

Mental Health and Quality of Life among Egyptian Patients with Esophageal Motility Disorders: A Psychiatric Assessment

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Background and study aim: This study aimed to assess the effect of esophageal motility disorders on quality of life, anxiety, and depression among Egyptian patients.

Patients and Methods: This cross-sectional study included 38 patients with esophageal dysmotility who visited GIT motility unit at Ain Shams specialized hospitals from April to November 2022. The manometry was done for all patients. The study assessed clinical symptoms, quality of life using the World Health Organization Quality of Life-BREF instrument, and anxiety and depression using the Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI), respectively.

Results: The mean age of the patients was 36.6 ± 9.7 years, and 63.2% were male. Most patients (75.7%) had higher education, and 70.3% were employed. Of the patients, 34.2% were diagnosed with

outflow disorders, and 57.9% had hypomotility peristaltic disorders. The mean score of the WHOQOL-BREF domains was 56.08 ± 19.2 for physical health, 60.74 ± 19.8 for psychological health, 61.9 ± 25.9 for social relationships, and 57.7 ± 18.8 for environmental health. Males were more affected in the environmental domain, while females scored lowest in the physical health domain among all other quality-of-life assessment domains. The BDI and BAI assessments showed that most patients had moderate degrees of anxiety (42.1%) and depression (26.3%). Patients with a mean age of 41.6 ± 8.4 showed statistically significant moderate levels of depression severity according to the BDI.

Conclusion In our studied patients, all domains of quality of life are affected, with variable affection of mental health as regards depression and anxiety.

INTRODUCTION

The most widely known and studied esophageal motility disorder is achalasia. In spite of that, investigations and management workup for other primary esophageal motility disorders are increasing and becoming more relevant and updated [1].

Esophageal symptoms such as dysphagia, non-cardiac chest pain, and regurgitation can arise from primary esophageal motor disorders like achalasia. Yet, these symptoms can also arise from disorders of impaired relaxation across the lower esophageal sphincter (LES) and other disorders of esophageal peristalsis, in addition to other unclassified

conditions with abnormal manometric findings [2].

A lot of studies have found that the motility pattern of esophageal body in GERD patients is mainly ineffective esophageal motility (IEM) [3]. It has been evident that it is a significant correlation between hypomotile esophagus and GERD [4,5].

Due to the wide spectrum of esophageal motility disorders, and the long course of the disease from diagnosis to definitive management (medical, endoscopic, or surgical); Many patients are at risk of developing psychological distress and other mental health symptoms. Previous studies have focused on relation of individual

motility disorders with psychological stress and mental disorders.

At the same time, psychological stress is known to play a crucial role in the pathogenesis of gut motility disorders. It was believed that stress could be a precipitating factor of gastrointestinal symptoms in patients with functional gastrointestinal disorders. However, little research has been done to evaluate the effect of stress in exacerbating the symptoms associated with gastroesophageal reflux and it is still debatable [6].

Gastroesophageal reflux disease (GERD), as considered a disorder of esophageal motility, has an evident effect on the health-related quality of life (QOL), affecting daily social activities and physical and emotional aspects of patients. It also interferes with healthy sleep and work [7,8].

The most common mental disorders known among patients with gastroesophageal reflux disease (GERD) were depression, anxiety, bipolar disorder and sleep disorders [6,9,10]. Previous studies concluded that achalasia alone irrespective of other comorbidities was associated with an increased incidence of depression [9, 11]. It also has been observed that achalasia patients have impaired quality of life that improves generally after interventions like Heller's cardiomyotomy [12].

This study aimed to evaluate mental health outcomes and Quality of life among Egyptian patients suffering from esophageal motility disorders.

PATIENTS/MATERIALS AND METHODS

This was a cross-sectional study registered at the Faculty of Medicine Ain Shams Research Institute (MASRI) and approved by the Research Ethics Committee of the Faculty of Medicine, Ain Shams University (FMASU REC no. R48/2022). The study conducted at the department of tropical medicine, Ain Shams University Hospital, and the GIT motility unit at Ain Shams Specialized hospital, Cairo, Egypt.

