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Pelvic floor disorders and quality of life in women with self-reported irritable bowel syndrome

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Summary

Background—Quality of life among women with irritable bowel syndrome may be affected by pelvic floor disorders.

Aim—To assess the association of self-reported irritable bowel syndrome with urinary incontinence, pelvic organ prolapse, sexual function, quality of life.

Methods—We analyzed data from the Reproductive Risks for Incontinence Study at Kaiser Permanente, a random population-based study of 2109 racially diverse women (mean age=56). Multivariate analyses assessed the association of irritable bowel syndrome with pelvic floor disorders and quality of life.

Results—The prevalence of irritable bowel syndrome was 9.7% (n=204). Women with irritable bowel had higher adjusted odds of reporting symptomatic pelvic organ prolapse (OR 2.4;95% CI 1.4–4.1) and urinary urgency (OR 1.4;95% CI 1.0–1.9); greater bother from pelvic organ prolapse (OR 4.3;95% CI 1.5–11.9) and fecal incontinence (OR 2.0;95% CI, 1.3–3.2); greater lifestyle impact from urinary incontinence (OR 2.2;95% CI, 1.3–3.8); and worse quality of life (p<0.01).

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Women with irritable bowel reported more inability to relax and enjoy sexual activity (OR 1.8;95%CI 1.3–2.6) and lower ratings for sexual satisfaction (OR 1.8;95%CI 1.3–2.5), but no difference in sexual frequency, interest, or ability to have an orgasm.

Conclusions—Women with irritable bowel are more likely to report symptomatic pelvic organ prolapse and sexual dysfunction, and report lower quality of life.

Keywords

Irritable bowel syndrome; pelvic floor disorders; sexual function

Background

Irritable bowel syndrome (IBS) is defined by abdominal pain and altered bowel habits. It occurs commonly in the general population, and the prevalence is known to be higher in women than in men.(1) A detailed study done to estimate the prevalence of IBS among women in the United States found that 5.4% of women had IBS by Rome II criteria, 8.3% of women had IBS by a more liberal variant of the Rome criteria (allowing for pain over 3 months ever in the past), and in a separate sample of households the prevalence of physician-diagnosed IBS was 8.1%.(2) The authors made a point that the more temporally restrictive criteria of the Rome II may miss some people affected by IBS. The use of “IBS” in the literature can be difficult because some physicians may label a patient with abdominal symptoms as having “IBS” even though they do not fit the diagnostic criteria. Thus, a study of self-reported IBS will likely include a broad spectrum of people, some who meet diagnostic criteria and were appropriately diagnosed by a physician with IBS, and those who were labeled as having IBS by a physician or themselves without necessarily meeting diagnostic criteria.

Many people are cognizant of the bowel-related symptoms of IBS, and visits with health care practitioners may focus on these issues. There may be associated conditions that are less frequently addressed. In addition, it is well described that people with IBS report worse quality of life compared to the general public and to those with chronic disease conditions, such as lung disease, heart failure, and diabetes.(3,4) While altered bowel habits and pain may be the major factors that affect daily functioning, lifestyle, and hence quality of life, other factors associated with irritable bowel syndrome may also affect quality of life, especially in women. Pelvic floor disorders, such as pelvic organ prolapse,(5) urinary urgency and incontinence,(5,6) and sexual dysfunction,(7,8) have been associated with IBS in women and can all influence overall quality of life. Several studies have described that women with IBS have a higher likelihood of a co-diagnosis of other somatic conditions. For example, one study found that women with interstitial cystitis or painful bladder syndrome had a greater likelihood of an antecedent diagnosis of fibromyalgia, chronic fatigue syndrome, and IBS.(9) A systematic review of the comorbidities associated with IBS described a high prevalence of somatic syndromes such as fibromyalgia (33% incidence), chronic pelvic pain (50% incidence), dysuria (50% incidence), and interstitial cystitis (30%). It is not clear whether these other diagnoses were initially misdiagnoses or whether these conditions coexist, but it is suggested that there is a subgroup of IBS patients who have these other coexisting somatic disorders, and often have higher levels of anxiety or depression. Whether these disorders are related due to underlying psychological factors or a common pathophysiologic mechanism is unknown.(10,11)

Our objective was to examine the association of pelvic floor disorders with IBS and the effects of such symptoms on quality of life, using a population-based cohort of middle-aged women. The pelvic floor disorders examined include self-reported symptoms of pelvic organ prolapse, urinary symptoms, and sexual dysfunction.

