Medical comorbidity and distress in patients with irritable bowel syndrome: The moderating role of age ☆

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ABSTRACT

Objectives: Irritable bowel syndrome (IBS) affects people across the age spectrum and is highly comorbid with other medical conditions. The aim of this study was to determine the moderating effect of age on the relationship between medical comorbidity and health outcomes in IBS patients.
Methods: Patients ($n = 384$) across the age spectrum (18 to 70) completed questionnaires regarding medical comorbidities, anxiety, depression, IBS symptom severity, and IBS quality of life (QOL).
Results: The mean age was 41 ($SD = 15$). Age interacted with medical comorbidities to predict anxiety, $F(7,354) = 5.82$, $p = 0.009$, $R^2 = 0.10$. Results revealed significant main effects for education, $\beta = -0.16$, $p < 0.05$, age, $\beta = -0.15$, $p < 0.05$, medical comorbidities, $\beta = 0.25$, $p < 0.05$, and a significant interaction, $\beta = -0.15$, $p < 0.01$. Anxiety was greater among patients with many comorbidities, with this effect being more pronounced for younger adults. Depression, also predicted by the interaction between age and comorbidities, showed the same pattern as anxiety. There was no significant interaction between age and medical comorbidities in predicting IBS symptom severity or IBS QOL.
Conclusion: Distress among IBS patients with medical comorbidities varies with age, with higher levels of anxiety and depression among younger adults than their older counterparts. Medical comorbidity may have a more selective impact on psychological distress as compared to IBS symptom severity and quality of life for younger adults with IBS. Distress may increase IBS burden for these patients and complicate its medical management.

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1. Introduction

Irritable bowel syndrome (IBS) is a chronic and potentially disabling disorder that afflicts approximately 25 million Americans. Individuals aged 25–54 [1] have higher rates of IBS than other age groups, causing IBS to often be regarded as a "young person's disease". However, recent studies suggest that IBS is more common among older individuals than previously believed [2,3]. The lower prevalence of IBS among older adults may be a function of low sensitivity of diagnostic criteria in this age group [4]. Another factor that may influence detection of IBS is the higher prevalence of medical comorbidities among older adults [3]. Amid a variety of medical problems, IBS may not be considered clinically meaningful or may be thought to be part of the natural course of aging.

Medical comorbidity among patients with IBS may not only present a unique diagnostic challenge for clinicians but also may pose a significant burden on patients. Although individuals with IBS and medical comorbidities tend to have worse health outcomes than those with IBS alone [5], the impact of medical comorbidity among older adults with IBS has not been specifically examined. This is an important area of research, given that the older population in the United States is growing rapidly, with those aged 65 and older projected to be 83.7 million in 2050, almost double the rates of 43.1 million seen in 2012 [6]. Adverse effects of IBS may be amplified in older adults because of the additive effect of multiple medical problems; however, little is known about how age influences the association between medical comorbidity and health outcomes in patients with IBS.

The aim of this study was to determine the influence of age on the relationship between number of medical comorbidities and clinically

relevant health outcomes in a cohort of severely affected IBS patients. We hypothesized that the relationship between number of medical co-morbidities and IBS symptom severity, anxiety, depression, and quality of life would be moderated by age, with older adults experiencing great-er IBS symptom severity, higher levels of anxiety and depression, and a lower quality of life than their younger counterparts.

2. Methods

2.1. Participants and procedures

This study is a secondary analysis of a larger National Institutes of Health clinical trial of behavioral treatments for IBS. Patients were re-cruited primarily through local media coverage and community adver-tising and referral by physicians in surrounding areas to tertiary care clinics at two academic medical centers in Buffalo, NY, and Chicago, IL. After a brief telephone interview to determine whether interested indi-viduals were likely to meet basic inclusion criteria, patients were sched-uled for a medical examination to confirm a Rome III diagnosis of IBS [7], written signed consent was obtained, and psychometric testing was conducted. Eligibility criteria are described more fully elsewhere [5]. Participants ($n = 384$) were primarily Caucasian (89.5%) and female (79.9%) and were represented across the age spectrum (range: 18 to 70 years), with a mean age of 41. Institutional review board approval (UB, May 19, 2009; NU, December 19, 2008) was obtained.

2.2. Measures

For the purposes of this study, psychometric testing used the follow-ing psychometrically validated measures.

2.2.1. Patient characteristics
Information was obtained via self-report on participants' age at the time of presentation (in years), gender, race, marital status, income (in thousands of dollars), education, IBS subtype (IBS-constipation, IBS-diarrhea, IBS-mixed, IBS-undifferentiated), duration of symptoms (years), age symptoms began (years), number of recent medical visits (past 3 months), and recent physician visit (yes and no).

