4.0	1.10 (0.71 to 1.72)
Chinese/other	0.6	1.2	0.47 (1.15 to 1.50)
Education			
No school/primary	6.9	7.9	0.85 (0.59 to 1.22)
Secondary age up to 16 years (referent)	53.3	51.8	
Secondary age > 16 years	12.4	13.7	0.88 (0.66 to 1.17)
Higher education	27.8	26.6	1.00 (0.81 to 1.24)
Employment			
≥20 hours (referent)	39.0	41.5	
<20 hours	6.8	6.1	1.19 (0.81 to 1.73)
Unemployed — looking	3.0	2.8	1.16 (0.68 to 1.99)
Unemployed — not looking	1.0	1.0	1.02 (0.40 to 2.60)
Home maker	7.2	6.0	1.28 (0.88 to 1.85)
Retired	24.2	33.1	0.78 (0.62 to 0.98)
Retired, working part-time	2.1	1.9	1.18 (0.62 to 2.25)
Unable to work due to bad health	14.8	5.7	2.76 (2.06 to 3.70)
Adults in household			
1	36.2	34.0	1.10 (0.90 to 1.35)
2 (referent)	50.0	51.6	
3	9.9	10.0	1.03 (0.74 to 1.42)
3+	3.9	4.4	0.90 (0.55 to 1.47)
Children in household			
0 (referent)	68.2	69.0	
1	11.9	12.1	0.99 (0.74 to 1.33)
2	14.5	12.8	1.15 (0.87 to 1.50)
3	3.6	4.5	0.83 (0.50 to 1.36)
3+	1.8	1.6	1.13 (0.56 to 2.29)

OR = odds ratio.

rhoeals ($n = 16$, 4%); patients also used bulking agents ($n = 11$, 3%), herbal therapies, homeopathic remedies and Chinese medicine. A variety of foodstuffs were also used to control or alleviate symptoms, such as fruit, cereal, herbal teas, hemp seeds, brandy and spicy foods. Patients who self-treated had more severe symptoms (median symptom score 31.4 versus 25.7; $z = 3.5$, $P = 0.0005$).

Predicting patients likely to attend their general practitioner

Table 5. Multiple linear regression model — determinants of reduced quality of life.

Variable	β (SE)	t statistic	P value
Pain in abdomen	-4.1 (0.88)	4.6	<0.0001
Pain after eating	-4.81 (0.77)	6.2	<0.001
Leaking or soiling	-3.65 (1.06)	3.4	0.0007
Feeling of urgency	-2.43 (0.71)	3.4	0.0007
Mucus or slime in stools	-2.90 (0.81)	3.6	0.0003
Working less than 20 hours/week	-8.77 (3.24)	2.7	0.007
Retired	-9.06 (2.37)	3.8	0.0002
Unable to work — bad health	-8.5 (2.41)	3.5	0.0005

 β = regression coefficient; SE = standard error.

Table 6. Irritable bowel syndrome (IBS)-related healthcare utilisation in the past 6 months.

	n
General practitioner visits (%)	
0 (includes no answer)	165 (43.5)
1	117 (30.9)
2	49 (12.9)
3+	48 (12.7)
Hospital specialist visits (%)	
0 (includes no answer)	318 (83.9)
1	39 (10.3)
2+	22 (5.8)
Hospital nurse visits (%)	
0 (includes no answer)	366 (96.6)
1+	13 (3.4)
Practice nurse visits (%)	
0 (includes no answer)	357 (94.2)
1+	22 (5.8)
Alternative therapist visits (%)	
0 (includes no answer)	364 (96.0)
1+	15 (4.0)
Other healthcare professional visits (%)	
0 (includes no answer)	368 (97.1)
1+	11 (2.9)
Number of prescription medicines (%)	
0	202 (53.3)
1	110 (29.0)
2	43 (11.3)
3	20 (5.3)
Not specified	4 (0.1)
Median (range) number of weeks taking prescription medications	6 (0-26)
Number of non-prescription medicines (%)	
0	214 (56.5)
1	108 (28.5)
2	35 (9.2)
3	19 (5.0)
Not specified	3 (0.8)
Median (range) number of weeks taking non-prescription medications	4 (0-26)
Number who had an operation (%) or test in past 6 months	52 (14.0)

 $n = 379$.

