

## Definitions, Epidemiology, and Impact of Chronic Constipation

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*Constipation, however it is defined, is a common problem in the community. The exact prevalence of constipation depends on the definition used; prevalence estimates range from 2% to 28%. The prevalence of constipation has been stable because the onset and disappearance rates over time are similar, but accurate data on the incidence of constipation are lacking. Approximately one third of those individuals with constipation seek health care; this is an expensive fraction due to investigational and medication costs. The evidence that life-style factors are causally linked to constipation is weak, although nonsteroidal anti-inflammatory drug use and the use of other constipation-inducing medications are important risk factors. Constipation is not of clinical importance until it causes physical risks or impairs quality of life. There is accumulating evidence that self-reported constipation and functional constipation as defined by the Rome Criteria lead to significant impairment of quality of life, with the implication that this is a serious condition in the majority of people afflicted. Constipation may have other serious consequences; an increased risk of colon cancer has been reported but could be explained by confounding. Although hemorrhoids have been attributed to constipation, this association has been questioned. The costs of testing in patients presenting with constipation has been conservatively estimated to be 6.9 billion dollars annually in the United States; treatment costs add substantially to the health care burden.*

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Constipation is a major health problem, but this is not a recent phenomenon; in the 16th century B.C. in Egypt, a version of the autointoxication theory suggesting that the body can be poisoned by decomposing waste in the intestines was written about.<sup>1</sup> In the United States in the 1850s, daily bowel evacuation was considered critical to avoid corruption to health.<sup>1</sup> By the mid-1880s,

a number of unexplained conditions were considered to be linked to constipation and autointoxication. Bran cereals, including All-Bran®, were introduced to fight autointoxication, about which the public had become very anxious in the early 20th century.<sup>1</sup> In the 1920s and 1930s, all types of purgatives, rectal dilators, stimulators, and colonic irrigation equipment

were sweeping through the civilized world.<sup>1</sup> Despite these options, an obsession with bowel habits has persisted to this day in at least a segment of the population. There are some good reasons for this because constipation is such a ubiquitous clinical condition and is not a trivial medical problem.<sup>2</sup>

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### Confusion About Terms

Constipation, however it is defined, remains a common problem that is important primarily because of its negative impact on quality of life as well as its costs. A difficulty with the term constipation is that it is defined differently by patients and physicians; there appears to be a disconnection between community concepts and how physicians conceptualize the issue.<sup>2,3</sup> In a general sense, constipation refers to a lack of satisfactory defecation either because of an unpleasant sensation or a belief that bowel function is abnormal.<sup>2</sup> Hence, a constellation of different symptoms in varying combinations could theoretically constitute constipation, and indeed symptoms alternating between constipation and diarrhea are not uncommon. Use of over-the-counter laxative products further confounds defining constipation; patients may self-report constipation, yet on treat-

ment not have any symptoms that physicians would regard as indicative of constipation.<sup>2,3</sup> Simple objective measures of constipation have been difficult to devise. The stool form scale validated in Bristol provides an objective prospective stool assessment by either the patient or a willing physician, and is used increasingly in clinical trials.<sup>4</sup>

Aichbichler and colleagues aimed to measure the physical hardness of stool objectively. The authors found that using their texture analyzer, which measured the mean force required to push a cylindrical probe into a stool sample for a given distance at a constant speed, yielded no significant difference in the consistency of stools of those individuals with constipation versus controls. Only 2 of the 20 subjects with constipation had a physical hardness of the stools that was

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outside of the range seen in normal individuals.<sup>5</sup> This work has not been replicated.

The easiest way to define constipation is to ask the patient, "Do you feel constipated?" Self-reported constipation, however, appears to be an insensitive indicator of other cardinal symptoms that physicians regard as identifying constipation. Sandler and Drossman found that patients could mean either straining (52%), hard stools (44%), inability to defecate on demand (34%), or infrequent defe-

cation (32%) when they reported being constipated.<sup>6</sup> Harari and colleagues examined the association of self-reported constipation with bowel symptoms in 10,875 subjects aged 60 years and over who were participants in the National Health Interview Survey in 1999. Straining and hard bowel movements were most strongly associated with self-reported constipation in this older population, whereas feelings of incomplete evacuation and pain and bloating were less strongly associated.<sup>7</sup> Glia and Lindberg reported that among patients with self-reported constipation, the most bothersome symptom was straining during a bowel movement followed by hard or lumpy stools.<sup>8</sup> Talley and colleagues found that self-reported constipation failed to identify the majority of patients who were classified as having constipation based on specific symptoms.<sup>9</sup> In Canada, Pare and colleagues undertook a random digit dial national survey; 27% of the 1149 participants had self-reported constipation within the prior 3 months.<sup>10</sup> Again, the correlation between rates of self-reported consti-

pation and other definitions of constipation was poor.

