

Depression, Anxiety and Quality of Life in Adults and Older Adults with Irritable Bowel Syndrome (IBS): Observational Analysis of MEPS National Database

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Background: Irritable bowel syndrome (IBS) is associated with impaired health-related quality of life (HRQoL) and a high burden of comorbid mental health conditions. However, limited population-level evidence exists. Therefore, this study examined the relationship between anxiety, depression, and HRQoL among adult and elderly populations with IBS in the United States.

Methods: A cross-sectional observational analysis was conducted. Data were drawn from the 2017–2022 Medical Expenditure Panel Survey (MEPS). Adults aged ≥ 18 years with a diagnosis of IBS were included. HRQoL was assessed using the Veterans RAND 12-Item Health Survey, generating Physical Component Summary (PCS) and Mental Component Summary (MCS) scores. Adjusted multivariable linear regression models provides weighted national estimates for the associations between IBS groups (IBS only, IBS with anxiety, IBS with depression, and IBS with both) and HRQoL. Depression and anxiety were identified from MEPS using the ICD-10-CM codes. Subgroup analyses compared adults (18–64 years) and older adults (≥ 65 years).

Results: Among 595 adults with IBS, most were women (78%) and aged >65 years (39%). IBS with comorbid depression and/or anxiety was strongly associated with lower HRQoL. Participants with both depression and anxiety reported the poorest HRQoL (PCS mean = 38.84; MCS mean = 39.20). Regression analyses showed significant reductions in both PCS and MCS for individuals with comorbid psychiatric disorders compared with IBS only (all $p < 0.001$). In age-stratified analyses, depression and anxiety were primarily associated with larger declines in mental HRQoL among younger adults, whereas in older adults these comorbidities were associated with reductions in both physical and mental HRQoL, with greater overall impairment in the presence of chronic comorbid conditions. Protective factors included employment, higher income, physical activity, and good self-rated health.

Conclusion: Comorbid depression and anxiety substantially reduce both physical and mental HRQoL among individuals with IBS, with distinct age-specific patterns. Younger adults are primarily affected in mental domains, whereas older adults experience broader impairment in both physical and mental domains. These findings suggest the need for integrated clinical approaches that address both IBS and mental health to improve overall HRQoL in IBS patients.

Plain Language Summary:

- (1) People with irritable bowel syndrome (IBS) who also have depression or anxiety experience much poorer quality of life, especially those who have both conditions together.
- (2) Younger adults with IBS are affected mainly in their mental well-being, while older adults experience declines in both physical and mental health, partly due to other chronic health problems.
- (3) Regular physical activity, good overall health, higher income, and employment are linked to better quality of life, highlighting the importance of integrated care that supports both mental and physical health in IBS.

Keywords: mental health, irritable bowel syndrome, depression, quality of life

Introduction

Irritable bowel syndrome (IBS) is a common functional gastrointestinal disorder characterized by recurrent abdominal pain and altered bowel habits, affecting approximately 10–15% of adults globally.^{1,2} In the United States, IBS imposes a substantial burden on patients due to chronic symptoms, high healthcare utilization and costs, work productivity loss, and interference with daily activities.^{1,3–6} Mental health concerns, particularly anxiety and depression, are highly prevalent among individuals with IBS, with up to one-third of IBS experience these mental illnesses.^{7–10} Previous studies have demonstrated a bidirectional relationship between IBS and psychiatric disorders, mediated by dysregulation of the gut–brain axis.^{2,11} Psychological stress, anxiety, and depression can disrupt neuroendocrine and autonomic pathways, leading to altered gastrointestinal motility, immune activation, and visceral hypersensitivity.⁶ Conversely, chronic abdominal symptoms may exacerbate psychological distress through sustained pain signaling and central sensitization, with gut microbiota alterations further contributing to this interaction and its impact on HRQoL in IBS.⁸ Psychological distress can exacerbate IBS severity, complicate management, increase healthcare utilization, and contribute significantly to diminished quality of life.^{12,13}