Methods

Participants

The Reproductive Risks for Incontinence Study at Kaiser (RRISK) is a population-based, racially diverse cohort (20% African-American, 20% Latina, 20% Asian-American, and 40% white) of 2109 women between the ages of 40 and 69, enrolled from October 1999 through February 2003. Kaiser Permanente Medical Care Program of Northern California is a large, integrated health care delivery system with over three million members, serving approximately 25 percent of the population in the area. The sampling has been described in previous studies with this cohort.(12,13) Among the approximately 66,000 long-term female members, a sample of 10,230 females was randomly selected within age and race strata, Eligibility criteria included having at least one-half of all births at Kaiser, resulting in the 2,109 females enrolled in the cohort. Of the 2109 women in the RRISK cohort, two women were excluded from this study for lack of information regarding their IBS status. The institutional review boards at the University of California San Francisco and Kaiser Permanente approved this study.

Data Elements

Data were collected by self-report questionnaires and in-person interviews. Cross-sectional data on demographics, medical and surgical history, current medications, menopause, hormone therapy use, anal incontinence, pelvic organ prolapse, and functional status (using the Medical Outcomes Study Short Form-36 [SF-36])(14) were obtained through a structured questionnaire administered by a trained interviewer. No physical examinations of included subjects were performed for the purposes of this study.

In the questionnaire, IBS status was determined by a single self-report question: "Has a medical doctor or other medical person ever told you that you had irritable bowel syndrome or IBS?" Additional information regarding frequencies of fecal incontinence and constipation was elicited in separate questions. Constipation included any of the following symptoms: difficulty passing stool, spending over 15 minutes on the toilet, hard stools, or incomplete stools. Urinary incontinence was defined a priori as leakage at least once a month for at least 3 months in a row. Frequency of urine leakage and urgency without leakage over the past 12 months was assessed using standardized questions. Urinary incontinence-specific quality of life was measured with the Incontinence Impact Questionnaire (IIQ), a validated measure for assessing the effect of incontinence on quality of life.(15) Women with scores in the highest quartile of the IIQ (≥ 53) were considered to have high impact on their lifestyles from incontinence symptoms. Pelvic organ prolapse was defined as a "feeling of bulging, pressure, or protrusion" or a "visible bulging or protrusion." Sexual activity was defined as "any activity that is sexually arousing to you, including masturbation." Sexual function was assessed by the use of six questions (Table 2).(16) Response options for sexual frequency included less than monthly, monthly, weekly, or daily. Overall sexual satisfaction over the past 12 months was evaluated with five response choices ranging from very satisfied to very dissatisfied. Sexual dysfunction was examined based on the scale from the Medical Outcomes Study Sexual Problems Survey Instrument. (16) The four domains of sexual dysfunction were explored with the questions, "How much of a problem was each of the following over the past 12 months: lack of sexual interest, unable to relax and enjoy sexual activity, difficulty in becoming sexually aroused, and difficulty in having an orgasm?" Answer choices included "not a problem, little bit of a problem, somewhat a problem, very much a problem, or not applicable." The physical and mental health scales for the SF-36 were calculated by using the standardization technique described in the SF-36 Summary Measures Manual.(14)

Statistical Analysis

We performed univariate analysis to describe women with and without IBS and to compare the prevalence of characteristics associated with IBS. Normally distributed continuous variables were compared using standard t-tests, and categorical variables were analyzed with chi-square tests. To evaluate characteristics independently associated with IBS, we included variables associated with IBS ($p < 0.2$) in univariate analyses in a multivariate logistic regression model. All variables that remained significant ($p < 0.2$) after adjustment were included in the final multivariate model. We then created separate models to evaluate the association of IBS with each pelvic floor outcome of interest (e.g. sexual function, bother from pelvic prolapse) by treating IBS as a predictor and controlling for variables that were found to be independently associated with IBS from the previous multivariate model. We used multivariate logistic regression for binary outcomes, linear regression for continuous outcomes, and proportional odds logistic regression models for ordinal outcomes. The proportional odds model is a generalization of the logistic model that is commonly used for ordered multilevel categorical outcomes. For ordinal predictors, tests for linear trend were calculated using linear contrasts of the model coefficients. All analyses were performed using SAS Version 9.1 (SAS Institute, Cary, NC).

Results

Among the RRISK cohort of 2107 women, nearly 10% reported having IBS. The characteristics of the cohort are displayed in Table 1. Compared with women without IBS, women with IBS were more likely to report frequent symptoms of constipation (23% versus 11% had symptoms weekly or more often) and fecal incontinence (6% versus 2% had symptoms weekly or more often). Women with IBS were likely to be younger than those without IBS after adjusting for other characteristics of the two groups (Table 1).

