Prevalence, impact and attitudes toward lower gastrointestinal dysmotility and sensory symptoms, and their treatment in Canada: A descriptive study

Richard H Hunt FRCP FRCPC¹, Surinder Dhaliwal MSc¹, Gervais Tougas MDCM FRCPC^{1,2}, Carmen Pedro MSc³, Jean-Francois Labbé BA³, Heidi Paul MSc³, Michael Ennamorato MA CMRP⁴

RH Hunt, S Dhaliwal, G Tougas, et al. Prevalence, impact and attitudes toward lower gastrointestinal dysmotility and sensory symptoms, and their treatment in Canada: A descriptive study. *Can J Gastroenterol* 2007;21(1):31-37.

OBJECTIVES: To investigate the impact of lower gastrointestinal (GI) symptoms in the general Canadian population, and to explore patient satisfaction with traditional therapies and the level of patient interest in new treatments.

PATIENTS AND METHODS: Stage 1: A telephone survey of a weighted sample of 1000 adults (18 years of age or older) was conducted to determine the prevalence of five GI symptoms – abdominal pain, abdominal discomfort, bloating, constipation or constipation with occasional diarrhea – that were present for 12 weeks or more (not necessarily consecutive) over the past year. Respondents with only abdominal pain were excluded. Stage 2: A telephone survey of 689 women (18 to 64 years of age), experiencing the GI symptoms described in stage 1, was conducted to assess symptom impact and treatment satisfaction.

RESULTS: Overall, 5.2% of the Canadian population (2.3% men and 7.9% women) experienced one or more lower GI symptoms (excluding those reporting abdominal pain alone). In stage 2, 26.2% of respondents had previously been diagnosed with irritable bowel syndrome. Overall, 78.1% of participants experienced two or more symptoms. Bloating was the most common symptom (75.3%) and abdominal pain the most bothersome and most severe. Over the previous three months, 13.2% of respondents missed work or school and 28.8% were less productive. At least one physician (average of 2.2 physicians) was consulted for symptoms in 80.9% of respondents. Of the 63.8% women receiving treatment, most used nonprescription products. Patients receiving prescription treatments for constipation were most often dissatisfied (75%).

CONCLUSIONS: Abdominal pain and discomfort, bloating and constipation are common, frequently occurring symptoms in the Canadian population and have a high burden on work performance and health care seeking. Most patients were dissatisfied with traditional therapies.

Key Words: Abdominal pain; Bloating; Constipation; Irritable bowel syndrome; Prevalence; Treatment satisfaction

La prévalence, les répercussions et les attitudes envers une dysmotilité gastro-intestinale réduite, les symptômes sensoriels et leur traitement au Canada : Une étude descriptive

OBJECTIFS : Examiner les répercussions des symptômes gastro-intestinaux (GI) bas sur la population canadienne et explorer la satisfaction des patients envers les traitements classiques ainsi que leur taux d'intérêt envers les nouveaux traitements.

PATIENTS ET MÉTHODOLOGIE : Étape 1 : Un sondage téléphonique auprès d'un échantillon pondéré de 1 000 adultes (de 18 ans ou plus) a permis de déterminer la prévalence de cinq symptômes GI, soit les douleurs et les malaises intestinaux, les gonflements, la constipation ou la constipation accompagnée de diarrhée occasionnelle, qui les avaient gênés pendant au moins 12 semaines (pas nécessairement consécutives) depuis un an. Les répondants qui souffraient seulement de douleurs abdominales étaient exclus. Étape 2 : Un sondage téléphonique, auprès de 689 femmes (de 18 à 64 ans) souffrant des symptômes GI décrits à l'étape 1, a permis d'évaluer les répercussions des symptômes et la satisfaction envers le traitement.

RÉSULTATS : Dans l'ensemble, 5,2 % de la population canadienne (2,3 % d'hommes et 7,9 % de femmes) avaient souffert d'au moins un symptôme GI bas (excluant ceux qui ne déclaraient que des douleurs abdominales). Pendant l'étape 2, 26,2 % des répondantes avaient déjà reçu un diagnostic de syndrome du côlon irritable. Dans l'ensemble, 78,1 % d'entre elles souffraient d'au moins deux symptômes. Les gonflements constituaient le symptôme le plus courant (75,3 %) et les douleurs abdominales étaient les symptômes les plus dérangeants et les plus graves. Au cours des trois mois précédents, 13,2 % des répondantes avaient raté le travail ou l'école et 28,8 % avaient été moins productives. Chez 80,9 % d'entre elles, au moins un médecin (moyenne de 2,2) avait été consulté en raison des symptômes. Des 63,8 % femmes traitées, la plupart utilisaient des produits en vente libre. La plupart du temps, celles qui recevaient des traitements sur ordonnance contre la constipation étaient insatisfaites (75 %).