Health-related quality of life (HRQoL) is a multidimensional construct encompassing perceived effect of illness on physical, psychological, and social life.¹⁴ In IBS, HRQoL can be assessed using disease-specific instruments that capture symptom-related burden or generic measures that evaluate broader physical and mental health domains. While IBS-specific tools provide condition-focused detail, generic instruments such as the Veterans RAND 12-Item Health Survey (VR-12) are well suited for population-level analyses, allowing standardized comparisons across conditions in large national datasets such as MEPS. In IBS, quality of life is frequently impaired due to symptom burden, dietary restrictions, and social limitations.^{15–18} IBS with a lower quality of life experienced markedly greater healthcare utilization and cost, along with increased difficulties in work performance and daily activities.¹⁹ Moreover, age may influence HRQoL trajectories: younger adults may experience work and social disruptions, whereas older adults may face compounded challenges from comorbidities and functional decline. Capturing these differences at a national level provides valuable insights into the healthcare needs and resource allocation for distinct age populations. Despite this, there is limited population-level research comparing the relationship between mental health and HRQoL between adult and elderly patients with IBS, leaving a gap in knowledge regarding age-specific differences. This study extends prior research by leveraging nationally representative data from MEPS (2017–2022) to examine how depression and anxiety influence health-related quality of life in IBS, with a focus on age-specific differences between adults and older adults. By integrating sociodemographic, behavioral, and clinical determinants, this work provides new population-level evidence on how mental health comorbidities uniquely shape HRQoL across life stages.

This study extends existing IBS–HRQoL research by using nationally representative MEPS data to examine the independent and combined associations of depression and anxiety with physical and mental HRQoL among adults with IBS. In addition, age-stratified analyses with comprehensive adjustment for sociodemographic, behavioral, and clinical factors allow identification of life-stage-specific patterns that are not captured in prior population-level studies. Age may meaningfully modify the relationship between psychiatric comorbidities and HRQoL in IBS due to differences in life stage, social roles, and clinical complexity. Younger adults are more likely to experience impairments in mental and social functioning, including work productivity, psychological distress, and role limitations, whereas older adults often face greater multimorbidity, functional decline, and physical health limitations that can exacerbate both physical and mental HRQoL impairments. Stratifying analyses by age enables identification of these life-course-specific patterns and yields clinically relevant insights that may be obscured in pooled analyses. Collectively, these findings enhance understanding of the age-dependent impact of mental health on HRQoL among individuals with IBS.

Methods

Study Design and Data

This study adopted a retrospective cross sectional approach, drawing on data from the 2017–2022 of the Medical Expenditure Panel Survey (MEPS). MEPS is a nationally representative survey of the US noninstitutionalized civilian population, administered by the Agency for Healthcare Research and Quality (AHRQ). The survey employs an

overlapping panel design in which households are followed for two consecutive calendar years using a stratified, multistage probability sampling framework. MEPS collects comprehensive information on sociodemographic profiles, chronic medical conditions, expenditures, insurance coverage, and access to care. Health conditions are identified based on respondents' self-reports during the interview process, which subsequently reviewed and coded by professional coders into standardized International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes.

Study Population

For inclusion in the study, individuals had to be ≥ 18 years of age, have a confirmed diagnosis of irritable bowel syndrome, be alive during the study period, and have complete data on health-related quality of life (HRQoL). Cases of IBS were identified within the MEPS dataset using the ICD-10-CM diagnosis code "K58".

Measures

Outcome: Health-Related Quality of Life (HRQoL)

To assess health-related quality of life (HRQoL), adult respondents in MEPS completed the Veterans RAND 12-Item Health Survey (VR-12[®]), a well-validated and widely used patient-reported outcome instrument.^{20,21} The VR-12 consists of 12 items that capture eight health domains: general health, physical functioning, role limitations due to physical problems, bodily pain, vitality, role limitations due to emotional problems, mental health, and social functioning. These domains are summarized into two composite scores: the Physical Component Summary (PCS), derived from general health, physical functioning, role physical, and bodily pain items, and the Mental Component Summary (MCS), derived from vitality, role emotional, mental health, and social functioning items.²²

Independent Variables

The primary independent variable in this study was irritable bowel syndrome (IBS) group classification, defined as mutually exclusive categories: IBS only, IBS with anxiety, IBS with depression, and IBS with both anxiety and depression. Depression and anxiety were identified from the MEPS using the ICD-10-CM codes for depression (icd10cdx: "F34", "F39", "F32") and anxiety (icd10cdx: "F40", "F41"). IBS, depression, and anxiety were identified based on at least one reported diagnosis during the MEPS survey period using ICD-10-CM codes, and health-related quality of life (HRQoL) was assessed using the VR-12 within the same survey year.