Informed consent was included, explaining in details the study design and aim prior to respondents' enrollment. Participants could terminate at any time they desired. Moreover, confidentiality of information was assured, and they were informed that this study could be used for scientific publication without the disclosure

of the participants' personal identity. Patients were asked to participate in psychiatric evaluation after completing the required esophageal motility studies.

Assuming the expected population standard deviation to be 10, and employing t-distribution to estimate sample size, the study would require a sample size of 19 to estimate a mean with 95% confidence and a precision of 5 [13]. However, the sample size was later upgraded to 30 by the Ain Shams University reviewing board. Thirty-eight patients who visited the motility unit from April 2022 to November 2022 and accepted to participate in the study were included. The patients with previous evident psychiatric disorders and those who refused participation in the study were excluded.

Study Tools:

Full history taking (personal and history of present illness)

1. Patients with non-cardiac chest pain referred (NCCP) for manometry after exclusion of cardiac cause by ECG and echocardiogram.
2. Upper GI endoscopy and Barium swallow.
3. High-resolution esophageal manometry using Laborie MMS software.

HRM:

Type of Catheter: Water perfusion.

Type of software: MMS, Laborie, Chicago Classification version III.

The participants were instructed to fast at least 8 hours before performing the esophageal Manometry procedure [1].

4. At the start of the procedure the patient lied in supine position, one nostril is anesthetized with a numbing lubricant. A water perfused catheter approximately one-eighth inch in diameter was then passed through the anesthetized nostril down into the back of the throat then into the esophagus as the patient swallows, following catheter placement, a minimum of 60 seconds of quiet rest allows for an adaptation period.
5. Next, a baseline period of at least 30 seconds to enable identification of anatomic landmarks including the upper esophageal sphincter (UES), lower esophageal sphincter (LES), respiratory inversion point (RIP) and basal EGJ pressure, once the catheter reaches the lower esophageal sphincter (LES) which was clearly shown by an altered color on the color plot, we fix it in

that zone exactly. We gave the patient ten 5-ml wet swallows of liquid solutions every 20 second, then MRS sequence involving five 2-ml swallows every 2-3 seconds in the supine position will be done. The procedure usually takes 15 to 20 Minutes. During The procedure HRM metrics were identified including [1]:

6. Integrated Relaxation Pressure (IRP) (mmHg) which is the mean lower esophageal sphincter (LES) pressure for four contiguous or non-contiguous seconds of relaxation in the ten second window following deglutitive UES relaxation, it assesses the relaxation pressure across the esophagogastric junction in response to deglutition and considered normal if <22 mmHg for the Supine position or <15 mmHg for the Upright one. Distal Contractile Integral (DCI) (mmHg•s•cm) which is the product of multiplying Amplitude × duration × length of the distal esophageal contraction exceeding 20 mmHg from the transition zone to the proximal margin of the distal LES, Contraction was considered normal when DCI was between 450 and 8,000 mmHg•s•cm.
7. Distal latency (DL) (second) which is the interval between UES relaxation and contractile deceleration point (CDP) it assesses latency of deglutitive inhibition, normal DL > 4.5 seconds.
8. Multiple Rapid Swallows (MRS) response considered to be normal when the esophageal body contractility is absent (DCI < 100 mmHg•s•cm) with complete deglutitive inhibition of the LES during the repetitive swallows, and presence of post-MRS contraction augmentation (DCI post-MRS greater than single swallow mean DCI) [1].
9. Beck depression inventory (BDI) [14]:is a 21-question multiple-choice self-report inventory, one of the most widely used psychometric tests for measuring the severity of depression. The score of depression was calculated by summing the answers degrees for the twenty-one questionnaire items, also each answer was graded either 0= no at all, 1= mild, 2= moderate, 3= severe (total score from 0 to 9 was considered negative for depression, 10-15 mild depression, 16 to 23 moderate depression, 24 to 36 severe depression, above this is considered extreme degree). Arabic validated version was used [15].
10. Beck anxiety inventory (BAI) [16]: is a 21-question multiple-choice self-report inventory that is used for measuring the severity of anxiety in adolescents and adults ages 17 and older. The score of anxiety was calculated with the sum of twenty-one items, each answer was graded either 0= no at all, 1= mild, 2= moderate, 3= severe, and so (total score from 0 to 7 was considered negative for anxiety, from 7 to 15 was considered mild anxiety, from 16-25 was considered moderate, and above is considered severe). Arabic validated version was used [17].
11. Quality of life assessment through the World Health Organization Quality of Life Brief Version [18]:The World Health Organization Quality of Life Brief Version (WHOQOL-BREF) is an abbreviated, 26-item version of the 100-item WHOQOL-100 quality of life measure. The WHOQOL-BREF addresses four quality of life domains: physical health, psychological health, social relationships and environment, each domain was evaluated by summing the points values for questions corresponding to each domain, and then transforming the score to 0 -100 point interval. Arabic validated version was used [19].
12. According To Chicago IV classifications, Manometric diagnosis was classified to:
13. Patients with disorders of out flow obstruction:
14. Achalasia with its subtypes.
15. Esophagogastric out flow obstruction.
16. Patients with disorders of peristalsis:
17. Hypomotility: absent contractility, ineffective motility, and inconclusive ineffective motility.
18. Spastic disorders: Distal esophageal spasm and Hypercontractile esophagus.

Statistical Analysis

Data were collected and entered to the computer using SPSS (Statistical Package for Social Science) program for statistical analysis, (BM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Data from questionnaires were entered as numerical or categorical, as appropriate. Two types of statistics were done:

Descriptive statistics:

- Quantitative data were shown as mean, SD, and range.
- Qualitative data were expressed as frequency and percent.

Analytical statistics:

- Chi-square test was used to measure association between qualitative variables, while Fisher exact test was used for 2x2 qualitative variables when more than 25% of the cells have expected count less than 5.
- Student t-test was used to compare mean and SD of 2 sets of quantitative normally distributed data, while Mann Whitney test was used when this data is not normally distributed.
- Pearson's correlation was used to study correlation between two variables having normally distributed data, while Spearman's correlation was used when this data is not normally distributed.
- The Friedman test was used for one-way repeated measures analysis having quantitative not normally distributed.
- Kruskal-Wallis test was used for comparison between three or more groups having quantitative not normally distributed.
- P-value was considered statistically significant when it is less than 0.05.

RESULTS

3.1. Participants' Characteristics

Thirty-eight patients who visited GIT motility at Ain Shams specialized hospitals from April 2022 to November 2022, accepted to participate in the study. Mean age of the patients was 36.63 ± 9.719 years, twenty-four of them (63.2%) were males, twenty-eight (75.7%) received higher education, twenty-eight (75.7%) were from urban cities, twenty-six (70.3%) were employed (Table 1).

3.2. Clinical symptoms of studied Egyptian patients complaining of esophageal motility disorders.

Twenty-nine (76.3%) were complaining of chest pain, twenty (52.6%) were complaining of heart burn, eighteen (47.4%) were complaining of regurgitation and vomiting, sixteen (42.1%) were complaining of dysphagia.

On the other side, thirteen (34.2%) were diagnosed to have disorders of out flow, and twenty-two (57.9%) had hypomotility peristaltic disorders (Table 1).