Women with IBS had 2.4 times the adjusted odds (95% CI 1.4–4.1) of reporting symptomatic pelvic organ prolapse and 1.4 times the odds (95% CI 1.0–1.9) of reporting urinary urgency compared with women without IBS, after adjusting for white race, diabetes, urinary incontinence, hysterectomy, colon surgery, and prolapse surgery (Table 1). There was no significant difference in the odds of reporting urinary incontinence in women with IBS compared to women without IBS, although women with IBS had a trend towards more daily urinary incontinence symptoms (OR 2.0, 95% CI 1.0–4.3).

The proportional odds ratios for the association of IBS and the various aspects of sexual function after adjustment for age, race, diabetes, urinary urgency, urinary incontinence, symptomatic prolapse, hysterectomy, colon surgery, and prolapse surgery, are presented in Table 2. Compared to women without IBS, those with IBS were nearly twice as likely to report more problems with inability to relax and enjoy sexual activity ($p < 0.01$) and to give a lower rating of overall sexual satisfaction ($p < 0.01$). There was no difference in sexual frequency, sexual interest, or ability to have an orgasm.

Women with IBS reported greater bother and worse quality of life than women without IBS (Table 2), with 4.3-times the odds of being more bothered by symptoms of pelvic organ prolapse ($p < 0.01$) and 2.2-times the odds of having higher IIQ scores than those without IBS ($p < 0.01$) (i.e. a greater impact from urinary incontinence on lifestyle and activities). They also reported worse health status compared to women without IBS ($p < 0.01$). Scores on the mental health and physical component of the SF-36 remained lower in women with IBS after adjustment for age, race, diabetes, urgency, urinary incontinence, symptomatic pelvic organ prolapse, hysterectomy, colon surgery and pelvic organ prolapse surgery (Table 3).

Discussion

This is a secondary study of a cohort designed specifically to examine pelvic floor disorders. Details of IBS and bowel function are not as clearly provided in the dataset but allowed us to estimate a prevalence of IBS among a cohort of middle-aged women and its association with the pelvic floor symptoms studied. In our cohort of 2107 racially diverse women, almost 10% of the women reported IBS. These women with IBS had more symptoms and bother from pelvic organ prolapse, and more bother from urinary incontinence, than women who did not have IBS. Sexual function in women with IBS differed from those without IBS with respect to more difficulty relaxing and lower sexual satisfaction scores. As in other published studies,(3,4) the women with IBS in our cohort reported lower SF-36 scores. It is difficult to know whether the associations seen here are due to a heightened perception of symptoms in women with IBS as opposed to an actual higher prevalence of these symptoms. While some symptoms are more objective, such as number of incontinent episodes, many questions relate to “bother” from symptoms, and certainly these types of questions depend on one’s perception of pain and bother, which have been described to be elevated in people with IBS.

Our findings support that some relationship exists between IBS and conditions related to the pelvic floor. In a recent separate study examining our cohort, women with pelvic organ prolapse had 2.8 times the odds of having IBS.(17) One hypothesis for the relationship between IBS and pelvic organ prolapse is that women with IBS may have cycles of constipation, making them prone to weakness of the pelvic floor and prolapse. Support for this hypothesis is seen in a cross-sectional study of women evaluated in a urogynecology clinic, which found that among women with stage 3 or 4 pelvic organ prolapse, 18% had IBS (95% CI 9–33%). However, there was no comparison to a healthy control group or a description of IBS prevalence in the women without prolapse.(5) In our cohort, we found that the reported prevalence of symptomatic prolapse was higher in the women with IBS, and interestingly, they reported proportionally more bother from their prolapse symptoms than women without IBS. The nature of the data for our cohort did not provide us with adequate information to examine a subset of patients with constipation alone, to assess whether the prolapse is also correlated with constipation.

While the association of prolapse and IBS has been previously explored, few studies have focused on the relationship between IBS and urinary incontinence or urgency. In a case-control study comparing 100 consecutive outpatients with IBS (90% women) with 100 control subjects matched for age, sex, and social class, urinary frequency, urgency, nocturia, and incomplete emptying of the bladder occurred in over 50% of the IBS patients compared to 18% or less of the control group ($p < 0.0001$). (18) In our population-based cohort, women with IBS did not report a higher prevalence of urinary incontinence than those without IBS, although there was a higher prevalence of urinary urgency. However, again the women with IBS reported greater impact on their lifestyle from urinary incontinence symptoms. The presence of both IBS and urinary incontinence symptoms may have a greater impact on one’s lifestyle compared with the effect of urinary incontinence symptoms alone.