### Prevalence of Constipation in the Community

There have been a number of population-based studies that have evaluated the prevalence of symptoms of constipation as well as the prevalence of self-reported constipation. The normal stool frequency, based on data from the United States and the United Kingdom, is known to be between 3 times per day and 3 times

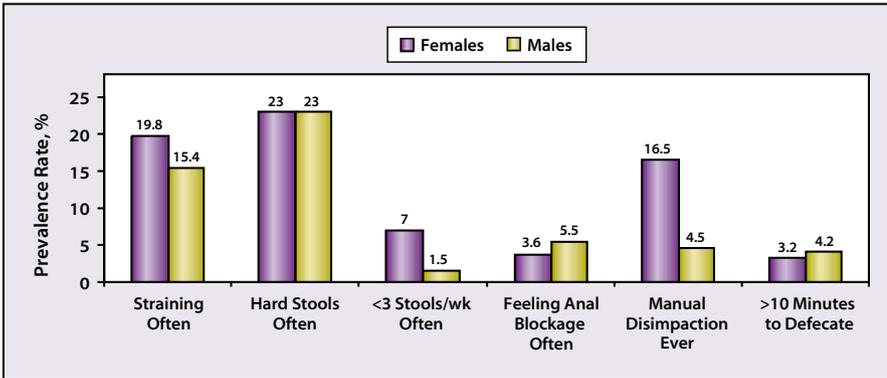


Figure 1. Prevalence of individual constipation symptoms in Olmsted County, MN (30-64 years). Data from Talley NJ et al. *Gastroenterology*. 1993;105:781-790.<sup>9</sup>

per week.<sup>6,11</sup> Abnormal is defined as a stool frequency outside the 95% confidence limits for a population, and is, therefore, an arbitrary cutoff.

Talley and colleagues evaluated an age- and sex-stratified random sample of 1021 Olmsted County, MN residents with a follow up of 12 to 20 months. Overall, 12.5% of the population self-reported constipation; however, the majority actually identified an alternating constipation and diarrhea pattern. The prevalence of self-reported constipation rose to 16% if subjects who used a laxative or enema were included, even if they did not report constipation. Self-reported constipation was more common in women. Women also reported infrequent stooling, manual disimpaction, and laxative or enema use more frequently. Men, on the other hand, reported prolonged defecation and feelings of incomplete evacuation more often than women. The prevalence of individual constipation symptoms in this representative US Caucasian population is summarized in Figure 1.<sup>9</sup>

Certain demographic patterns emerge from the published data. The prevalence of constipation is higher in the elderly. Thompson and Heaton, in a UK study of 301 apparently healthy adults, reported that straining with stool was significantly more

frequent in the elderly (20%) compared with middle-aged and younger subjects (8% and 3%, respectively).<sup>12</sup> Whitehead and colleagues reported that 30% of men and 29% of women

aged 60 to 93 years self-reported constipation,<sup>13</sup> whereas Talley and colleagues reported the prevalence of constipation at 24% in nonnursing home elderly subjects living in Olmsted County, MN.<sup>14</sup> The prevalence of constipation consistently has been reported to be higher in women than in men, even when age adjustment of the data is undertaken, although an exact explanation for these associations is as yet uncertain.<sup>2,3</sup>

The Rome committees defined a category labeled functional constipation (Table 1) in order to devise a uniform standard.<sup>15</sup> The prevalence of functional constipation as defined by the Rome Criteria, however, has varied remarkably in studies to date. In Canada, Pare and colleagues found

Table 1  
Rome I and II Criteria for Functional Constipation

**Rome I**

Diagnostic Criteria

Two or more of the following for at least 3 months:

- 1) Straining at defecation at  $\geq 1/4$  of the time;
- 2) Lumpy and/or hard stools  $\geq 1/4$  of the time;
- 3) Sensation of incomplete evacuation  $\geq 1/4$  of the time; and/or
- 4)  $\leq 2$  bowel movements in a week.

Abdominal pain is not required, loose stools are not present, and there are insufficient criteria for IBS. These criteria may not apply when the patient is taking laxatives.

**Rome II**

Diagnostic Criteria

At least 12 weeks, which need not be consecutive, in the preceding 12 months or two or more of:

- 1) Straining  $>1/4$  of defecation;
- 2) Lumpy or hard stools  $> 1/4$  of defecations;
- 3) Sensation of incomplete evacuation  $>1/4$  of defecations;
- 4) Sensation of anorectal obstruction/blockage  $> 1/4$  of defecations;
- 5) Manual maneuvers to facilitate  $> 1/4$  of defecations (eg, digital evacuation, support of the pelvic floor); and/or
- 6)  $< 3$  defecations per week.