CONCLUSIONS : Les douleurs et les malaises intestinaux, les gonflements et la constipation sont des symptômes courants et fréquents au sein de la population canadienne et imposent un lourd fardeau sur le rendement au travail et la demande de soins de santé. La plupart des patients n'étaient pas satisfaits par les traitements classiques.

¹Department of Medicine, McMaster University, Hamilton, Ontario; ²Novartis Pharmaceuticals AG, Basel, Switzerland;

³Novartis Pharmaceuticals Canada Inc, Montreal, Quebec; ⁴TNS Canadian Facts, Toronto, Ontario

Correspondence: Dr Richard H Hunt, Department of Medicine, Division of Gastroenterology, McMaster University Medical Centre, Room 4W8A – 1200 Main Street West, Hamilton, Ontario L8N 3Z5. Telephone 905-521-2100 ext 73219 or 76403, fax 905-521-5072, e-mail hunt@mcmaster.ca

Received for publication August 3, 2005. Accepted April 12, 2006

Abdominal pain and discomfort, bloating and altered bowel habit (constipation, diarrhea or both in alternation) are common lower gastrointestinal (GI) dysmotility and sensory symptoms, and are characteristic of irritable bowel syndrome (IBS). The prevalence of IBS and its individual symptoms has been studied extensively in Europe and North America, including Canada (1-3). Prevalence rates of 10% to 15% have been reported (2), and a population-based survey of Canadian residents using the Rome II criteria for IBS reported a rate of approximately 12% for IBS symptoms (3).

Despite its high prevalence, the combination of these lower GI symptoms is not always diagnosed as IBS. Many patients experience one or more of these symptoms, yet some may not formally fulfill all of the Rome II diagnostic criteria for IBS (4). Depending on the primary bowel pattern, it is possible to further classify IBS into three subgroups: IBS with constipation (IBS-C), IBS with diarrhea and IBS with alternating bowel function. Each form of IBS is reported to affect approximately one-third of IBS patients (1,5). The lower GI dysmotility and sensory symptoms associated with IBS-C were the focus of the present study.

In general, patients with lower GI symptoms are dissatisfied with traditional IBS treatments (6,7). In a European study, Hungin et al (6) reported that only 38% of participants with IBS were 'completely' satisfied with the treatment. The majority of conventional therapies only targets individual lower GI symptoms and, as a result, may exacerbate other symptoms associated with IBS (8,9). The introduction of a new class of therapy, the serotonergic agents, including tegaserod (a promotility agent for the treatment of IBS-C, and chronic or idiopathic constipation [10-12]), provides a therapeutic option designed to alleviate the multiple dysmotility and sensory symptoms associated with IBS.

Other studies conducted in the United States and Europe have demonstrated that the lower GI symptoms associated with IBS have a negative impact on both the patient's health-related quality of life (13-15) and the societal costs due to reduced work or school productivity and increased work or school absenteeism (14,16-19). The burden of IBS symptoms on both the individual and society is greatly dependent upon the country and its cultural variations; the latter can influence the number of women versus men presenting with IBS (20). In Canada, the annual mean costs (direct and indirect) related to IBS have been estimated at \$1,007 per patient (21).

The present study was conducted to evaluate the prevalence, impact and effect on work or school attendance of common dysmotility and sensory symptoms, such as abdominal pain, abdominal discomfort, bloating, constipation and constipation with occasional diarrhea, on the lives of IBS sufferers in the general Canadian population. In addition, attitudes and beliefs regarding traditional GI treatments and potential treatment options were explored.

PATIENTS AND METHODS

In January 2003, a two-stage program was performed in Canada via interviews conducted in either English or French, depending on the respondent's native language. First, a population survey determined the prevalence of five lower GI dysmotility and sensory symptoms associated with IBS in the Canadian population. Next, a second study conducted among women experiencing one or more of the above-mentioned five GI symptoms (excluding abdominal pain alone) was used to determine the impact of these symptoms on their lives.