3.3. WHOQOL-BREF assessment

Mean score of studied Egyptian patients complaining of esophageal motility disorders was 56.08 ± 19.267 for Domain 1 (Physical health), 60.74 ± 19.857 for domain 2 (Psychological health), 61.95 ± 25.929 for domain 3 (Social relationships) and 57.79 ± 18.822 for domain 4 (environmental) (Table 2)

3.3.1 Comparing sociodemographic data and clinical symptoms with different domains of WHOQOL-BREF,

As regard quality of life assessment, environmental domain was significantly more affected in males (52.63 ± 16.741) than females (66.64 ± 19.464) p value = 0.027. Also, the female physical health domain was significantly the lowest score in all other quality-of-life assessment domain scores with mean (56.07 ± 17.265), p value 0.038. On the other side, Males, living in urban areas, being employed and experiencing chest pain and heart burn were more likely to experience anxiety and depression symptoms yet with no statistical significance. Although the fact that there is no other statistical significance, we cannot deny the affection of all different domains of quality-of-life assessment scores. Table (3)

Moreover, Environmental, and social quality of life domains were more affected in patients from rural areas, their medians scores were both 50, while Environmental and physical domain was more affected in those from urban areas their medians scores were 59.50 and 56 respectively (Table 3).

Physical and environmental domains were more affected in all patients regardless of the main presenting symptom. All quality-of-life domains were more affected in patients with outflow disorders than other categories (Fig. 1) (Table 3).

3.4 Beck Depression inventory and Beck anxiety inventory assessments:

As regard anxiety, sixteen (42.1%) had moderate degree anxiety, eight (21.1%) had severe degree and four (10.5%) had extreme degree, while 28.9% and 26.3% were mild and moderate scoring levels respectively in BDI (Table 2.). In addition, patients with flow disorders, four (30

.8%) had severe anxiety, 3 patients (23%) had moderate anxiety, also 3 patients (23 %) had mild degree, and 2 patients (15.4%) had extreme anxiety. Moreover, patients with hypomotility peristaltic disorders, 12 patients (54.5%) had moderate anxiety, 3 patients (13.6%) had severe anxiety, and 2 patients (9 %) had extreme anxiety (Table 4).

As regard depression, ten patients (26.3%) had moderate degree depression, seven (18.4%) had severe degree and nine (23.7%) had extreme

degree (Table 2) In patients with outflow disorders; 5 patients (38.5%) had extreme depression and 4 patients (30.8 %) had moderate degree depression. Additionally, patients with hypomotility peristaltic disorders, 8 patients (36.4%) had mild depression, and 6 patients (27.3%) had moderate degree depression (Table 5).

Patients mean age 41.6 ± 8.43 showed statistical significance on experiencing moderate levels of severity on the BDI P value =0.031* (Fig. 1) (Table 5).