Additional covariates were chosen based on established evidence of their association with health-related quality of life (HRQoL) in adults with IBS. These included key sociodemographic characteristics (age, sex, education, income, employment, marital status, and geographic region), which are widely recognized social determinants of health influencing both physical and mental HRQoL.^{5–11} Income was defined using family income in relation to the federal poverty line (FPL) and classified as poor (<100% FPL), near poor (100% to <200% FPL), middle income (200% to <400% FPL), and high income ($\geq 400\%$ FPL). Health behaviors, specifically physical activity, were incorporated given the strong link between regular exercise and improved gastrointestinal functioning, mental health, and overall well-being in IBS populations. Self-rated health status was included, as it represents a robust predictor of HRQoL. In addition, common chronic comorbidities (eg, hypertension, diabetes, asthma, chronic obstructive pulmonary disease (COPD), gastroesophageal reflux disease (GERD)) were assessed, as these conditions are frequently present in individuals with IBS and contribute to increased symptom burden and diminished quality of life. Finally, Prescription drug insurance coverage was considered a proxy for access to healthcare resources, which can directly shape HRQoL outcomes.

Statistical Analyses

Descriptive statistics were used to summarize the baseline characteristics of the study sample, including means, standard deviations, frequencies, and percentages. Differences in participant characteristics across the IBS groups (IBS only, IBS with anxiety, IBS with depression, and IBS with both anxiety and depression) were examined using chi-square tests. Variations in HRQoL scores between IBS groups were evaluated with analysis of variance (ANOVA), followed by Tukey's post hoc test to identify pairwise group differences. To examine the association between IBS group classification and HRQoL, we employed multivariable linear regression models, adjusting for all selected covariates. Assumptions of

linear regression were evaluated prior to model estimation. Normality of residuals was assessed using visual inspection of residual histograms and normal probability (Q–Q) plots. Homoscedasticity was examined by plotting residuals against fitted values. Multicollinearity among covariates was evaluated using variance inflation factors (VIFs), with all VIF values below commonly accepted thresholds, indicating no evidence of problematic collinearity or violations of model assumptions. Subgroup analysis by age group was conducted to compare the factors associated with HRQoL between adults (28–64 years old) and older adults (>65 years). To account for the complex survey design of MEPS, variance adjustment weights (strata and primary sampling unit) were applied in combination with person-level weights. All analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA).

Results

Characteristics of the Study Sample

Among 595 adults with irritable bowel syndrome (IBS), the majority were female (78%) and White (83.2%), with most participants aged >65 years (39%) (Table 1). Factors related to IBS groups differences were gender, marital status, geographic region, socioeconomic status, and several comorbid conditions (Table 1). Women were more likely than

Table 1 Characteristics of the Total Irritable Bowel Syndrome (IBS) Sample (n=595), Characteristic of Study Participants Across IBS Groups

	Total Sample		IBS Only		IBS & Dep		IBS & Anxiety		IBS & Dep & Anxiety		p-value
	N	Wt.%	N	Wt.%	N	Wt.%	N	Wt.%	N	Wt.%	
All	595	100.0	313	54.2	68	11.0	99	17.1	115	17.7	
Age in years											
18-39	114	23.6	55	40.3	6	9.5	28	27.7	25	22.6	0.062
40-49	71	11.4	28	46.7	10	13.2	14	18.4	19	21.7	
50-64	160	25.2	88	56.3	25	14.8	24	14.6	23	14.2	
≥65	250	39.8	142	63.3	27	8.8	33	12.0	48	15.9	
Gender											
Women	464	78.0	228	49.9	56	12.0	82	18.6	98	19.5	0.012
Men	131	22.0	85	69.4	12	7.4	17	11.6	17	11.6	
Race/ethnicity											
White	471	83.2	246	54.2	49	10.2	81	17.3	95	18.4	0.551
African American	51	5.8	28	58.2	11	16.3	5	12.5	7	13.0	
Latino	41	4.4	24	66.7	3	3.8	5	14.4	9	15.1	
Others	32	6.5	15	42.6	5	21.5	8	20.6	4	15.4	
Marital status											
Married	285	50.5	170	59.9	30	11.3	49	17.5	36	11.4	0.031
Wid/Sep/Div	191	30.7	89	51.4	28	13.0	29	13.0	45	22.7	
Never married	119	18.8	54	43.4	10	7.0	21	22.8	34	26.8	
Region											
Northeast	119	19.2	56	50.7	6	3.2	16	13.9	41	32.2	0.011
Mid-west	174	28.2	96	51.7	23	13.7	29	17.3	26	17.3	
South	193	34.4	106	58.2	26	14.4	33	17.2	28	10.2	
West	109	18.2	55	54.1	13	8.5	21	20.0	20	17.4	
Employment											
Employed	240	43.3	136	55.3	23	9.7	45	19.3	36	15.7	0.601
Not employed	355	56.7	177	53.4	45	11.9	54	15.4	79	19.2	
Poverty status											
Poor	79	10.3	30	42.0	15	19.9	13	12.8	21	25.3	0.028
Near Poor	108	16.7	47	47.8	19	14.1	16	19.4	26	18.7	

(Continued)

Table 1 (Continued).