Stage 1: General population screening survey

Stage 1 comprised a general population screening survey that examined the occurrence of abdominal pain and discomfort, bloating, constipation or constipation with occasional diarrhea for at least 12 weeks (not necessarily consecutive) over the previous 12 months. A sample of Canadian adults who were 18 years of age or older (1017 completed telephone interviews), and represented the five major regions in Canada, namely, the Atlantic provinces (New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador); Quebec, Ontario; the Prairies (Manitoba, Saskatchewan and Alberta) and British Columbia, participated in an omnibus telephone survey (TNS Canadian Facts, Toronto, Ontario) using a computer-assisted in-person telephone interviewing system (22,23). Telephone numbers were selected using 'Plus-Digit' sampling techniques within each of Canada's five major regions. In each household, one person was selected randomly from all eligible residents using a modified Trolldahl-Carter selection procedure (24) to accommodate telephone data collection using the computer-assisted in-person telephone interviewing system. The basic Trolldahl-Carter technique specifies respondent selection according to the total number of eligible individuals residing in the household and the total number of individuals who are male. On the basis of this technique, a matrix is constructed and a respondent specified. The Bryant modification to the Trolldahl-Carter selection procedure substitutes women for men as the second parameter in the equation and uses disproportionately more matrices, which selects a higher proportion of men to compensate for the relative shortage of men achieved by the basic method.

A callback procedure was used with one initial call and up to three callbacks (if required) to complete an interview. Excluding those telephone numbers confirmed as nonresidential, a total of 8485 numbers were dialled to secure the completed interviews ultimately achieved.

Before the final analysis, the sample underwent four stages of weighting by geographical stratum, household size within the region, the inverse of individual selection probability within the household and, finally, age and sex within the region. Weighting in this manner reflected the profile of sufferers of abdominal pain and discomfort and/or constipation in individuals 18 to 64 years of age, as determined from the TNS Canadian Facts Health Panel (a panel of over 22,000 households prescreened to identify family members who suffer from various symptoms, and/or diagnosed with various diseases and/or conditions). All demographic weighting targets for 2001 were derived from the Canadian Census statistics <www.statcan.ca>.

Stage 2: Study in individuals with identified symptoms

In stage 2, a separate study was undertaken among 689 women, 18 to 64 years of age, with one or more of the following five lower GI symptoms: abdominal pain, abdominal discomfort, bloating, constipation or constipation with occasional diarrhea. Women who reported only abdominal pain and none of the other symptoms listed above were excluded. The women were selected using a national database of 22,000 households (TNS Canadian Facts Health Panel) that had been prescreened to identify family members who experience various lower GI symptoms and/or have already been diagnosed with one of the five symptoms. Up to four attempts were made to contact each respondent, enhancing both response and co-operation rates. Although the interview process was structured, some open-ended probing was allowed; the interviewers were fully trained and supervised by professional field supervisory staff. Quotas were set by the age of the respondent. Data were

TABLE 1
Call outcomes and completion rates

Call outcomes and completion rates	n Total numbers dialled = 6519
Outcome	
Number not in service or business number	477
Busy or no answer	571
Answering machine or voice mail	1135
Appointment made but not kept	319
Respondent never available	458
Refused	217
Quota filled	200
Miscellaneous	16
Nonqualifiers (n=1572)	
Question 1: No gastrointestinal problems	1530
Question 2: None of the five symptoms experienced or abdominal pain only	42
Completed interview*	8485
Met the 12-week symptom experience criterion imposed postfield†	689

*Fifteen per cent of individuals completed the interview; †12% of individuals met the 12-week symptom experience criterion

weighted by age within the respective regions to reflect the profile of the population in question as determined from the full TNS Canadian Facts Health Panel.

Interview questions focused on symptoms experienced by the patients and the impact on their lifestyle, current treatment of symptoms, satisfaction with medications, interest in new treatments and perception of tegaserod, based on the following description: 'tegaserod is a new prescription drug that is clinically proven to relieve abdominal pain and discomfort, relieve bloating and improve bowel function in patients with constipation. Tegaserod is one pill taken twice a day before meals; it is not a laxative and has few side effects. Tegaserod will improve quality of life'.

Statistical analysis

Statistical tests were considered to be significant at $P < 0.05$. The 95% CI was used for testing purposes, with the exception of symptom prevalence in men and women, where a 99% level of confidence was applied. The binomial Z-test was used in all cases to test the difference between the population size and the sample size.

RESULTS

A complete interview was achieved for 18% of the numbers dialled in stage 1 (taking into account 'not-in-service' and 'non-residential' numbers). A 15% completion rate for interviews was obtained in stage 2, including those disqualified on the basis of symptom experience. The population sample was of mixed ethnicity. The detailed call outcomes generating the reported completion rates are outlined in Table 1.