2.2.2. IBS medical comorbidity
Medical comorbidity was assessed using a comorbidity checklist that covers 112 medical conditions organized around 12 body systems (musculoskeletal, digestive, kidney/genitourinary, endocrine, respirato-ry, circulatory, cardiovascular, oral, CNS, dermatological, cancer, ear, nose and throat) [8]. Respondents were asked whether a physician had ever diagnosed them with a condition and, if so, whether the condi-tion was present in the past 3 months. A total score was based on the number of medical comorbidities a patient reported.

2.2.3. Anxiety and depression
Psychological distress was assessed using the 18-item version of the Brief Symptom Inventory (BSI) [9], which has been used extensively in IBS research [10]. Respondents indicated their level of distress on a five-point scale, 0 (not at all) to 4 (extremely). In this study, we analyzed the anxiety and depression subscales. Internal consistency, test-retest reli-ability, and validity of the BSI-18 are well-established [9].

2.2.4. IBS symptom severity
The Irritable Bowel Syndrome Symptom Severity Scale [11] contains five questions measured on a 100-point scale, examining severity of ab-dominal pain, frequency of abdominal pain, severity of abdominal dis-tension, dissatisfaction with bowel habits, and interference with quality of life. The number of days out of 10 the patient experiences ab-dominal pain is asked by a final item, and the answer is multiplied by 10. All five items are summed to create a total score (range: 0–500), and scores ranging from 75–175 represent mild severity, scores ranging

from 175–300 represent moderate severity, and a score of 300 or great-er represents severe IBS symptoms [11].

2.2.5. IBS quality of life
The 34-item IBS-QOL measure [12] evaluates quality of life impair-ment due to IBS symptoms. Each item is scored on a five-point scale (1 = not at all, 5 = a great deal) that represents one of eight dimensions (dysphoria, interference with activity, body image, health worry, food avoidance, social reaction, sexual dysfunction, and relationships). An overall total score of IBS-related quality of life is transformed to a scale ranging from zero (poor quality of life) to 100 (maximum quality of life).

2.3. Statistical analyses

To determine the relationship between demographic and clinical characteristics, we examined patient characteristics, based on age, num-ber of medical comorbidities, anxiety and depression, IBS symptom se-verity and IBS quality of life.

Pearson correlations were used to examine the association between age and each of the following: number of medical comorbidities, IBS symptom severity, depression, anxiety, and IBS quality of life. To identify potential confounding variables, these variables were examined as they related to patient characteristics, using independent samples *t*-tests or analyses of variance and Pearson product moment correlations.

Moderated multiple linear regression analyses were conducted to examine whether age interacted with medical comorbidity to predict anxiety, depression, IBS symptom severity, and quality of life. The models were constructed in two steps. Step one included any significant covariates from the previous analyses. Step two included all predictors from step one with the main effects of age and the number of medical comorbidities. Step two also included all predictors from step one, with the addition of the interaction term between age and the number of medical comorbidities. If a significant interaction is found, it means that the relationship of the predictor (number of medical comorbidities) on the outcome (anxiety, depression, symptom severity, or quality of life) differs, based on the moderator (age) of the patient. The shape of any significant interactions between number of medical comorbidities and age was examined by plotting the predicted variables for the de-pendent variable at one standard deviation above and below the mean for both variables involved in the interaction [13]. A power analysis for our test of the interaction effect with our sample size ($n = 384$) and an alpha level set at 0.05 resulted in estimates of 80% power for a 2% increase in variance in the dependent measures accounted for, and a 92% power for a 3% increase in variance accounted for in our analyses.

3. Results

3.1. Characteristics of study sample

The distribution of age, number of medical comorbidities, and health outcomes (anxiety, depression, IBS symptom severity, and IBS quality of life), across demographic and clinical features is presented for all partic-ipants (Table 1). Patients reported moderate-to-severe IBS (IBS-SSS range: 106–473) with symptoms that were present for many years ($M = 16.29$ years, $SD = 14.08$ years). Medical comorbidities were prev-alent in the study population, with a range from 0 to 32 comorbidities. The most common medical comorbidity experienced was seasonal al-lergies (49%), followed by gastroesophageal reflex disease/heartburn (40%), and chronic low back pain (29%). Overall, patients experienced high levels of anxiety ($M = 4.73$, $SD = 4.68$) and depression ($M = 4.13$, $SD = 4.39$) and a low IBS-related quality of life ($M = 56.32$, $SD = 18.23$).