Loose stools are not present, and there are insufficient criteria for IBS.

Reproduced with permission from Drossman DA, Richter JE, Talley NJ, et al. *The Functional Gastrointestinal Disorders*. 1st ed. Lippincott Williams & Wilkins; 1994;4C:140. IBS, irritable bowel syndrome.

Used with permission from Drossman DA et al. *The Functional Gastrointestinal Disorders*. 2nd ed. 2000. Available at <http://www.romecriteria.org>.

16.7% of the population fulfilled the Rome I definition for functional constipation.<sup>10</sup> The prevalence using the Rome II definition was higher in a US study by Stewart and colleagues based on telephone interviews using random digit dialing.<sup>16</sup> On the other hand, even higher rates were seen in Olmsted County, MN, where 30.9% of those studied had functional constipation if the Rome I criteria and symptoms of outlet delay were added together.<sup>9</sup> This variability in reporting rates likely reflects past differences in the Rome definitions. Unlike Rome II, Rome I does not include symptoms suggestive of outlet obstruction. Not excluding patients with intermittent loose or watery stools probably accounts for the higher rates observed in reports using the Rome I criteria.

Unfortunately, the Rome criteria for constipation remain arbitrary. The exact cutoffs that should be used to determine constipation need to be based on a more useful clinical paradigm. For example, heartburn is very common in the general population yet not everyone in the population with this symptom has a disease. One approach to defining disease is to identify those who are either at risk of physical complications or those who have impaired quality of life because of the symptoms.<sup>17</sup> A similar approach to defining functional constipation would be very useful, yet it is not part of the Rome criteria.

### Can Subtypes of Constipation Be Distinguished By Symptoms Alone?

Chronic constipation can be divided into pathophysiological subgroups. For example, a subgroup may have very infrequent stool frequency and on physiological testing will be shown to have slow-transit constipation; these patients (usually women) are typically classified as having colonic inertia.<sup>2,3</sup> However, the transit

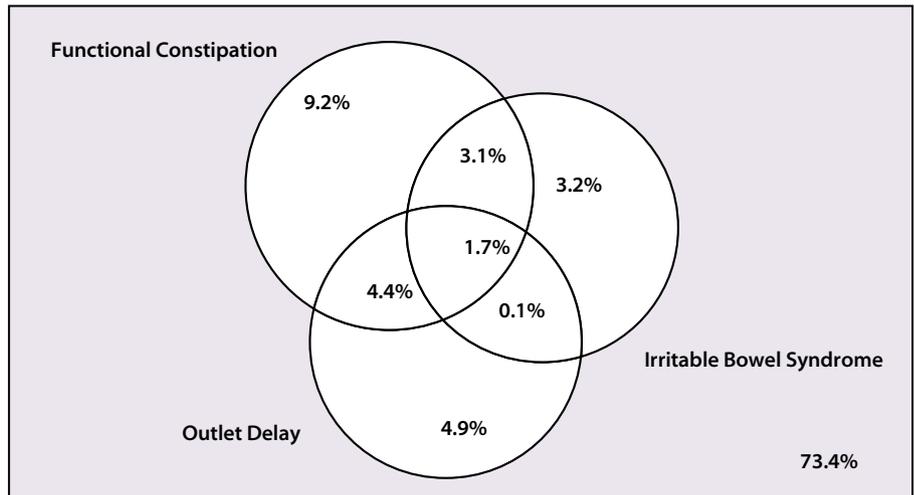


Figure 2. Overlap of symptoms suggestive of functional constipation and outlet delay with irritable bowel syndrome (IBS). Note physiological criteria were not used to identify the constipation subgroups, only symptoms. Reproduced with permission from Talley NJ et al. *Gastroenterology*. 1993;105:781-790.<sup>9</sup>

time that distinguishes colonic inertia from slow transit from health is arbitrarily defined; those individuals with modest delays in colonic transit are difficult to classify. Another subgroup may have pelvic floor dysfunction, with symptoms that can include feelings of anal blockage, prolonged defecation, manual disimpaction, and severe straining.<sup>3</sup> However, these symptoms overlap with those seen in patients who do not have any demonstrable evidence of pelvic floor dysfunction on objective tests.<sup>2,3</sup> Two other subgroups have been identified in the literature. One is functional constipation; the Rome committees have emphasized that the criteria for irritable bowel syndrome (IBS) are not met in functional constipation although these patients have a combination of constipation items. The final subgroup is constipation predominant IBS, where abdominal pain is associated with disturbed defecation and often bloating.<sup>15</sup> However, these last two subgroups are somewhat blurred, as many patients with functional constipation will have an element of abdominal pain or discomfort, although the pain

may not be relieved by defecation or obviously altered by constipation symptoms.