Prevalence of lower GI dysmotility and sensory symptoms in the Canadian population

The prevalence of chronic lower GI dysmotility and sensory symptoms was 5.2% in the adult Canadian population, where individuals suffered for at least 12 weeks over the past year from one or more of the following: abdominal pain and discomfort,

TABLE 2
Prevalence of lower gastrointestinal symptoms in the Canadian population

Characteristic	Prevalence of symptoms, %
Men	2.3
Women	7.9*
Age, years	
18–34	5.8
35–49	5.0
50–64	5.3
≥65	5.1

* $P < 0.01$ for women versus men

bloating, constipation or constipation with occasional diarrhea. Women were much more likely than men to experience these lower GI symptoms ($P < 0.01$) (Table 2). The incidence of symptoms was similar across all age groups.

Canadian women with chronic lower GI dysmotility and sensory symptoms

In stage 2, 689 women experiencing one or more lower GI symptoms for 12 weeks or more over the past 12 months were identified through a separate survey. These women had a similar demographic profile to that of the overall Canadian female population with regard to age and geographical distribution (Table 3), and 26.2% had previously been diagnosed with IBS. The remainder of the present paper focuses on these 689 women identified from stage 2.

The prevalence of specific lower GI symptoms in this sample of Canadian women ($n=689$) is shown in Figure 1. Bloating was the symptom most commonly reported by respondents in the survey, experienced by three-quarters of respondents (75.3%), and noted more often than abdominal discomfort (59.0%) and abdominal pain (52.4%), which were reported by over one-half of respondents. Overall, 78.1% of women with chronic lower GI symptoms had two or more symptoms and 57.9% had three or more symptoms. Nearly one-third (31.1%) of the women experienced four or more symptoms, and 14.3% experienced all five symptoms. The mean number of symptoms experienced by respondents was 2.9 of a maximum of five.

Table 4 shows the proportion of women reporting individual symptoms on a weekly and monthly basis. Abdominal pain, abdominal discomfort, bloating and constipation were experienced by over 60% of women at least weekly and by over 90% at least monthly. Constipation with occasional diarrhea was also commonly experienced by these women, reported by approximately one-half on a weekly basis and by 86.2% at least once per month.

For each symptom, the majority of women rated its usual severity as 'moderate' (Figure 2). The percentage of sufferers rating each symptom as 'severe' ranged from 13.7% in the case of bloating, to 28.0% and 31.2% with reference to constipation with occasional diarrhea and abdominal pain, respectively. Overall, 10.4% of respondents rated all their symptoms as 'mild' and 34.8% of women had one or more 'severe' symptoms.

Over 60% of women experienced constipation for more than 10 years, compared with one-half or fewer who experienced bloating, abdominal discomfort, abdominal pain or constipation with occasional diarrhea for more than 10 years (Table 5). However, these differences were not statistically significant.

TABLE 3
Demographic profile of women with lower gastrointestinal symptoms associated with irritable bowel syndrome versus the general female population in Canada

	Total number of women aged 18–64 years (N=10,230,615), %	Women with symptoms aged 18–64 years (n=689), %
Age, years		
18–24	15	13
25–34	21	22
35–44	25	28
45–54	23	23
55–64	16	14
Region		
Atlantic	7	9
Quebec	23	23
Ontario	39	37
Prairies	17	17
British Columbia	14	14
Employment status		
Full-time	48	38
Part-time	17	20
Homemaker, student, retired or unemployed	35	42
Marital status		
Married or common-law	53	73
Single	31	11
Divorced or separated	13	14
Widow	3	2
Annual household income (\$)		
<30,000	16	31
30,000–49,999	19	31
50,000–69,999	19	20
≥70,000	46	18

N Population size; n Sample size. Data from reference 31

Figure 1) Prevalence of specific lower gastrointestinal symptoms. The mean number of symptoms was 2.9. Women reporting abdominal pain only were excluded

On average, 35.4% of women experiencing chronic lower GI symptoms reported that their symptoms were triggered or exacerbated by food and 15.7% reported their lifestyle as the main trigger (patients could cite more than one trigger).