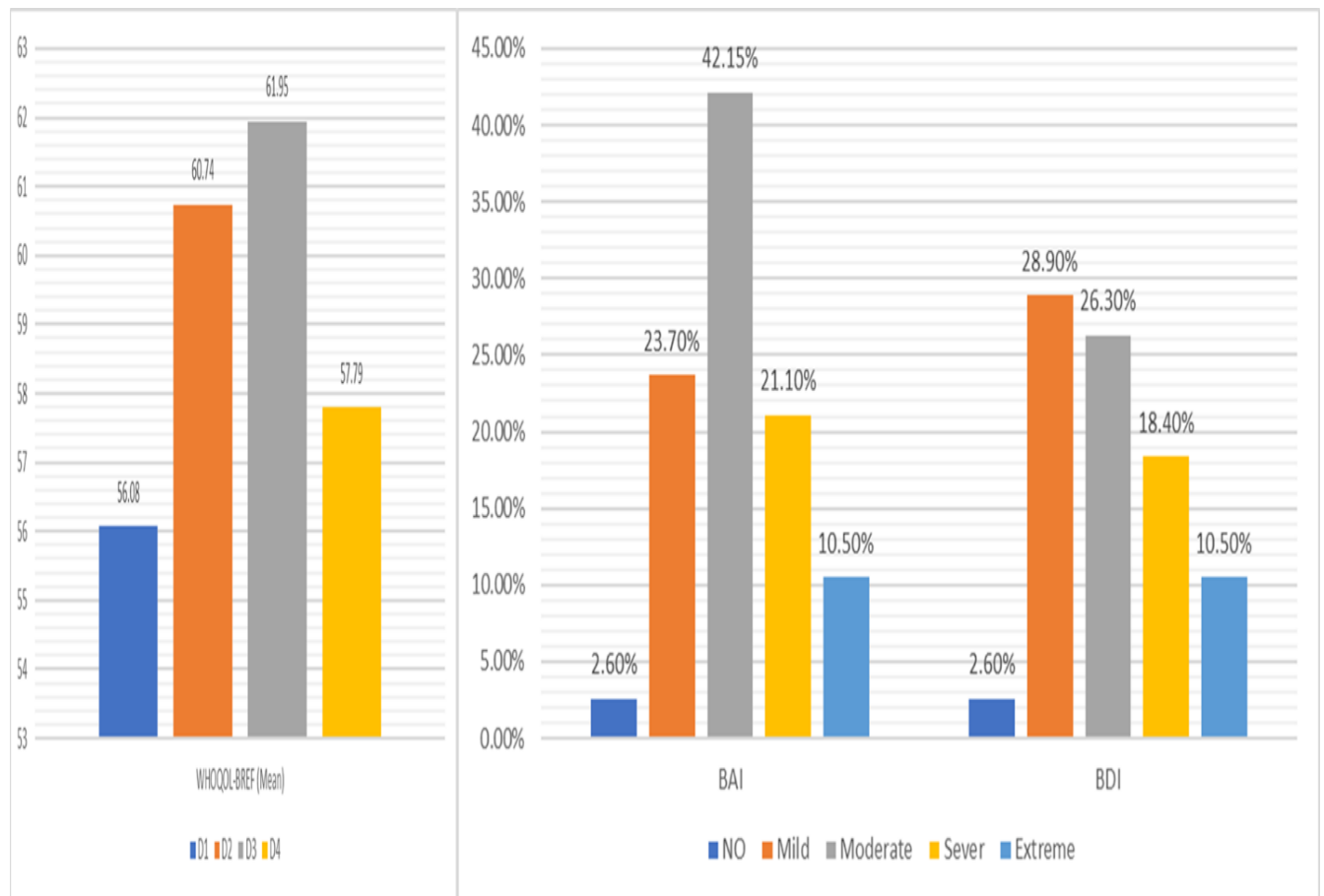


Figure 1. Descriptive presentation of WHOQOL-BREF, BAI and BDI scores of studied Egyptian patients complaining of esophageal motility disorders (n=38).

Table 1. Sociodemographic characteristics and clinical symptoms of studied Egyptian patients complaining of esophageal motility disorders (n=38)

	Category	N (%)
Gender	Female	14 (36.8%)
	Male	24 (63.2%)
Age (years)	Mean \pm SD	36.63 \pm 9.719
	Median (Min-Max)	34.5 (21-70)

	Category	N (%)
Residence	Rural	9 (24.3%)
	Urban	28 (75.7%)
Level of education	Primary / Secondary or equivalent	10 (26.3%)
	Bachelor's degree	28 (73.7%)
Workplace^(*)	Not employed	11 (29.7%)
	Private	26(70.3%)
Chest pain	No	9 (23.7%)
	Yes	29 (76.3%)
heart burn	No	18 (47.4%)
	Yes	20 (52.6%)
Regurgitation	No	20 (52.6%)
	Yes	18 (47.4%)
Vomiting	No	20 (52.6%)
	Yes	18 (47.4%)
Dysphagia	No	22 (57.9%)
	Yes	16 (42.1%)
Diagnosis	1	13 (34.2%)
	2	3(7.9%)
	3	22 (57.9%)