Some epidemiological studies have attempted to identify subcategories of constipation based on the symptom patterns. Talley and colleagues defined functional constipation according to the Rome I criteria and also defined obstructive defecation based on symptoms considered to be typical of outlet delay. The data indicated an impressive overlap of symptoms, particularly among those with functional constipation and outlet delay, although clearly there are subgroups of individuals with constipation that fall into only one of the symptomatic categories (Figure 2). Interestingly, postprandial abdominal bloating, manual disimpaction, prolonged defecation, feelings of anal blockage, and painful defecation were associated with functional constipation, whereas only straining was an independent predictor of the outlet delay group in this study.<sup>9</sup>

However, clinical studies suggest that the subdivision of patients into physiologically abnormal subgroups based on symptoms only is inade-

quate. Knowles and colleagues studied 71 patients with intractable constipation and 20 healthy controls to determine if a questionnaire could distinguish among constipation subgroups. All patients underwent extensive investigation including colonic transit time and pelvic floor function testing. The authors found that pathophysiological abnormalities could be predicted correctly for just 55% of patients; however, the small number of patients in this study makes interpretation somewhat difficult.<sup>18</sup> In a study of 184 patients, Grotz and colleagues found that although some individual symptoms appeared to have utility, symptom patterns were not able to identify physiological subtypes of constipation.<sup>19</sup> Using objective tests as the gold standard, these data provide support for the hypothesis that symptoms possess insufficient discriminatory power to identify subtypes of constipation. Unfortunately, the available studies do not totally clarify the issue as there is no accepted gold standard for subclassifying constipation; this situation is similar to gastroesophageal reflux disease (GERD),

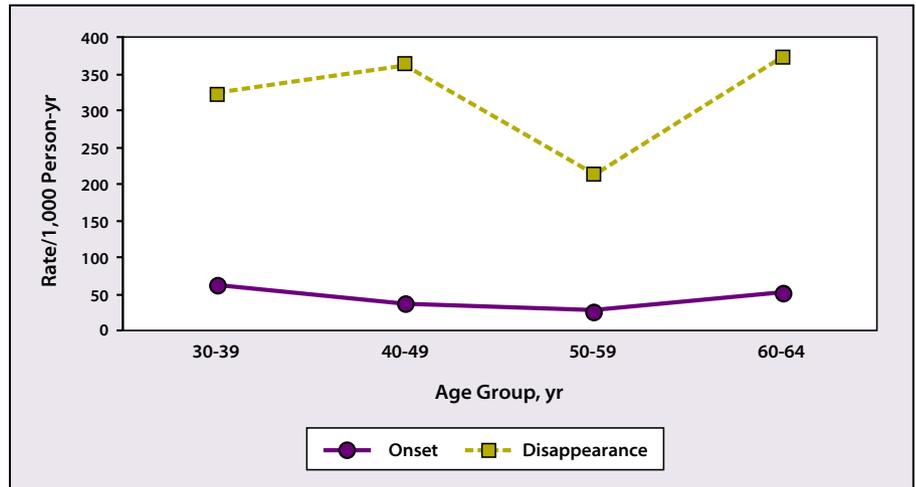


Figure 3. Onset and disappearance rates per 1000 person-years by age for chronic constipation: Olmsted County, MN, 1988-1991. Reproduced from Talley NJ et al. *Am J Epidemiol.* 1992;136:165-177,<sup>20</sup> with permission from Oxford University Press.

and passing hard stools and/or a stool frequency of less than 3 stools per week; 17% of respondents reported constipation on the first survey and 15% reported constipation on the second survey, a nonsignificant difference that indicates a stable prevalence. The onset rate of constipation per 1000 individuals was 40; the disappearance rate was 309 per 1000 person-years. Notably, the absolute numbers of individuals gaining and

### Seeking Healthcare for Constipation

The prevalence of constipation ranges from 2% to 28% depending on the definition applied, but only a minority of patients with symptoms in population-based surveys have sought care for constipation.<sup>3,6,8,10,14,16</sup> A Canadian study by Pare and colleagues<sup>10</sup> reported that, overall, only 34% of patients reported physician visits for constipation and 34% also used laxatives among those with self-reported constipation in the prior 3 months. Similar results have been observed in the United States.<sup>22,23</sup> In patients who had visited a physician for constipation, use of previous constipation medications, history of self-reported constipation, or use of antidepressants were all predictors of healthcare seeking; women were more likely than men to seek care for self-reported constipation.<sup>10</sup>

### Risk Factors for Constipation

It is well established that increased dietary fiber reduces colonic transit time, increases fecal weight, and increases stool frequency.<sup>3</sup> Dukas and colleagues reported that women who ate more dietary fiber were less likely