Women with IBS have also been described to have altered sexual function due to low interest in sex, interference with sexual activity due to their bowel symptoms, or abdominal pain.(7,8,19) The few publications that have examined sexual dysfunction in women with IBS describe a prevalence of sexual dysfunction ranging from 24 to 83%.(7,8,18,20) The women with IBS in our population-based cohort had a greater likelihood of reporting an inability to relax and enjoy sexual activity and had low sexual satisfaction. Despite these differences, they were no different from women without IBS with respect to sexual frequency, interest, arousal and ability to reach orgasm.

In one study that examined factors affecting quality of life in patients with IBS, low sexual interest and IBS symptoms interfering with sexual function were associated with a lower SF-36 mental component score.⁽¹⁹⁾ Our IBS cohort had scores similar to those found in that study, which examined a large cohort of patients with IBS at a specialty center. Of note, while the SF-36 scores for women with IBS in our study were significantly lower than for women without IBS, the clinical significance of this difference is difficult to interpret when other unmeasured variables may be modulating this effect.

Study strengths and limitations need to be considered when interpreting the results of this study. One strength of this study is that it examines a diverse cohort of women. The women in our population-based cohort are likely representative of middle-aged women with IBS. Our IBS prevalence of 10% is within the published range of 2.6–37%, especially when considering female and middle-aged subgroups.^(1,21–24) One important limitation of this study is that the diagnosis of IBS was not based on any set criteria, but was self-reported by the patient when completing a section in a standard questionnaire regarding past medical history. Therefore it is not known what proportion of the women with IBS in our cohort meet published criteria that define the syndrome. Some patients may fit under the definition of functional abdominal pain syndrome as described by Drossman et al.⁽²⁵⁾ However, because the self-report questionnaire specifically questioned about IBS, we cannot make that assumption. We can only assume that our prevalence of IBS may capture a broader spectrum of patients with abdominal pain syndromes.

While we do have data regarding the frequency of constipation symptoms, our bowel habit questions do not elicit a history of diarrhea. The finding of a higher frequency of fecal incontinence among women with IBS could be an indicator of more diarrhea or could be unrelated. Thus, details about the subtype of IBS are also lacking, such as whether this is diarrhea or constipation predominant IBS, and it is possible that pelvic floor disorders are more prevalent in one subgroup. Severity of IBS symptoms or even the presence of current symptoms is not known. However, all questions about urinary incontinence, prolapse, and sexual function were specific to symptoms in the past 12 months, so this scope of time should encompass periods of IBS symptom activity. The temporal relationship of certain covariates such as prior operations or onset of diabetes to the diagnosis of IBS is unknown, given the nature of our data collection. We also do not know specific details of type of intestinal surgery performed. In addition, there are unmeasured covariates that may play an important role in the associations we investigated. Psychological history in addition to IBS medications, antidepressants, or other medications may affect sexual function, as may a history of sexual abuse. The latter is known to be associated with IBS and may affect the association of IBS with pelvic organ prolapse and sexual function.

In summary, this study examines the interrelationship between self-reported IBS and various pelvic organ functions in a group of middle-aged women. The symptoms we have found to be associated with IBS, including pelvic organ prolapse, urinary urgency, and sexual dysfunction, can contribute to lower quality of life, which we found in our cohort when comparing symptom bother scores and SF-36 scores between the two groups. The associations seen in this study may be due to a heightened perception or at least an increased self-awareness of symptoms among women with IBS. There is no evidence that IBS and pelvic floor symptoms are causally related, as this could only be established by performing a prospective study of women to temporally follow the course of development of IBS and pelvic floor symptoms.

Abbreviations

IIQ	Incontinence Impact Questionnaire
IBS	Irritable Bowel Syndrome
RRISK	Reproductive Risk of Incontinence Study in Kaiser

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Table 1

Baseline Characteristics of RRISK Cohort and factors associated with Irritable Bowel Syndrome