	Total Sample		IBS Only		IBS & Dep		IBS & Anxiety		IBS & Dep & Anxiety		p-value
	N	Wt. %	N	Wt. %	N	Wt. %	N	Wt. %	N	Wt. %	
Middle Income	174	27.6	94	55.4	10	5.1	29	17.9	41	21.6	0.095
High Income	234	45.3	142	58.6	24	11.4	41	16.8	27	13.3	
Rx Insurance											
Rx insurance	289	54.9	167	57.5	28	10.3	53	18.5	41	13.7	
No Rx insurance	306	45.1	146	50.2	40	11.8	46	15.4	74	22.6	0.000
General health											
Excellent/very good	187	33.2	118	63.1	14	5.1	39	23.0	16	8.8	
Good	215	35.1	129	61.6	19	8.3	28	12.2	39	17.9	
Fair/poor	193	31.7	66	36.7	35	20.1	32	16.4	60	26.9	0.122
Physical activity											
3/week	229	38.3	134	59.9	27	11.0	37	17.1	31	12.0	
No exercise	366	61.7	179	50.7	41	11.0	62	17.1	84	21.3	
Heart											0.347
Yes	97	14.7	54	60.3	14	12.5	11	9.6	18	17.7	
No	498	85.3	259	53.2	54	10.7	88	18.4	97	17.7	
Hypertension											
Yes	246	36.8	129	59.3	32	10.7	37	14.1	48	15.9	0.406
No	349	63.2	184	51.2	36	11.1	62	18.8	67	18.8	
Diabetes											
Yes	82	11.9	30	38.2	20	25.9	7	7.4	25	28.5	
No	513	88.1	283	56.4	48	9.0	92	18.4	90	16.3	0.000
Hyperlipidemia											
Yes	218	35.4	107	56.6	29	11.4	29	10.5	53	21.5	
No	377	64.6	206	52.9	39	10.8	70	20.7	62	15.6	
Asthma											0.005
Yes	118	17.5	43	37.1	16	14.6	20	17.0	39	31.3	
No	477	82.5	270	57.8	52	10.2	79	17.1	76	14.8	
COPD											
Yes	72	11.4	21	31.5	6	8.3	19	26.2	26	33.9	0.000
No	523	88.6	292	57.1	62	11.3	80	15.9	89	15.7	
Osteoarthritis											
Yes	165	25.0	64	41.1	18	9.1	35	22.8	48	27.1	
No	430	75.0	249	58.6	50	11.6	64	15.2	67	14.6	0.002
GERD											
Yes	188	31.1	82	49.3	21	9.3	31	16.0	54	25.4	
No	407	68.9	231	56.4	47	11.7	68	17.6	61	14.3	
Cancer											0.878
Yes	68	10.1	39	61.9	6	8.6	8	14.1	15	15.4	
No	527	89.9	274	53.3	62	11.2	91	17.4	100	18.0	

Notes: Asterisks (*) represent significant differences in IBS groups from chi-square tests.

Abbreviations: Dep, Depression; COPD, Chronic obstructive pulmonary disease; GERD, Gastroesophageal reflux disease; Wt, weighted; Rx, Medication; Wid./Div./Sep., widowed, divorced, and separated.

men to report comorbid depression and/or anxiety ($p=0.012$). Never-married individuals more often represented in the IBS with depression and anxiety group ($p=0.031$) as compared to married adults. Regional variation was also noted, with participants in the Northeast disproportionately represented in the IBS with both depression and anxiety group ($p=0.011$).

Socioeconomic indicators revealed that individuals classified as poor were more likely to report IBS with comorbid depression and/or anxiety compared to higher-income groups ($p=0.028$).

Several comorbidities significantly differed across IBS groups. Diabetes ($p<0.001$), asthma ($p=0.005$), COPD ($p<0.001$), osteoarthritis ($p=0.002$), and GERD ($p=0.048$) were more prevalent among participants with IBS and comorbid mental health conditions, particularly those with both depression and anxiety.