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where 24-hour esophageal pH testing alone is also insufficient to identify all patients with this condition.<sup>17</sup>

### Incidence of Constipation

Remarkably little is known about the onset and disappearance of constipation in the general community. Talley and colleagues used a validated questionnaire in a study of 690 residents of Olmsted County, MN residents, with a follow-up of 12 to 20 months after the initial survey.<sup>20</sup> Constipation was defined as often straining at stool

losing constipation symptoms were similar (Figure 3). The disappearing rates seemed to increase as individuals tended towards increased age, but elderly individuals were not included in this study.<sup>20</sup>

In a study of nursing home residents, Robson and colleagues found that 12.5% of this elderly population (mean age: 83 years) were constipated, with 7% developing constipation over the 3 months of follow-up.<sup>21</sup> In general, incidence data otherwise are lacking, and this area needs research.

to experience constipation.<sup>24</sup> Sandler and colleagues reported that, among 15,014 adults, those with self-reported constipation had a lower consumption of dry beans and peas as well as milk and cheese.<sup>25</sup> A study from the National Health and Nutrition Examination Survey, on the other hand, failed to identify fiber intake as an independent risk factor for constipation.<sup>26</sup>

An insufficient fluid intake is thought to be relevant to constipation but few studies have examined this factor. Sandler and colleagues in the United States reported less consumption of beverages in constipated adults,<sup>25</sup> but a New Zealand survey failed to find any association.<sup>27</sup> Although recommendations to increase fluid intake are routine in constipation care, the evidence base for this advice is remarkably limited.

Exercise or increased mobility also is commonly recommended for patients with constipation.<sup>3</sup> Dukas and colleagues analyzed data from the Nurses Health Study and found that daily physical activity was associated with a lower prevalence of constipation.<sup>24</sup> Everhart and colleagues also reported that low physical activity was an independent risk factor for constipation.<sup>26</sup> However, no randomized trials of an exercise intervention for relief of constipation are available.

Medication use can be associated with constipation. Aspirin, as well as nonaspirin nonsteroidal anti-inflammatory drugs (NSAIDs) have been implicated. In an elderly population study, Talley and colleagues found that aspirin and other NSAIDs, as well as medicines usually classified as linked to constipation, were all associated with a small but significantly increased risk among patients with functional constipation symptoms.<sup>9</sup> Another study similarly observed this association with aspirin and NSAIDs

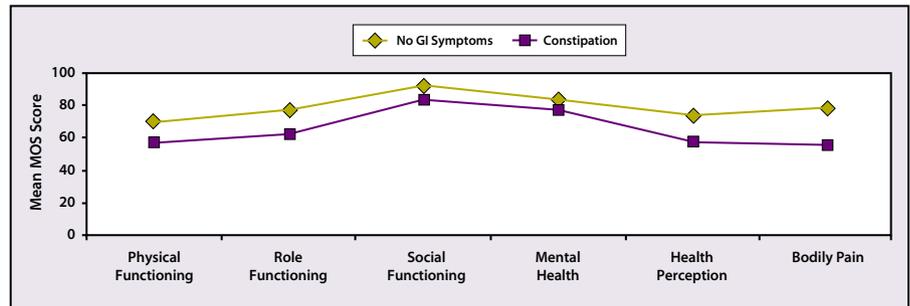


Figure 4. Impact of Chronic Constipation on Quality of Life in Olmsted County Residents  $\geq 65$  years of age (mean medical outcomes survey (MOS) scores). A lower score indicates worse quality of life. GI, gastrointestinal. Adapted from O'Keefe EA et al. *J Gerontol.* 1995;50A:M184-M189.<sup>23</sup>

in older patients.<sup>14</sup> In addition, there is a UK report based on the General Practitioners Research Database that showed opioids, diuretics, antidepressants, antihistamines, antispasmodics, anticonvulsants, and aluminum antacids to be associated with a substantially higher risk of constipation.<sup>28</sup>

Primary neurological disease has been strongly associated with constipation.<sup>28</sup> Diabetes is also a risk factor for constipation. Bytzer and colleagues, in a study of 15,000 adults, reported an approximately 50% higher risk of constipation in those with diabetes compared with controls (odds ratio 1.54, 95% CI, 1.13-2.13). Furthermore, patients with poor glycemic control had a nearly three-fold increased risk of constipation symptoms (odds ratio 2.72, 95% CI, 1.50-3.45).<sup>29</sup>

Wong and colleagues evaluated sociodemographic and lifestyle factors in a Singapore population sample. Similar prevalence rates of functional constipation were identified in this sample compared with studies from the United States (11.6% of individuals had functional constipation); an association between Chinese tea and constipation was also identified.<sup>30</sup>