Although patients who consulted their GP or practice nurse had similar overall symptom scores to those who did not consult (29.1 versus 27.3, $\chi^2 = 1.5$, $P = 0.14$), there was weak evidence to suggest that consulters experienced higher scores within the pain dimension (33.3 versus 26.7, $\chi^2 =$

2.2, $P = 0.03$) and reduced quality of life (79.0 versus 83.1, $\chi^2 = 2.3$, $P = 0.02$). Family history of gastrointestinal diseases including IBS was not associated with primary care attendance. A logistic regression analysis confirmed that symptom scores were not a major determinant of the decision to consult. Factors identified as influencing primary care attendance were: having a previous diagnosis of a stomach ulcer (OR = 2.21, 95% CI = 1.02 to 4.81; $P = 0.046$) and reduced IBS-specific quality of life (OR = 0.99, 95% CI = 0.97 to 1.00, $P = 0.046$). However, these factors were not significant at the $P < 0.01$ level and the accuracy of the model was low with only 57% of behaviour predicted and 3% of variation explained.

Discussion

Summary of main findings

This large population-based survey demonstrates a community prevalence of disease of 10.5% (6.6% of men and 14.0% of women). Our estimate of the prevalence of IBS is similar to that reported by others,¹ including a recent large European survey that utilised telephone interviewing, which also embedded IBS-related questions within a general health survey.⁶ Some of the existing literature suggests that the prevalence of disease is greater than we report.^{7,11} However, these surveys either fail to disguise the purpose of their research, use different diagnostic criteria, or describe prevalence within the population attending their GP.

Our data confirms that IBS continues to have a significant impact on quality of life.^{6,9,10} Mental component scales were worse than those reported for patients with heart failure³⁴ and stroke.³⁵ Patients with alternating symptoms reported higher symptom scores and lower quality of life. This study has confirmed the considerable impact that irritable bowel syndrome places on an individual's health and lifestyle as well as on healthcare services. Despite the collection of a wide range of data relating to patient and disease-related factors it was not possible to accurately identify the characteristics of those who chose to consult their GP.

Of the patients identified with IBS, 75% exhibited current symptom profiles that were identified by the Rome II based questionnaire. However, 25% had a diagnosis of IBS but would not have been identified if sole reliance was on the postal version of the Rome II because they either exhibited no symptoms, with their disease being controlled by current therapy, or they reported symptoms using terminology other than that used on the questionnaire. Less than half of those reporting symptoms of IBS according to the Rome II criteria had received a diagnosis of IBS.

Those responders who met the Rome criteria had the lowest quality of life, highest symptom scores and placed the greatest demands on health services. These diagnostic criteria do, therefore, identify those most affected by their symptoms and are a valid clinical tool. However, the use of these criteria alone, which were designed for clinical practice, may underestimate the prevalence of disease.

More than half of the patients had been seen by a primary care practitioner within the past 6 months, 13% attending three or more times. Interestingly, those who choose to consult their primary care provider did not report significantly

higher symptom scores, although previous research had suggested that pain severity and duration predict consultation.³³ Consultations were associated with reduced quality of life. There is a substantial burden on primary healthcare services despite over half of those with symptoms also self-medicating.

Strengths and weaknesses of the study

This survey provides comprehensive and robust data on the prevalence of disease, the distribution by symptom profile, the impact on quality of life and the use of healthcare resources by those suffering from IBS. While a response rate of 57% indicates the potential for bias in the estimation of prevalence, the concealment of the questions relating to IBS within a general health survey should have minimised the possibility of differential response rates. This, along with standardisation of prevalence rates, would suggest that the estimates achieved are an accurate reflection of the frequency of disease.

Implications for future research

This research has confirmed that application of the Rome criteria underestimates the prevalence of irritable bowel syndrome. It is therefore recommended that future health surveys should modify the terminology used and supplement the Rome criteria with questions aiming to identify patients formally diagnosed but whose symptoms are currently under control.

This study, however, also demonstrates that the Rome criteria are a useful means of identifying those at greatest need and placing the greatest demands on health services. It may be appropriate that future therapeutic trials focus on this sub-set of the population.

There remains a need for research that focuses on the patient and utilises appropriate methods to better determine the ways in which patients describe their symptoms and to identify the factors that motivate people to consult or self-treat.

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