TABLE 4
Proportion of women reporting individual symptoms on a weekly and monthly basis

Symptom	n	At least once per week, %	At least once per month, %
Bloating	516	61.1	96.3
Abdominal discomfort	414	67.2	94.7
Abdominal pain	358	65.6	93.5
Constipation	347	64.6	92.9
Constipation with occasional diarrhea	340	49.5	86.2

Figure 2) Usual severity of symptoms. The percentage of women experiencing each of the symptoms does not total 100%. A small percentage of women were either unable to rate the severity of their symptoms or did not experience an individual symptom. The inclusion criteria specified that one or more symptoms must be experienced with the exception of abdominal pain alone

TABLE 5
Duration of specific symptoms

Symptom	n	Duration			
		<5 years, %	5–10 years, %	>10 years, %	Do not know, %
Bloating	516	29.9	19.0	46.8	4.4
Abdominal discomfort	414	31.0	15.6	50.0	3.0
Abdominal pain	358	32.9	17.6	47.2	2.3
Constipation	347	22.0	13.0	61.9	3.0
Constipation with occasional diarrhea	340	36.8	18.3	42.4	2.6

However, 53.4% stated that 'anything in particular' could trigger their symptoms.

Impact of dysmotility and sensory symptoms

As many as 63.7% of women experiencing abdominal pain stated that they were 'bothered quite a bit' or 'extremely bothered' by this symptom. The corresponding values for those experiencing abdominal discomfort, bloating, constipation or constipation with occasional diarrhea were 53.5%, 46.7%, 47.5% and 57.7%, respectively.

Over the past three months, work and social activities of many participants were disrupted by their symptoms. Of the women questioned, 28.8% stated that they were less productive at work or at school (an average of 8.9 occasions). In addition, 13.2% of respondents had missed work or school (an average of five occasions) and 24.7% had missed or were late for a social

Figure 3) Incidences of respondents ever consulting a doctor about their symptoms

engagement (an average of 3.3 occasions). Similarly, 15.3% of women had missed or were late for an appointment (an average of 3.4 occasions), 9.6% were late for work or school (an average of 5.5 occasions) and 14.7% had left work or school early (an average of four occasions) because of their lower GI symptoms.

Almost all participants (97.8%) had made lifestyle changes to cope with their symptoms, such as trying to get 'enough' sleep (80.1%), wearing looser clothing (72.1%), avoiding certain foods (71.2%), increasing the amount of exercise (66.3%) and fibre intake (65.1%), and avoiding caffeine (30.9%). In total, 41.3% of women 'strongly agreed' with the statement 'I would do anything to get rid of these problems'.

Health care utilization

Overall, 80.9% of women in the study had consulted a physician about their symptoms at some point in the past, and of these, 34.8% were currently under a physician's care for their symptoms (Figure 3). The average number of physicians consulted was 2.2; the likelihood of being currently under a physician's care and the number of physicians visited, all increased in parallel with increasing severity of symptoms. Of women with 'severe' symptoms, 47.7% were currently being cared for by a physician compared with 30% and 17% of women with 'moderate' or 'mild' symptoms, respectively. The majority of women felt comfortable discussing their problems; only 8.4% strongly agreed with the statement 'I find it embarrassing to discuss these symptoms'. Among those who had never had a consultation (n=111), the reason most commonly cited by respondents for not visiting a physician was that 'symptoms were not severe enough' (47.0%) ($P<0.05$). Despite this, 20% of these nonconsulting patients classified their symptoms as 'severe'. For those not currently under a physician's care (but who had previous consultations), the perceived lack of severity (27.4%) and the perception that symptoms could be managed on one's own without medical advice (28.2%) were the most commonly cited reasons.

At the time of the study, medications to treat lower GI dysmotility and sensory symptoms were being taken by 63.8% of women, 45.6% of whom used nonprescription medications, 26.4% used prescription medications and 18.6% used herbal or alternative medications. Additional coping strategies were used by 15.0% of the women questioned. These included general relaxation techniques (4.8%), yoga (3.1%) and massage therapy (2.2%).

Figure 4) Proportion of individuals taking various classes of medication to treat their gastrointestinal (GI) symptoms

Antacids were the class of nonprescription GI medications most commonly used by surveyed respondents (32.2%) ($P<0.05$). No single prescription GI medication emerged as dominant. Omeprazole was among the most commonly used prescription, as reported by 14.3% of women who took prescription medication for their symptoms. Use of all categories of medication (nonprescription, prescription and herbal or alternative therapies) increased with the severity of symptoms (Figure 4). Of those taking medications, 64.6% used medicine from one category only, 29.0% from two categories and 6.4% from all three categories. The average monthly expenditure, based on women using medication from one or more categories, was \$34.50, while the average expenditure on alternative treatments alone was \$48.60 per month.

Satisfaction with treatments

Overall satisfaction ('generally' or 'completely' satisfied) was widespread among those individuals who were taking herbal or alternative medication (n=133) for constipation (85.5%), constipation with occasional diarrhea (82.5%) and bloating (79.7%), and subjects taking nonprescription medication (n=311) for abdominal pain (86.5%) and abdominal discomfort (83.5%).