Stewart and colleagues reported that the prevalence of functional constipation increased with increasing education and that outlet obstruction

symptoms were more common in non-Caucasians than in Caucasians.<sup>16</sup> Sandler and colleagues observed that self-reported constipation was more frequent in African Americans and in those with a low-income.<sup>25</sup> Constipation in Medicare beneficiaries (based on hospital discharge data) was more prevalent in northern and in poorer states, as well as in rural compared with urban states, as reported by Johanson.<sup>31</sup> Although lower socioeconomic status, therefore, does appear to be an important factor in constipation, the exact mechanisms for this association remain unclear, particularly in view of the fact that diet alone is unlikely to account for such variation.<sup>25</sup>

The relevance of psychological comorbidity to constipation remains poorly defined in the community. In patients presenting to tertiary referral centers, psychological comorbidity is a well-known and common component that can make management challenging.<sup>32</sup>

### Impact of Constipation on Quality of Life

It is remarkable how little research is available on the impact of this common condition. O'Keefe and colleagues in Olmsted County, MN, were the first to report population-based data suggesting that functional disorders

in the older age group interfered with daily living and well-being (Figure 4).<sup>33</sup> Irvine and colleagues reported similar results in a Canadian population sample. They found a prevalence of a Rome II diagnosis for functional constipation of 15%, although only 26% of those approached were prepared to be involved in the study and a lower percentage were actually eligible. Even so, those with self-reported constipation and those with the Rome II Criteria for functional constipation were significantly more impaired on the physical and mental component scores of the SF-36 survey, compared with established normal values.<sup>34</sup>

In a study of 47 women with severe idiopathic constipation, Mason and colleagues reported that these patients had increased psychological and social morbidity, increased somatization, and less satisfaction in their sexual life, compared with healthy women. In contrast, women with Crohn's disease did not differ significantly on these issues.<sup>32</sup> However, this

reflects a referral practice setting and cannot be extrapolated to other clinical practices or the general population.

It appears unlikely that all individuals with constipation symptoms, even if they fulfill the Rome Criteria, have any true disease; some of these individuals fall outside the normal 95% confidence limits in terms of bowel function, but if this condition does not perturb them, then its importance is minimal. More data are required to determine the impact of

### Consequences of Constipation

In addition to impairing quality of life, constipation has been reported to have other physical outcomes, although controversy remains. It has been often suggested that constipation can lead to fecal incontinence because of damage to anorectal sensation from stool retention. However, there is insufficient evidence in the literature to determine the validity of this hypothesis. Fecal incontinence is a multifactorial problem, and this

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complicates interpreting the current evidence. It seems likely that individuals at higher risk of constipation also have a higher risk of incontinence,<sup>35,36</sup> but a causal link has not been strongly established.

Hemorrhoids also have been attrib-

### Main Points

- Although constipation is a common problem in the community, its exact prevalence remains elusive to define because of the variety of patient and physician definitions for the condition.
- Studies have provided evidence for demographic patterns for constipation. The condition is more prevalent in the elderly and in women, even when data are age-adjusted.
- The Rome I and II Criteria can yield different data regarding constipation; both Rome I and Rome II Criteria are arbitrary. A more useful clinical paradigm is indicated that takes the impact on quality of life into account.
- Epidemiological studies have sought to identify subcategories of constipation based on symptom patterns; however, clinical studies suggest that the subdivision of patients into physiological subgroups based on symptoms alone is inadequate. A gold standard for subclassifying constipation remains to be defined.
- It has been shown that although constipation prevalence can range as high as 28% in a population, only a minority of patients seek physician care. A history of self-reported constipation, use of previous constipation medications, or use of antidepressants have been shown to predict seeking physician care.
- Several diseases or conditions have been strongly associated with constipation, including primary neurological disease and diabetes.
- Medication use has been demonstrated to be linked with the onset of constipation. These include such commonly used medications as aspirin and nonaspirin nonsteroidal anti-inflammatories, as well as opioids, diuretics, antidepressants, antihistamines, antispasmodics, anticonvulsants, and aluminum antacids.

uted to constipation. However, this association has been seriously questioned based on the quite different epidemiological patterns of hemorrhoids and constipation in a US study.<sup>37</sup>

Both constipation and laxatives have been associated with an increased risk of colorectal cancer.<sup>38,39</sup> However, this association is likely to be confounded by a host of dietary and sociodemographic factors. Furthermore, colorectal cancer may lead to increased constipation and use of laxatives before it is diagnosed, further potentially muddying any association.