Characteristics	No IBS N (%)	IBS N (%)	Multivariate OR (95% CI)	P [†]
N	1903	204		
Demographics				
Age, mean +/- SD [‡]	56 ± 9	56 ± 9	0.9 (0.8 – 0.9)	<0.01
Race				<0.01
Caucasian	878 (46)	125 (61)	Reference	
African-American	349 (18)	33 (16)	0.6 (0.4 – 0.9)	
Asian	332 (17)	13 (6)	0.3 (0.1 – 0.5)	
Latina and other	344 (18)	33 (16)	0.6 (0.4 – 0.9)	
Medical/Surgical History				
Diabetes	151 (8)	23 (11)	1.8 (1.1 – 3.1)	0.02
Hysterectomy	401 (21)	74 (36)	2.0 (1.4 – 2.9)	<0.01
Urinary incontinence surgery	42 (2)	8 (4)	0.5 (0.2 – 1.4)	0.17
Pelvic organ prolapse surgery	57 (3)	18 (9)	2.5 (1.1 – 5.5)	0.02
Colon surgery	60 (3)	18 (9)	2.5 (1.3 – 4.8)	<0.01
Pelvic Floor Disorders				
Urinary urgency, ≥ weekly	446 (30)	72 (40)	1.4 (1.0 – 1.9)	0.06
Any urinary incontinence	1346 (71)	170 (83)	1.6 (0.8 – 3.0)	0.18
Never	557 (29)	34 (17)	Ref	0.12
Less than monthly	552 (29)	57 (28)	1.4 (0.7 – 2.9)	
Monthly	265 (14)	39 (19)	1.9 (0.9 – 3.8)	
Weekly	308 (16)	33 (16)	1.2 (0.6 – 2.5)	
Daily	221 (12)	41 (20)	2.0 (1.0 – 4.3)	
Symptomatic pelvic organ prolapse in last 12 months	93 (5)	25 (12)	2.4 (1.4 – 4.1)	<0.01

IBS = Irritable Bowel Syndrome; OR = Odds Ratio; CI = Confidence Interval; SD = Standard Deviation

Variables not included in this table include, history of cancer, postmenopausal, tobacco use, oophorectomy because statistical significance of each was p>0.2 in univariate analysis

[†]Based on a multivariate logistic regression model that included all variables shown in the table with p-values that remained less than 0.20 after adjustment.[‡]Odds ratio for age is reported per 5 years.

Table 2

The association between Irritable Bowel Syndrome and pelvic floor outcomes from multivariable models*

Outcome	IBS Multivariate	
	OR (95% CI) †	P-value
Sexual dysfunction		
Lower sex frequency	1.2 (0.9 – 1.8)	0.25
Difficulty in having an orgasm	1.2 (0.9 – 1.8)	0.27
Lack of sexual interest	1.3 (0.9 – 1.9)	0.13
Difficulty in becoming sexually aroused	1.4 (1.0 – 2.0)	0.07
Low rating of overall sexual satisfaction	1.8 (1.3 – 2.5)	<0.01
Unable to relax and enjoy sexual activity	1.8 (1.3 – 2.6)	<0.01
Bother from pelvic floor disorder		
Fecal incontinence	2.0 (1.3 – 3.2)	<0.01
Pelvic organ prolapse	4.3 (1.5 – 11.9)	<0.01
Quality of Life		
Worse self reported health status	1.7 (1.2 – 2.2)	<0.01
High IIQ, reflecting urinary incontinence‡	2.2 (1.3 – 3.8)	<0.01

IBS=Irritable Bowel Syndrome; OR = Odds Ratio; CI = Confidence Interval; IIQ = Incontinence Impact Questionnaire

* IBS was treated as an independent variable and the outcome was treated as the dependent variable. All models were adjusted for age, race, diabetes, urgency, urinary incontinence, symptomatic pelvic organ prolapse, hysterectomy, colon surgery and pelvic organ prolapse surgery.

† Odds ratio and 95% Confidence interval from proportional odds logistic regression model. P-value is from a test for trend.

‡ High IIQ was defined as having a score in the upper quartile, IIQ Score >53, odds ratio and 95% confidence interval from multivariate logistic regression models

Table 3

Unadjusted and Adjusted Quality of Life in Women with Irritable Bowel Syndrome and Women without Irritable Bowel Syndrome

QOL score	No IBS	IBS	P-value
SF-36 MCS			
Unadjusted*	44.6 (44.4, 44.8)	43.1 (42.2, 43.9)	<0.01
Adjusted†	44.6 (44.3, 44.9)	43.3 (42.5, 44.2)	<0.01
SF-36 PCS			
Unadjusted*	46.3 (46.0, 46.5)	43.7 (42.7, 44.7)	<0.01
Adjusted†	46.2 (45.9, 46.5)	44.4 (43.5, 45.2)	<0.01

IBS=Irritable Bowel Syndrome; SF-36 MCS=Short Form-36 Mental Component Scores; SF-36 PCS=Short Form-36 Physical Component Scores

* Based on univariate statistics from standard t-tests for continuous variables.

† Based on multivariate linear regression models where IBS was treated as an independent variable and the outcome was treated as the dependent variable. All models were adjusted for age, race, diabetes, urgency, urinary incontinence, symptomatic pelvic organ prolapse, hysterectomy, colon surgery and pelvic organ prolapse surgery.