In this survey, the majority of patients were not completely satisfied with traditional treatments (Table 6). Relatively small proportions of respondents claimed to be 'completely' satisfied with treatments for each of the five lower GI symptoms. Particularly low levels of 'complete' satisfaction were registered for prescription medication for constipation (1.1%) and constipation with occasional diarrhea (8.2%), and for nonprescription medication for abdominal pain (10.0%), abdominal discomfort (12.5%) and bloating (13.2%).

Over the past two years, 32.6% of women stopped taking one or more forms of medications: 40.4% stopped taking nonprescription medications, 17.0% stopped prescription medications, 16.2% stopped herbal or alternative medications and 37.6% did not know or could not recall (some patients stopped taking more than one type of medication). The most commonly volunteered reasons cited by these respondents for discontinuing medication were lack of efficacy (44.5%) followed by side effects (17.2%).

Based on a brief description of tegaserod given by the interviewer, 90% of women with severe symptoms were 'very interested' or 'fairly interested' in finding out about the drug compared with 73% and 84% experiencing 'mild' and

TABLE 6
Per cent of total respondents satisfied with gastrointestinal medications taken

Level of satisfaction	Bloating			Abdominal discomfort			Abdominal pain			Constipation			Constipation with occasional diarrhea		
	Rx	Non-Rx	Herbal or alternative	Rx	Non-Rx	Herbal or alternative	Rx	Non-Rx	Herbal or alternative	Rx	Non-Rx	Herbal or alternative	Rx	Non-Rx	Herbal or alternative
Dissatisfied	33.9	28.5	20.3	24.4	16.5	21.8	26.9	13.5	23.8	75.0	54.3	14.5	39.7	43.5	17.5
Generally satisfied	41.8	58.3	62.1	52.0	71.0	56.0	58.4	76.5	51.9	23.9	40.4	58.2	52.1	38.1	55.3
Completely satisfied	24.3	13.2	17.6	23.6	12.5	22.2	14.7	10.0	24.3	1.1	5.3	27.3	8.2	18.4	27.2

Rx Prescription medication

'moderate' symptoms, respectively. Of individuals taking prescription medications, 54% expected that tegaserod (as described) would be more effective than their current therapy.

DISCUSSION

The present study did not evaluate IBS specifically, but examined the key individual dysmotility and sensory symptoms associated with IBS-C. Although the sample of individuals surveyed was of mixed ethnicity, individuals who did not speak English or French were not represented.

Results from this survey confirmed that the symptoms of abdominal pain and discomfort, bloating and constipation are common in the Canadian population. These data support previous findings from the Domestic/International Gastroenterology Surveillance Study (25), which also found a high prevalence of chronic lower GI symptoms in the Canadian adult population.

The prevalence rate for respondents experiencing lower GI symptoms characteristic of IBS-C was 5.2%. Thompson et al (3) reported a comparable prevalence of IBS-C in Canada using the Rome II criteria (5.4%). The prevalence of all IBS subgroups (ie, IBS-C, IBS with diarrhea and IBS with alternating bowel function) in Canada has been reported to be 12.1% using the Rome II criteria and 13.5% using the Rome I criteria (3). These numbers are similar to prevalence rates reported in previous studies (1-3) in Canada and other Western countries (10% to 15%), and are in agreement with the suggestion that approximately one-third of patients with IBS have IBS-C (3,6,26,27).

Individuals frequently experience multiple lower GI dysmotility and sensory symptoms associated with IBS-C. The negative impact of these symptoms on respondents' quality of life was significant, with almost all women (97.8%) stating that they had made lifestyle changes as a result. Furthermore, 13.2% of women missed work or school (an average of five occasions) in the preceding three months. These results are in agreement with findings from a previous study (28) in the United States where more than one-third (39.0%) of IBS patients reported missing work (an average of six days) in the preceding three months. The impact of lower GI symptoms on work or school and social activities in the current study is similar to that reported in a large study (6) of individuals with IBS in Europe. IBS has been previously shown to carry a high burden in terms of the impact on the individual's life and on society through impaired quality of life, increased absenteeism from work or school, and increased costs (14,16,17).

In the current study, 78.1% of respondents had two or more lower GI symptoms. While all symptoms occurred with similar prevalence, the high incidence and frequency of bloating is of particular interest, because it is not often discussed during physician consultations. Currently, bloating is not included in the

research diagnosis guidelines; however, this study demonstrates that bloating is highly prevalent and bothersome to patients and should be considered more seriously when assessing lower GI symptoms associated with IBS.