Health-Related Quality of Life Across IBS Groups

Health-related quality of life (HRQoL) differed significantly across IBS groups ($p<0.0001$) (Table 2). For the Physical Component Summary (PCS), adults with IBS only had the highest mean score (51.06), indicating better physical HRQoL, while those with both depression and anxiety had the lowest mean PCS (38.84).

For the Mental Component Summary (MCS), individuals with IBS only (43.64) and IBS with anxiety (45.19) had higher mental HRQoL, whereas those with IBS and depression (39.19) or both depression and anxiety (39.20) exhibited significantly lower MCS scores.

Factors Related to HRQoL Among IBS from Adjusted Linear Regression Analysis

Table 3 presents findings from the multivariable linear regression analyses on factors related to HRQoL among adults with IBS, adjusting for sociodemographic, health behavior, and comorbidity variables. For the physical domain, adults with both depression and anxiety had significantly lower PCS ($\beta = -0.258$, $p<0.001$) compared with IBS only. Factors

Table 2 Weighted Means and Standard Errors Health-Related Quality of Life Scores by Irritable Bowel Syndrome (IBS) Groups Among Adults with IBS

	Total Sample		IBS Only		IBS & Depression		IBS & Anxiety		IBS & Depression & Anxiety		
HRQoL	Mean	SD	Mean	SE	Mean	SE	Mean	SE	Mean	SE	p-value
PCS	41.66	12.2	51.06	0.57	40.81	2.05	46.44	0.96	38.84	0.97	<0.0001
MCS	46.50	11.2	43.64	0.77	39.19	1.54	45.19	1.22	39.20	1.74	<0.0001

Notes: P value represent mean differences by IBS groups using Anova.

Abbreviations: HRQoL, Health-related Quality of Life; SE, Standard Error; SD, Standard Deviation; Sig, Significance.

Table 3 Intercept and Parameter Estimates from Adjusted Multivariate Linear Regressions on Health-Related Quality of Life Among Adults with Irritable Bowel Syndrome (IBS)

	Health-Related Quality of Life					
	PCS			MCS		
	Regression Coefficients	SE	P- value	Regression Coefficients	SE	P- value
Irritable Bowel Syndrome Group						
IBS & depression	0.182	0.021	0.002	-6.470	0.061	0.011
IBS & anxiety	0.267	0.032	0.010	-3.711	0.032	0.033
IBS & depression and anxiety	-0.258	0.031	0.036	-9.123	0.071	0.014
IBS only (Ref.)						
Age in years						
22-39	5.419	0.041	0.010	-2.437	0.051	0.031
40-49	-0.120	0.012	0.041	-3.179	0.052	0.023
50-64	0.214	0.041	0.021	-1.030	0.011	0.034
≥65 (Ref.)						
Gender						
Men	-0.009	0.012	0.023	-0.793	0.017	0.041
Women (Ref.)						

(Continued)

Table 3 (Continued).

	Health-Related Quality of Life					
	PCS			MCS		
	Regression Coefficients	SE	P- value	Regression Coefficients	SE	P- value
Race/ethnicity						
African American	−1.847	0.041	0.001	−0.316	0.021	0.032
Latino	0.481	0.012	0.003	1.281	0.032	0.025
Others	−1.624	0.001	0.023	−0.594	0.061	0.002
White (Ref.)						
Marital status						
Married	4.242	0.051	0.006	−0.617	0.011	0.013
Never married	2.458	0.042	0.021	−2.094	0.062	0.026
Wid/Sep/Div (Ref.)						
Region						
Northeast	−0.753	0.051	0.011	−0.818	0.061	0.009
Mid-west	−0.508	0.062	0.031	−1.329	0.022	0.045
South	−0.597	0.011	0.022	−0.348	0.071	0.023
West (Ref.)						
Employment						
Employed	4.984	0.098	<0.001	1.415	0.053	<0.001
Not employed (Ref.)						
Poverty status						
Poor	−0.209	0.061	0.050	−4.640	0.031	0.012
Near Poor	−1.791	0.072	0.042	−1.706	0.032	0.041
Middle Income	−0.679	0.091	0.001	−1.566	0.021	0.031
High Income (Ref.)						
General health						
Ex/very good	11.996	0.032	0.001	8.538	0.021	0.002
Good	7.197	0.015	<0.001	5.222	0.011	<0.001
Fair/poor (Ref.)						
Physical activity						
3 times per week	2.920	0.087	<0.001	−1.270	0.056	<0.001
No exercise (Ref.)						
Heart						
Yes	−2.133	0.010	<0.001	−2.398	0.031	<0.001
Hypertension						
Yes	−2.369	0.040	<0.001	1.823	0.026	<0.001
Diabetes						
Yes	−0.990	0.074	<0.001	−1.756	0.013	<0.001
Asthma						
Yes	−1.195	0.017	<0.001	0.092	0.027	<0.001
COPD						
Yes	−0.070	0.060	<0.001	−0.876	0.012	<0.001
GERD						
Yes	−1.804	0.031	<0.001	−2.474	0.047	<0.001
Cancer						
Yes	−2.246	0.010	0.003	−2.400	0.089	0.005

Notes: Asterisks denote statistical significance from multivariable linear regression on health-related quality of life.

