Original Article

Anxiety and depression in proctitis in patients with extensive colitis

Hina Sultan, Ghulam Ishaq, Maryam Gul, Komal Razzaq, Rubia Azam

Department of Applied Psychology, Lahore College for Women University
Lahore Leads University, Lahore, Pakistan

Objective: To compare anxiety and depression between proctitis to extensive colitis patients and healthy controls across gender.

Methodology: Five (5) (Ulcerative Colitis) X 2 (Gender) multifactorial cross-sectional designswere adopted. Data were collected form Gastroenterology Department of Mayo Hospital during January to June 2021. Out of 600 participants, we purposively sampled 300 patients suffering from different stages of Ulcerative Colitis including 36 (12%) proctitis, 40 (13.3%) proctosigmoiditis, 124 (41.3%) left sided and 100 (33.3%) extensive colitis patients. A healthy control group of 300 individuals living in community were purposively selected for comparison. Demographic information form along Beck Anxiety Inventory, Beck Depression Inventory were used to collect data which was analysed through SPSS 23.

Results: MANOVA examined gender and Ulcerative Colitis for anxiety and depression as dependent variables and found Ulcerative Colitis (Wilks' Lambda = .01, F (8) = 375.61, p = .001) and gender (Wilks' Lambda = .70, F (2) = 31.45, p = .001) were significant, however the interaction was not. ANOVA for Ulcerative Colitis revealed significant effects for anxiety, F (4,590) = 460.36, p = .001, η2 =. 92 and depression F (4,590) = 3823.89, p = .001, η2 = .99. Anxiety and depression were significantly higher in extensive colitis patients followed by distal, proctosigmoiditis, proctitis and controls. Women had more anxiety and depression than men.However, the averages reached to severe anxiety and depression in stage 4 male and female patients.

Conclusion: Medical professionals should assess anxiety and depression as integral parts of Ulcerative Colitis assay and refer distal and extensive colitis patients to mental health clinicians to cope better with their physical and psychological issues associated with the ailment.

Keywords: Proctitis, proctosigmoiditis, distal colitis, extensive colitis, anxiety, depression.

INTRODUCTION

Ulcerative Colitis (UC) is inflammation of the inner lining of colon and rectum, divided into four stages that categorize the severity of UC. Proctitis (Stage 1) is inflammation and swelling of the rectum, proctosigmoiditis (Stage 2) is inflammation of a short span of left colon starting at rectum, distal colitis (Stage 3) inflammation continues up the left side of colon, and extensive colitis (Stage 4) where most of the colon is inflamed. Symptoms include diarrhea containing pus/blood, abdominal cramps, fatigue and weight loss.[1]

In 2017, a systematic review of 200 population-based studies reported that Europe had the highest prevalence of UC (Norway 500, Germany, 322 and North America 286 cases per 100,000 individuals).[2] Since 1990, this prevalence has increased in developed and developing countries including Pakistan, India, and other African countries largely due to genes, changes in lifestyles, increased drugs consumption, and other enteric infections.[3] No prevalence rates are available for Pakistan, however a few studies report severity of symptoms, for example in Lahore (2018) 56% of UC patients reported bloody stools, and 40% abdominal cramps.[4] Another study reported, 88% of UC patients suffered from bloody diarrhea.[5]

The gastrointestinal tract serves as a dynamic and local ecosystem for gut micro biota where enteric and vagal nerves send afferent signals from the intestinal lumen regulating physiological and psychological functions that include sleep, aggression, and stress.When large intestinal tract is inflamed these functions affect mood and behavior causing increased depression.[6] In psychiatric literature it is well understood chronic medical illnesses like asthma, diabetes, and migraine usually express moderate to severe depression.[7,8]

While looking at gender differences, women suffer from depression twice as much as men by UC, however, in 2018, a cohort analysis of 16 regions of European countries revealed that incidence of UC in men and women was equal.[9] In Pakistan, researchers also found this ratio equal in a majority (69%) of male and female patients suffering from moderate to severe colitis.[10]

The current study holds significance that UC patients experience a lot of difficulties including lack of bowel

control, indigestion, diarrhea which exerts higher psychological sufferings. Thus, the current study aimed to compare the anxiety and depression between proctitis to extensive colitis patients and healthy controls across gender.