### Economic Impact of Chronic Constipation

Remarkably limited data exists on the costs of this condition. Extrapolating from available information, and conservatively assuming 2.5 million people with constipation undergo evaluation annually, Locke and colleagues<sup>3</sup> calculated that testing in constipation would cost 6.9 billion dollars, aside from any treatment costs. Sonnenberg and Koch estimated 85% of physician visits for constipation result in a prescription, so drug costs also are likely to be enormous.<sup>40</sup> ■

### References

- Whorton J. Civilisation and the colon: constipation as the "disease of diseases". *Br Med J*. 2000;321:23-30.
- Lennard-Jones JE. Constipation. In: Feldman M, Friedman LS, Sleisenger MH, eds. *Sleisenger & Fordtran's Gastrointestinal & Liver Disease*, 7th ed. Philadelphia, PA: WB Saunders Company; 2002:181-210.
- Locke GR 3rd, Pemberton JH, Phillips SF. AGA technical review on constipation. American Gastroenterology Association. *Gastroenterology*. 2000;119:1766-1778.
- Heaton KW, Radvan J, Cripps H, et al. Defecation frequency and timing, and stool form in the general population: a prospective study. *Gut*. 1992;33:818-824.
- Aichbichler BW, Wenzl HH, Santa Ana CA, et al. A comparison of stool characteristics from normal and constipated people. *Dig Dis Sci*. 1998;43:2353-2362.
- Sandler RS, Drossman DA. Bowel habits in young adults not seeking health care. *Dig Dis Sci*. 1987;32:841-845.
- Harari D, Gurwitz JH, Avorn J, et al. How do older persons define constipation? Implications for therapeutic management. *J Gen Intern Med*. 1997;12:63-66.
- Glia A, Lindberg G. Quality of life in patients with different types of functional constipation. *Scand J Gastroenterol*. 1997;32:1083-1089.
- Talley NJ, Weaver AL, Zinsmeister AR, et al. Functional constipation and outlet delay: a population-based study. *Gastroenterology*. 1993;105:781-790.
- Pare P, Ferrazzi S, Thompson WG, et al. An epidemiological survey of constipation in Canada: definitions, rates, demographics, and predictors of health care seeking. *Am J Gastroenterol*. 2001;96:3130-3137.
- Connell AM, Hilton C, Irvine G, et al. Variation of bowel habit in two population samples. *Br Med J*. 1965;5470:1095-1099.
- Thompson WG, Heaton KW. Functional bowel disorders in apparently healthy people. *Gastroenterology*. 1980;79:283-288.
- Whitehead WE, Drinkwater D, Cheskin LJ, et al. Constipation in the elderly living at home. Definition, prevalence, and relationship to lifestyle and health status. *J Am Geriatr Soc*. 1989;37:423-429.
- Talley NJ, Fleming KC, Evans JM, et al. Constipation in an elderly community: a study of prevalence and potential risk factors. *Am J Gastroenterol*. 1996;91:19-25.
- Thompson WG, Longstreth GF, Drossman DA, et al. Functional bowel disorders and functional abdominal pain. *Gut*. 1999;45(suppl 2):S1-S13.
- Stewart WF, Liberman JN, Sandler RS, et al. Epidemiology of constipation (EPOC) study in the United States: relation of clinical subtypes to sociodemographic features. *Am J Gastroenterol*. 1999;94:3530-3540.
- Anonymous. An evidence-based appraisal of reflux disease management—the Genval Workshop Report. *Gut*. 1999;44(suppl 2):S1-S16.
- Knowles CH, Eccersley AJ, Scott SM, et al. Linear discriminant analysis of symptoms in patients with chronic constipation. *Dis Colon Rectum*. 2000;43:1419-1426.
- Grotz RL, Pemberton JH, Talley NJ, et al. Discriminant value of psychological distress, symptom profiles, and segmental colonic dysfunction in outpatients with severe idiopathic constipation. *Br J Surg*. 1994;35:798-802.
- Talley NJ, Weaver AL, Zinsmeister AR, et al. Onset and disappearance of gastrointestinal symptoms and functional gastrointestinal disorders. *Am J Epidemiol*. 1992;136:165-177.
- Robson KM, Kiely DK, Lembo T. Development of constipation in nursing home residents. *Dis Colon Rectum*. 2000;43:940-943.
- Drossman DA, Li Z, Andruzzi E, et al. U.S. household survey of functional GI disorders: prevalence, sociodemography and health impact. *Dig Dis Sci*. 1993;38:1569-1580.
- Talley NJ, Zinsmeister AR, Van Dyke C, et al. Epidemiology of colonic symptoms and the irritable bowel syndrome. *Gastroenterology*. 1991;101:927-934.
- Dukas L, Willett WC, Giovannucci EL. Association between physical activity, fiber intake, and other lifestyle variables and constipation in a study of women. *Am J Gastroenterol*. 2003;98:1790-1796.
- Sandler RS, Jordan MC, Shelton BJ. Demographic and dietary determinants of constipation in the US population. *Am J Pub Health*. 1990;80:185-189.
- Everhart JE, Go VLW, Johannes RS, et al. A longitudinal survey of self-reported bowel habits in the United States. *Dig Dis Sci*. 1989;34:1153-1162.
- Campbell AJ, Busby WJ, Horwath CC. Factors associated with constipation in a community based sample of people aged 70 years and over. *J Epidemiol Community Health*. 1993;47:23-26.
- Talley NJ, Jones M, Nuyts G, et al. Risk factors for chronic constipation based on a general practice sample. *Am J Gastroenterol*. 2003;98:1107-1111.
- Bytzer P, Talley NJ, Leemon M, et al. Prevalence of gastrointestinal symptoms associated with diabetes mellitus: a population-based survey of 15,000 adults. *Arch Intern Med*. 2001;161:1989-1996.
- Wong ML, Wee S, Hwee C, et al. Sociodemographic and lifestyle factors associated with constipation in an elderly Asian community. *Am J Gastroenterol*. 1999;94:1283-1291.
- Johanson JF. Geographic distribution of constipation in the United States. *Am J Gastroenterology*. 1998;93:188-191.
- Mason HJ, Serrano-Ikkos E, Kamm MA, et al. Psychological morbidity in women with idiopathic constipation. *Am J Gastroenterol*. 2000;95:2852-2857.
- O'Keefe EA, Talley NJ, Zinsmeister AR, et al. Bowel disorders impair functional status and quality of life in the elderly: a population-based study. *J Gerontol*. 1995;50A:M184-M189.
- Irvine EJ, Ferrazzi S, Pare P, et al. Health-related quality of life in functional GI disorders: focus on constipation and resource utilization. *Am J Gastroenterol*. 2002;97:1986-1993.
- De Lillo AR, Rose S. Functional bowel disorders in the geriatric patient: constipation, fecal impaction, and fecal incontinence. *Am J Gastroenterol*. 2000;95:901-905.
- Nelson R, Furner S, Jesudason V. Fecal incontinence in Wisconsin nursing homes: prevalence and association. *Dis Colon Rectum*. 1998;41:1226-1229.
- Johanson JF, Sonnenberg A. The prevalence of hemorrhoids and chronic constipation. *Gastroenterology*. 1990;98:380-386.
- Dukas L, Willett WC, Colditz GA, et al. Prospective study of bowel movement, laxative use, and risk of colorectal cancer among women. *Am J Epidemiol*. 2000;151:958-964.
- Roberts MC, Millikan RC, Galanko JA, et al. Constipation, laxative use, and colon cancer in a North Carolina population. *Am J Gastroenterol*. 2003;98:857-864.
- Sonnenberg A, Koch TR. Epidemiology of constipation in the United States. *Dis Colon & Rect*. 1989;32:1-8.