Abbreviations: COPD, Chronic obstructive pulmonary disease; GERD, Gastroesophageal reflux disease; Rx, Medication; Ref, reference group; SE, Standard Error; Sig, Significance; Wid./Div./Sep., widowed, divorced, and separated.

positively associations with PCS were being in age group (22–39 years), married or never-married participants, those employed, physically active, and those reporting excellent or very good general health. Conversely, comorbid conditions such as heart disease, hypertension, diabetes, asthma, COPD, GERD, and cancer were negatively associated with PCS.

For the mental domain, comorbid depression with or without anxiety, was strongly associated with reduced mental HRQoL (IBS & depression: $\beta = -6.470$; IBS & anxiety: $\beta = -3.711$; IBS & depression and anxiety: $\beta = -9.123$; all $p < 0.001$). Factors negatively associations with mental HRQoL included being in age group (22–39 years), men, married, low income, and some comorbidities, including heart disease, diabetes, and COPD. Factors positively associations with mental HRQoL were included being Latino participants, employed, physically active, reporting excellent or very good general health.

Subgroup Analyses for the Factors Related to HRQoL

In adults aged 18–64, IBS combined with depression and/or anxiety was strongly associated with poorer MCS, with only modest effects on PCS (Table 4). Socioeconomic factors particularly lower income and comorbidities negatively associated with HRQoL, especially with mental health. Younger adults benefitted substantially from protective factors

Table 4 Subgroup Analysis by Age Group on Health-Related Quality of Life P from Adjusted Multivariable Linear Regressions

	Age 18–64				Age ≥65			
	Health-Related Quality of Life							
	PCS		MCS		PCS		MCS	
	β	P- value	β	P- value	β	P- value	β	P- value
Irritable Bowel Syndrome Group								
IBS & depression	−0.007	0.003	−6.810	0.001	1.241	0.001	−4.867	0.036
IBS & anxiety	2.870	0.002	−3.444	0.009	−4.223	0.021	−4.714	0.038
IBS & depression and anxiety	0.983	0.021	−9.847	0.012	−2.054	0.032	−8.741	0.001
IBS only (Ref.)								
Gender								
Men	0.554	0.002	−2.261	0.021	0.617	0.036	1.088	0.005
Women (Ref.)								
Race/ethnicity								
African American	1.068	0.007	−1.953	0.021	−8.349	0.003	3.438	0.043
Latino	−0.459	0.009	0.775	0.012	5.328	0.046	6.976	0.002
Others	−0.244	0.031	−1.125	0.021	−2.950	0.005	1.874	0.001
White (Ref.)								
Marital status								
Married	2.752	0.016	−1.021	0.031	4.982	0.004	−0.248	0.041
Never married	2.624	0.002	−3.447	0.021	3.086	0.003	3.342	0.042
Wid/Sep/Div (Ref.)								
Region								
Northeast	−2.150	0.023	−2.535	0.005	1.098	0.008	−0.680	0.013
Mid-west	−3.401	0.032	−1.049	0.012	2.436	0.032	−0.398	0.034
South	−1.787	0.001	0.156	0.027	2.060	0.029	−1.249	0.022
West (Ref.)								
Employment								
Employed	5.534	<0.001	0.399	<0.001	6.143	<0.001	2.015	<0.001
Not employed (Ref.)								

(Continued)

Table 4 (Continued).