METHODOLOGY

This 5 (UC) X 2 (Gender) multifactorial cross-sectional study was approved by the Institutional Review Board, (Reference # 403). It was conducted at Gastroenterology Department, Mayo Hospital during January to June 2021. Written consent was taken from Medical Superintendent at the hospital and a group of healthy controls was taken from local community in Lahore.

Sample size was determined by G power analysis, with α error (.01), estimated 500 – 600 participants.[11] We purposively selected 315 UC patients and 310 controls; 15 patients and 10 healthy individuals left the study leaving 300 UC patients (men = 150, women = 150) and 300 healthy controls (men = 150, women = 150) with an average age = 39.80, SD = 9.70 years.

Severity of UC was determined by gastroenterologist through colonoscopies, scans, and blood tests. There were 36 (12%) proctitis, 40 (13.3%) proctosigmoiditis, 124 (41.3%) left sided and 100 (33.3%) extensive colitis patients. We excluded patients with co-morbidities like diabetes, heart, liver and renal malfunctioning to make sure that anxiety and depression was related only to UC. In healthy control group, a screening question was developed like "Have you faced any psychological or physical problems (for example, diabetes, cancer, gastro, arthritis, depression/mania etc. needed medical assistance) in last six months?" Those, replied in "no" were included only.

Patients and healthy individuals were requested to complete demographic information form, Beck Anxiety Inventory (BAI), consisting of 21 items with score format ranged from 0 (not at all) to 3 (it bothered me a lot). The cut off scores for severe anxiety were 36 or above.[12] In the current study, Urdu version had significant alpha for patients (α = .91) and healthy controls (α = .87). Beck Depression Inventory (BDI), comprised of 21 items, was also filled out. Response format ranged from 0 – 3, measuring normal (1 – 10) to mild (11 – 16), borderline (17 – 20), moderate (21 – 30) and severe (31 – 63) levels of depression.[13] Urdu version of scale had high reliabilities in clinical patients (α = .86) and healthy controls (α = .81). After collecting data, researchers thanked the participants for their co-operation.

Statistical Analysis: The collected data were used to extract descriptive, multivariate and univariate analyses through SPSS 23.

RESULTS

MANOVA revealed significant main effects for UC (Wilks' Lambda = .01, F (8) = 375.16, p = .001) and gender (Wilks' Lambda = .70, F (2) = 31.45, p = .001) but not their interaction. Further, ANOVA revealed a significant main effect F (4,590) = 460.36, p = .001, η^2 = .92; F (4,590) = 3823.89, p = .001,η^2 = .99, of UC for anxiety and depression respectively. Separate ANOVA for gender revealed a significant effect F (1,590) = 16.83, p = .001, η^2 =. 10; F (1,590) = 45.42, p = .001, η^2 =. 23 for anxiety and depression respectively (Table 1).

Table 1: MANOVA for Gender and UC.

Source		**F**	**p**	**η^2**
Ulcerative Condition	Wilk's Lambda (A)	375.16	.001	.91
Gender	Wilk's Lambda (A)	31.45	.001	.30
Ulcerative Condition X Gender	Wilk's Lambda (A)	1.18	.31	.03
Tests of Between – Subjects Effects				
Source		**F**	**p**	**η^2**
Ulcerative Condition	Anxiety	460.36	.001	.92
	Depression	3823.89	.001	.99
Gender	Anxiety	16.83	.001	.10
	Depression	45.42	.001	.23
Ulcerative Condition X Gender	Anxiety	0.87	.48	.02
	Depression	1.50	.21	.04

Note: F = ANOVA; η^2 = Effect Size

Table 2: Post-hoc Analysis for Anxiety and Depression Across UC.

Variable		Severity of UC				
		Control	**Stage 1**	**Stage 2**	**Stage 3**	**Stage 4**
Anxiety	M	8.19	14.00	15.25	29.10	38.12
	SE	0.51	0.39	1.15	0.43	0.37
Depression	M	7.59	17.25	17.33	31.29	40.56
	SE	0.12	0.43	0.36	0.40	0.42

Note: M = Means; SD = Standard Deviation

Table 3: Post-hoc Analysis for Anxiety and Depression Across UC Stages.

Variable		Severity of UC				
		Control	**Stage 1**	**Stage 2**	**Stage 3**	**Stage 4**
Gender (Anxiety)	Women (M)	9.23	14.43	17.80	31.13	39.50
	SE	0.77	0.53	1.02	0.34	0.50
	Men (M)	7.05	13.40	13.43	26.93	36.85
	SE	0.65	0.51	1.53	0.23	0.19
Gender (Depression)	Women (M)	8.23	18.14	18.00	32.50	41.58
	SE	0.14	0.40	0.32	0.47	0.51
	Men (M)	7.00	16.00	16.86	30.00	39.62
	SE	0.12	0.45	0.51	0.48	0.56

Note: M = Means; SD = Standard Deviation

Table 4: Discriminant Analysis for UC Stages Across Anxiety and Depression.