In the survey, one-fifth of individuals who had previously described their symptoms as 'severe' were not currently consulting a physician because they did not perceive their symptoms were severe enough. This suggested a certain mindset of some patients with lower GI symptoms who, despite classifying their symptoms as 'severe', did not consider them significant enough to consult a physician. Similarly, many respondents felt that they could manage their problems by themselves, suggesting that they may have chosen, for example, to self-medicate, alter their diet or use relaxation therapies.

The most common prescription and nonprescription GI medications were antacids and acid-suppressing drugs, such as omeprazole. Inquiries were not made into concomitant conditions. However, given the high degree of overlap between upper and lower GI motility disorders, it is reasonable to assume that some of the respondents may also experience dyspepsia or gastroesophageal reflux disease. The Domestic/International Gastroenterology Surveillance Study reported that 77% of those with lower GI symptoms also reported upper GI symptoms (25).

Patients were generally dissatisfied with traditional treatments, which was the case for both prescription and nonprescription medications. These data are similar to those reported in a European study (6) of patients with IBS. In the current study, there was a tendency toward greater satisfaction among patients who used herbal or alternative therapies. This may be explained by the characteristics of this small group of patients (18.6%) who had reported less severe symptoms, were generally more skeptical about 'conventional' therapies, were proactive in seeking alternative therapies and believed in their chosen therapy (29). Individuals taking prescription or nonprescription treatments for constipation or constipation with occasional diarrhea tend to report less satisfaction with their therapy.

The present study demonstrates the significant indirect costs that are placed on society through impaired work productivity and increased absenteeism. These results are consistent with findings from the International Foundation for Functional Gastrointestinal Disorders survey (30), which reported that in the three months preceding the study, over one-quarter of respondents with IBS took an equivalent of more than one sick day every other week as a result of their symptoms. Direct costs (eg, medications and health care resource utilization) associated with IBS can also be considerable; these costs become particularly significant when considering the lack of improvements in patient well-being achieved through this expenditure.

CONCLUSIONS

The dysmotility and sensory symptoms of abdominal pain and discomfort, bloating, constipation and constipation with occasional diarrhea are widespread in the Canadian general population and have a significant impact on an individual's quality of life, and work or school attendance. At the time of the present study, the majority of patients were not completely satisfied with prescription and nonprescription medications. Therefore, other therapeutic approaches are necessary to effectively treat the multiple symptoms associated with IBS-C. In general, levels of dissatisfaction with treatments were high in women taking prescription and nonprescription GI medications, particularly for constipation, or constipation with occasional diarrhea.

ACKNOWLEDGEMENTS: The authors acknowledge the editorial support and contribution of ACUMED Tytherington, UK, to this manuscript. The current research and ACUMED's contribution was funded by Novartis Pharmaceuticals AG, Basel, Switzerland.