	Age 18–64				Age ≥65			
	Health-Related Quality of Life							
	PCS		MCS		PCS		MCS	
	β	P- value	β	P- value	β	P- value	β	P- value
Poverty status								
Poor	−1.504	0.008	−4.385	0.023	2.019	0.009	−6.431	0.003
Near Poor	0.310	0.037	−2.678	0.007	−5.970	0.032	−0.888	0.036
Middle Income	−1.512	0.001	−1.871	0.009	0.627	0.031	−1.676	0.011
High Income (Ref.)								
General health								
Ex/very good	11.589	<0.001	9.427	<0.001	10.781	<0.001	7.345	<0.001
Good	9.023	<0.001	6.097	<0.001	4.490	<0.001	4.387	<0.001
Fair/poor (Ref.)								
Physical activity								
3/week	1.757	<0.001	−1.311	<0.001	5.149	<0.001	−0.366	<0.001
No exercise (Ref.)								
Heart								
Yes	−3.957	0.002	−1.859	<0.001	−1.099	<0.001	−1.998	<0.001
Hypertension								
Yes	−3.332	0.001	2.574	<0.001	−2.783	<0.001	0.420	<0.001
Diabetes								
Yes	−1.781	0.021	−2.634	<0.001	−2.600	<0.001	−0.994	<0.001
Asthma								
Yes	−0.746	0.032	−1.558	<0.001	−0.945	<0.001	2.657	<0.001
COPD								
Yes	−0.897	0.001	−0.797	<0.001	1.819	<0.001	−1.062	<0.001
GERD								
Yes	−2.801	<0.001	3.818	<0.001	−0.735	<0.001	−0.828	<0.001
Cancer								
Yes	−1.799	<0.001	0.905	<0.001	−2.172	<0.001	−2.645	<0.001

Notes: Asterisks denote statistical significance from multivariable linear regression on health-related quality of life.

Abbreviations: COPD, Chronic obstructive pulmonary disease; GERD, Gastroesophageal reflux disease; Rx, Medication; Ref, reference group; SE, Standard Error; Sig, Significance; Wid./Div./Sep., widowed, divorced, and separated.

such as employment, good/excellent self-rated health, and regular physical activity, all of which positively related to PCS and, in some cases, MCS.

In elderly aged over 64, IBS with depression and/or anxiety negatively impacted both PCS and MCS, with mental health remaining most affected. Similar to younger adults, physical comorbidities (heart disease, hypertension, diabetes, COPD, and cancer) played a more central role in reducing PCS. Employment and good/excellent self-rated health, and regular physical activity were positively related to PCS and, in some cases, MCS.

Discussion

This study advances existing IBS–HRQoL research by leveraging nationally representative data from the Medical Expenditure Panel Survey (MEPS) to examine the independent and combined associations of depression and anxiety with both physical and mental health-related quality of life across adulthood. Unlike prior studies that relied primarily on clinical or regional samples, this analysis enables population-level inference and incorporates age-stratified models, revealing life-stage-specific patterns that may be obscured in pooled analyses.

Our findings confirm that IBS is highly prevalent among women and older adults, consistent with prior literature reporting gender and age related disparities in symptom presentation and healthcare-seeking behaviors.²³ Importantly, depression and anxiety emerged as the strongest determinants of diminished HRQoL, with individuals experiencing both conditions reporting the most severe impairments. Psychiatric comorbidities may amplify visceral hypersensitivity and alter gut microbiota, thereby perpetuating the cycle of symptom severity and impaired HRQoL. Importantly, the interaction between mental health and IBS is not only additive but synergistic, as demonstrated by patients with both depression and anxiety reporting the lowest HRQoL scores. The strong association between psychiatric comorbidity and reduced HRQoL underscores psychological burden in IBS patients.

Our findings align with prior studies indicating that psychological distress substantially contributes to reduced HRQoL in IBS.¹⁹ For example, Goodoory et al (2023) among 752 individuals with IBS similarly reported that anxiety and depression were the most significant related to poor HRQoL in generic and disease specific HRQoL scales.¹⁹ Staudacher et al (2023) reported that individuals with IBS who have comorbid depression or multiple psychological disorders experience greater symptom severity, higher healthcare utilization, and poorer daily functioning.¹⁰ The review concludes that reduced quality of life in IBS is largely driven by psychological comorbidities rather than gastrointestinal symptoms, highlighting the importance of integrated mental and physical health care.

Furthermore, age-related differences revealed in our analysis deserve particular attention. Younger adults primarily reported impairments in mental domains, likely driven by employment challenges, social stressors, and lower access to psychological care. In contrast, older adults experienced declines in both PCS and MCS, reflecting the combined impact of chronic comorbidities, functional decline, and cumulative illness burden. Our results support age-specific vulnerability models, where younger adults may experience greater psychological reactivity to IBS symptoms, while older adults face physiological frailty and multimorbidity that jointly impair both physical and mental HRQoL. Beyond psychological and biological mechanisms, our findings highlight the central role of social determinants of health in shaping HRQoL among individuals with IBS. Socioeconomic disadvantage, particularly low income and unemployment, was consistently associated with poorer physical and mental HRQoL. These factors likely influence quality of life through pathways such as reduced access to healthcare, delayed treatment, increased psychosocial stress, and limited resources for symptom management.^{24,25} Besides, physical activity, and higher self-rated health indicate that modifiable lifestyle and social determinants may buffer against poor outcomes. Taken together, these patterns emphasize the need for tailored interventions psychological and behavioral programs for younger adults, and integrated chronic disease and mental health management for older adults.