Function(s)	**Wilks' Lambda**	**Chi-squate**	**p**
1 through 2	0.13	676.20	.001
2	.95	8.48	.03
Function	**% Variance**	**Cumulative %**	**Canonical Correlation**
1	99.9	99.9	99
2	10	100.0	23

Note: *p < .05

Post-hoc test revealed anxiety in controls (M = 8.19, SE = .51) was significantly (p < 0.05) lower than Stage 1 (M = 14.00, SE = .51), which was not significantly (p > 0.05) lower than Stage 2 (M = 15.25, SE = 1.15); but this Stage 2 was significantly (p < 0.05) lower in anxiety than Stage 3 (M = 29.10, SE = .43), which was significantly (p < 0.05) lower in anxiety than Stage 4 (M = 38.12, SE = .37). Outcomes also revealed depression in controls (M = .59, SE = .12) was significantly (p < 0.05) lower than Stage 1 (M = 17.25, SE = .43), which was not significantly (p > 0.05) lower than Stage 2; but this Stage 2 was significantly (p < 0.05) lower in depression than Stage 3 and this stage was lower in anxiety than Stage 4 (Table 2).

Gender comparison over UC Stages revealed depression in females (M = 8.23, SE = .14) was significantly (p < 0.05) higher than males (M = 7.00, SE = .12) in control group, at Stage 1, depression in female (M = 18.14, SE = .40) patients was significantly (p < 0.05) higher than male (M = 16.00, SE = .45) patients; at Stage 2,

depression levels did not differ across gender ($p > 0.05$); at Stage 3 and 4, depression in females was higher than men however, for these stages, it reached to clinical levels (M = 30 or above) across gender (Table 3).

Data also revealed a fairly clean separation of UC stages. Discriminant functions (DF) were statistically significant, Wilk's Lambda = .013 (8) = 676.20, p = .001 for DF1 through 2; Wilk's Lambda = .95 (2) = 8.48, p = .03 for DF2; DF1 explained 99.9% of variance and DF2 explained the rest of variance (.1%) (Table 4).

DISCUSSION

Our study suggested when gradients of anxiety and depression were analyzed together stages of UC were clearly separated. This pattern of separation was also evident in the data when anxiety and depression were analyzed separately, which boosted our confidence in the fact that severity of UC can be delineated by benchmark anxiety and depression measures established 30 to 60 years ago.

Data represented that anxiety and depression in control group was lower than those suffering from UC while proctitis and proctosigmoiditis patients were experiencing same levels of anxiety and depression but it reached to clinical levels in distal and extensive colitis patients.

Further, gender had no interaction effects with UC in exacerbating anxiety and depression however, as a separate component, women reported more anxiety and depression than men at all stages of UC except stage 2. A study also showed that women (5.1%) expressed greater anxiety disorders and depression than men (3.6%).[7] Risk of developing depression in women is 25 – 33% more than men in chronic diseases in Pakistan and European countries also.[14-16] Recent reports suggest, severity (mild to severe) of chronic medical illnesses like diabetes, cancer, gastro, Hepatitis C etc. increased anxiety, fear and depression among patients.[16,17]

However, surprisingly, based on BAI and BDI criteria female and male patients at stages 4 suffered extreme anxiety, and at Stages 3 and 4 suffered severe depression so it was noted that anxiety and depression in male patients started to catch-up with female patients as severity of UC increased, the percent gap for anxiety (slope = -1.79) and depression (slope = -1.40) decreased over the four stages of UC, which corroborates well with earlier studies that found 1:1 ratio in male and female patients in severe UC.[9,10,17]

Discriminant analysis further elaborated that anxiety and depression in controls were at normal levels. Stage 1 and 2 patients were having moderate while stage 3 and 4 had clinical levels of anxiety and depression irrespective to gender they belonged to. A study also found that patients with inflammatory bowel disease suffer psychologically, thus results were unlikely to be biased by gender-based constraints.[18] So far, and our results need further exploration through conducting more researches to expound this complex phenomenon.