Definition. Risk Factors. Types of Constipation. Constipation is traditionally defined as three or fewer bowel movements per week. Risk factors for constipation include female sex, older age, inactivity, low caloric intake, low-fiber diet, low income, low educational level, and taking a large number of medications. Chronic constipation is classified as functional (primary) or secondary. Functional constipation can be divided into normal transit, slow transit, or outlet constipation. Prevalence, sociodemography, and health impact. Dig Dis Sci. 1993;38(9):1569-1580. 2. Higgins PD, Johanson JF. Epidemiology of constipation in North America: a systematic review. Am J Gastroenterol. Clinical epidemiology of chronic constipation. J Clin Gastroenterol. 1989;11(5):525-536. To the constipation include: constipation among tourists; constipation during pregnancy; constipation caused by eating certain foods (tea, cocoa, foods with a low content of ballast substances, reduced intake of fluid, etc.); constipation, caused by various emotional factors (mental overload, depression); constipation as a side effect caused by medication. In medical literature contains many definitions of chronic constipation, but basically they all boil down to the following: Diagnosis of chronic constipation can be made if: frequency of stool is less than 3 times a week; defecation requires voltage The epidemiology of constipation demonstrates a consistent pattern with several key points. No true population-based incidence or natural history studies have been published to date. The prevalence... Digestive Diseases in the United States: Epidemiology and Impact. U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Disease. NIH publication no. 94-1447. Washington, DC: U.S. Government Printing Office, 1994:567-594. Google Scholar. 8. Devroede G. Constipation: mechanisms and management. Clinical epidemiology of chronic constipation. J Clin Gastroenterol 1989;11:525-536. PubMedCrossRefGoogle Scholar. 17. Sandler RS, Jordan MC, Shelton BJ.