REFERENCES

- Camilleri M, Choi MG. Review article: Irritable bowel syndrome. *Aliment Pharmacol Ther* 1997;11:3-15.
- Muller-Lissner SA, Bollani S, Brummer RJ, et al. Epidemiological aspects of irritable bowel syndrome in Europe and North America. *Digestion* 2001;64:200-4.
- Thompson WG, Irvine EJ, Pare P, Ferrazzi S, Rance L. Functional gastrointestinal disorders in Canada: First population-based survey using Rome II criteria with suggestions for improving the questionnaire. *Dig Dis Sci* 2002;47:225-35.
- Thompson WG, Longstreth GF, Drossman DA, Heaton KW, Irvine EJ, Muller-Lissner SA. Functional bowel disorders and functional abdominal pain. *Gut* 1999;45(Suppl 2):II43-7.
- Dapigny M, Bellanger J, Bonaz B, et al. Irritable bowel syndrome in France: A common, debilitating and costly disorder. *Eur J Gastroenterol Hepatol* 2004;16:995-1001.
- Hungin AP, Whorwell PJ, Tack J, Mearin F. The prevalence, patterns and impact of irritable bowel syndrome: An international survey of 40,000 subjects. *Aliment Pharmacol Ther* 2003;17:643-50.
- Society for Women's Health Research. IBS in women: The unmet needs. <<http://www.talkibs.org/NVU%203047%20Exe.Summary1%204.7.pdf>> (Version current at September 18, 2006).
- Jailwala J, Imperiale TF, Kroenke K. Pharmacologic treatment of the irritable bowel syndrome: A systematic review of randomized, controlled trials. *Ann Intern Med* 2000;133:136-47.
- Kellow JE. Treatment goals in irritable bowel syndrome. *Int J Clin Pract* 2001;55:546-51.
- Muller-Lissner SA, Fumagalli I, Bardhan KD, et al. Tegaserod, a 5-HT₄ receptor partial agonist, relieves symptoms in irritable bowel syndrome patients with abdominal pain, bloating and constipation. *Aliment Pharmacol Ther* 2001;15:1655-66.
- Novick J, Miner P, Krause R, et al. A randomized, double-blind, placebo-controlled trial of tegaserod in female patients suffering from irritable bowel syndrome with constipation. *Aliment Pharmacol Ther* 2002;16:1877-88.
- Kellow J, Lee OY, Chang FY, et al. An Asia-Pacific, double blind, placebo controlled, randomised study to evaluate the efficacy, safety, and tolerability of tegaserod in patients with irritable bowel syndrome. *Gut* 2003;52:671-6.
- Gralnek IM, Hays RD, Kilbourne A, Naliboff B, Mayer EA. The impact of irritable bowel syndrome on health-related quality of life. *Gastroenterology* 2000;119:654-60.
- Akehurst RL, Brazier JE, Mathers N, et al. Health-related quality of life and cost impact of irritable bowel syndrome in a UK primary care setting. *Pharmacoeconomics* 2002;20:455-62.
- Wilson A, Longstreth GF, Knight K, et al. Quality of life in managed care patients with irritable bowel syndrome. *Manag Care Interface* 2004;17:24-8,34.
- Talley NJ, Gabriel SE, Harmsen WS, Zinsmeister AR, Evans RW. Medical costs in community subjects with irritable bowel syndrome. *Gastroenterology* 1995;109:1736-41.
- Longstreth GF, Wilson A, Knight K, et al. Irritable bowel syndrome, health care use, and costs: A US managed care perspective. *Am J Gastroenterol* 2003;98:600-7.
- Zacker C, Chawla A, Wang S, Albers L. Absenteeism among employees with irritable bowel syndrome. *Manag Care Interface* 2004;17:28-32.
- Groves D. The impact of irritable bowel syndrome in the workplace: A study to improve health and productivity. *Health Productivity Management* 2003;2:8-10.
- Jain AP, Gupta OP, Jajoo UN, Sidhwa HK. Clinical profile of irritable bowel syndrome at a rural based teaching hospital in central India. *J Assoc Physicians India* 1991;39:385-6.
- Inadomi JM, Fennerty MB, Bjorkman D. Systematic review: The economic impact of irritable bowel syndrome. *Aliment Pharmacol Ther* 2003;18:671-82.
- Choi BC. Computer assisted telephone interviewing (CATI) for health surveys in public health surveillance: Methodological issues and challenges ahead. *Chronic Dis Can* 2004;25:21-7.
- Marcus AC, Crane LA. Telephone surveys in public health research. *Med Care* 1986;24:97-112.
- Sabin MC, Godley SH. Mental health citizen surveys: A comparison of two within household telephone sampling techniques. *Eval Program Plann* 1987;10:137-41.
- Chen Y, Eggleston A, Tougas G. Chronic lower gastrointestinal (CLGI) symptoms: Prevalence, sociodemographic factors and impact in the Canadian population. Finding from the DIGEST Study. *Gastroenterology* 2000;118:A395. (Abst)
- Mearin F, Balboa A, Badia X, et al. Irritable bowel syndrome subtypes according to bowel habit: Revisiting the alternating subtype. *Eur J Gastroenterol Hepatol* 2003;15:165-72.
- Talley NJ, Zinsmeister AR, Melton LJ III. Irritable bowel syndrome in a community: Symptom subgroups, risk factors, and health care utilization. *Am J Epidemiol* 1995;142:76-83.
- Gore M, Frech F, Yokoyama K, Tai K-S. Symptom burden and management of irritable bowel syndrome: A patient perspective. *Am J Gastroenterol* 2002;97:S239-40. (Abst)
- Bensoussan A, Talley NJ, Hing M, Menzies R, Guo A, Ngu M. Treatment of irritable bowel syndrome with Chinese herbal medicine: A randomized controlled trial. *JAMA* 1998;280:1585-9.
- The International Foundation for Functional Gastrointestinal Disorders. IBS in the real world. <<http://www.iffgd.org/Research/IBS2002Survey.html>> (Version current at September 18, 2006).
- IBS Telephone Omnibus Survey Tables Canada: Segmentation Tables, 2004:158-64.