Clinical Practice and Policy Implications

The results have several implications. These findings suggest that integrated approaches addressing both gastrointestinal symptoms and mental health may be beneficial for individuals with IBS, particularly when tailored to age-specific needs. Addressing socioeconomic barriers to care, including access to mental health services, may also be an important consideration for improving HRQoL. The observed age-related differences have important clinical implications. Younger adults with IBS appear to experience disproportionate impairments in mental health-related quality of life, underscoring the importance of early screening for depression and anxiety and timely psychological interventions aimed at preserving work productivity and social functioning. In contrast, older adults exhibit broader impairments across both physical and mental domains, suggesting a need for integrated care strategies that address psychiatric comorbidities alongside multimorbidity and functional decline. An important policy perspective is the role of health equity. Our results show that low-income groups are disproportionately affected, underscoring the need to address structural barriers to care. Expanding insurance coverage for mental health services and integrating psychological support within routine IBS care may reduce disparities.

Study Strengths and Limitations

This study draws on a large, nationally representative dataset with validated HRQoL measures, enhancing generalizability. The ability to stratify analyses by age provides unique insights into differential patterns of burden. Unlike earlier studies limited to clinical or regional samples, this analysis offers population-level evidence on age-related

heterogeneity in the mental and physical health burden of IBS, highlighting differential impacts that can guide age-tailored interventions.

Nevertheless, certain limitations should be acknowledged. The study relies on self-reported diagnoses, which may introduce recall bias or misclassification of IBS subtypes. Several sources of unmeasured confounding should be acknowledged. The MEPS dataset does not capture IBS symptom severity, subtype, treatment status, medication use, or key psychosocial stressors such as social support and coping strategies. These factors may independently influence HRQoL and could partially explain observed associations despite adjustment for a broad range of socio-demographic, behavioral, and clinical covariates. Besides, this study focused on depression and anxiety, the most prevalent and clinically significant psychiatric comorbidities in IBS. Other mental health conditions, such as stress-related, somatoform, or substance use disorders, were not captured in the dataset, which may limit the inclusiveness of mental health assessment. Interpretation of these findings should consider the use of the VR-12, a generic HRQoL instrument that is well suited for population-level analyses but does not capture IBS-specific symptom severity. As a result, the extent to which reduced HRQoL reflects psychiatric burden versus gastrointestinal symptom severity cannot be fully disentangled. However, disease-specific instruments like IBS-QoL or IBS-SSS were not available in MEPS. Future mixed-methods studies incorporating both generic and disease-specific HRQoL tools, alongside comprehensive psychiatric profiling, are needed to clarify causal mechanisms and inform integrated care strategies. Subgroup analyses were conducted with recognition that smaller age-stratified sample sizes may limit statistical power to detect modest associations; therefore, results from these analyses should be interpreted cautiously.

Conclusions

This study identifies strong associations between depression, anxiety, and reduced physical and mental health-related quality of life among adults with IBS, with distinct age-specific patterns. Younger adults exhibit greater impairment in mental HRQoL, whereas older adults experience broader reductions across both physical and mental domains, likely reflecting multimorbidity and cumulative health burden. These findings highlight subgroups of individuals with IBS who may be at higher risk for impaired quality of life but do not establish causal relationships. Longitudinal and interventional studies are needed to determine whether targeted management of psychiatric comorbidities leads to meaningful improvements in HRQoL.

Institutional Review Board Statement

As this study used publicly available, de-identified MEPS data, ethical approval was not required in accordance with national guidelines and the King Saud University Institutional Review Board (exemption No. E-18-3807).

Data Sharing Statement

The data files used in this study are accessible from the MEPS at this URL: https://meps.ahrq.gov/mepsweb/data_stats/download_data_files.jsp.

Informed Consent Statement

Medical Expenditure Panel Survey (MEPS) database is publicly available; therefore, patient consent was waived for this research.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The author affirms that there are no conflicts of interest related to the publication of this paper.

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