CONCLUSION

The study proposed medical professionals should assess anxiety and depression as integral parts of ulcerative colitis assay and refer distal and extensive colitis patients to mental health clinicians immediately to cope better with their physical and psychological issues associated with the ailment.

Author Contributions:
Conception and design: Hina Sultan, Ghulam Ishaq, Maryam Gul.
Collection and assembly of data: Maryam Gul, Komal Razzaq, Rubia Azam.
Analysis and interpretation of data: Hina Sultan, Komal Razzaq, Rubia Azam.
Drafting of the article: Maryam Gul, Komal Razzaq, Rubia Azam.
Critical revision of article for important intellectual content: Hina Sultan, Ghulam Ishaq.
Statistical expertise: Hina Sultan, Ghulam Ishaq.
Final approval and guarantor of the article: Hina Sultan.
Corresponding author email: Hina: hina.sultan91@yahoo.com
Conflict of Interest: None declared.
Rec. Date: Sep16, 2021 Revision Rec. Date: Nov21, 2021 Accept Date: Dec 3, 2021.

REFERENCES

1. Lee SH, Kwon JE, Cho ML. Immunological pathogenesis of inflammatory bowel disease. Intest Res. 2018; 16: 26-42.
2. Ng SC, Shi HY, Hamidi N, Underwood FE, Tang W, Benchimol EI, et al. Worldwide incidence and prevalence of inflammatory bowel disease in the 21st century: a systematic review of population-based studies. Lancet, 2017; 390: 2769-78.
3. Shouval DS, Rufo PA. The role of environmental factors in the pathogenesis of inflammatory bowel diseases: a review. JAMA Pediatr. 2017; 171: 999-1005.
4. Majeed S, Gohar F, Riaz M. Prevalence of inflammatory bowel disease and associated predisposing factors. Int J Appl Res. 2018; 4: 208-11.
5. Khan IA, Yousaf S, Anwar T, Ali MR, Sarfraz M, Mohsin A. Characteristics and associations of ulcerative colitis in Pakistani population. Professional Med J. 2020; 2: 1079-84.
6. Clapp M, Aurora N, Herrera L, Bhatia M, Wilen E, Wakefield S. Gut microbiota's effect on mental health: The gut-brain axis. Clin Pract. 2017; 7: 987-9.
7. Oligschlaeger Y, Yadati T, Houben T, Condello Oliván CM, Shiri-Sverdlov R. Inflammatory Bowel Disease: A Stressed "Gut/Feeling". Cells, 2019; 8: 659-62.
8. Godil A, Mallick M, Adam AM, Haq A, Khetpal A, Afzal R, et al. Prevalence and severity of Depression in a

Pakistani Population with at least one major Chronic Disease. J Clin Diagn Res. 2017; 11: OC05-10.
9. Shah SC, Khalili H, Gower-Rousseau P. Sex-based differences in incidence of inflammatory bowel diseases-pooled analysis of population-based studies from western countries. Gastroenterology, 2018; 155: 1079-89.
10. Qureshi M, Abbas Z. Clinical presentation of Ulcerative Colitis in Pakistani Adults. Euroasian J Hepatogastroenterol. 2015; 5: 127-30.
11. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. Behav Research Method. 2009; 41: 1149-60.
12. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. J Consul Clinical Psychol. 1988; 56: 893-97.
13. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Archives Gen Psych. 1961; 4: 561-71.
14. Lebel S, Mutsaers B, Tomei C, Leclair CS, Jones G, Petricone-Westwood D, et al. Health anxiety and illness-related fears across diverse chronic illnesses: A systematic review on conceptualization, measurement, prevalence, course, and correlates. PLoS One, 2020; 15: e0234124.
15. Guglielmi V, Vulink NC, Denys D, Wang Y, Samuels JF, Nestadt G. Obsessive–compulsive disorder and female reproductive cycle events: results from the OCD and reproduction collaborative study. Depress Anxiety, 2014; 31: 979-87.
16. Aijaz A, Ambareen U. Depression in a Pakistani woman. Am J Psychiatry, 2014; 171: 729-31.
17. Albert PR. Why is depression more prevalent in women? J Psychiatry Neurosci. 2015; 40: 219-21.
18. Popov J, Farbod Y, Chauhan U, Kalantar M, Hill L, Armstrong D, et al. Patients' experiences and challenges in living with Inflammatory Bowel Disease: A qualitative approach. ClinExp Gastroenterol. 2021; 14: 123-31.