(*) one missing case

1-Disorders of out flow (achalasia and out flow obstruction)

2-Disorders of peristalsis(spastic): (jackhammer and distal esophageal spasm)

3-Disorders of peristalsis (hypomotility): Absent peristalsis. Ineffective. Inconclusive ineffective

Table 2. Descriptive presentation of WHOQOL-BREF, BAI and BDI scores of studied Egyptian patients complaining of esophageal motility disorders (n=38)

Scores			Value
WHOQOL-BREF	D1	Mean ± SD	56.08 ± 19.267
		Median (Min-Max)	56.00 (19-88)
	D2	Mean ± SD	60.74 ± 19.857
		Median (Min-Max)	63.00 (6-94)
	D3	Mean ± SD	61.95 ± 25.929
		Median (Min-Max)	75.00 (6-100)
	D4	Mean ± SD	57.79 ± 18.822
		Median (Min-Max)	56.00 (25-94)
BAI		N	%
	NO	1	2.6
	Mild	9	23.7
	Moderate	16	42.1
	Sever	8	21.1
	Extreme	4	10.5
BDI	NO	1	2.6

Mild	11	28.9
Moderate	10	26.3
Sever	7	18.4
Extreme	9	23.7

Table 3: Comparative Sociodemographic data and clinical symptoms with different domains of WHOQOL-BREF:

	Category Mean \pm SD Median (Min- Max)	WHOQOL-BREF				P-value f
		D1	D2	D3	D4	
Gender	Female N=14	56.07 \pm 17.265 59.50 (19-88)	66.50 \pm 22.281 72.00 (6-94)	70.00 \pm 23.690 81.00 (31-100)	66.64 \pm 19.464 63.00 (25-94)	0.038
	Male N=24	56.08 \pm 20.705 56.00 (19-88)	57.37 \pm 17.937 56.00 (25-94)	57.25 \pm 26.492 62.50 (6-94)	52.63 \pm 16.741 53.00 (25-81)	0.373
	P-value	0.819 ^u	0.074 ^u	0.146 ^t	0.027 ^u	
Age(years)	Correlation r	-0.007	0.225	0.257	0.07	
	P-value	0.968	0.175	0.175	0.674	
Residence	Rural N=9	52.89 \pm 18.128 56.00 (19-81)	55.00 \pm 21.249 63.00 (6-81)	58.22 \pm 24.894 50.00 (31-94)	50.67 \pm 18.289 50.00 (25-81)	0.88
	Urban N=28	58.43 \pm 18.743 56.00 (25-88)	63.18 \pm 19.469 69.00 (25-94)	64.46 \pm 25.999 75.00 (6-100)	60.57 \pm 18.826 59.50 (25-94)	0.187
	P-value	0.442 ^t	0.308 ^u	0.505 ^u	0.176 ^t	
Level of education	Primary / Secondary N=10	55.90 \pm 21.284 59.50 (19-88)	62.00 \pm 24.608 66.00 (6-94)	66.70 \pm 21.050 78.00 (31-81)	53.80 \pm 17.756 56.00 (25-81)	0.155
	Bachelor's degree N=28	56.14 \pm 18.912 56.00 (19-88)	60.29 \pm 18.376 59.50 (25-94)	60.25 \pm 27.609 62.50 (6-100)	59.21 \pm 19.298 56.00 (25-94)	0.708
	P-value	0.973 ^t	0.818 ^t	0.625 ^u	0.442 ^t	
Work	Not Employed N=11	56.45 \pm 21.681 63.00(19-88)	61.91 \pm 25.905 69.00(6-94)	68.09 \pm 22.452 81.00(31-100)	61.55 \pm 22.425 56.00(25-94)	0.87
	Employed N=26	57.35 \pm 17.454 56.00(31-88)	60.88 \pm 17.416 63.00(25-94)	60.77 \pm 26.847 75.00(6-94)	56.73 \pm 17.556 56.00(25-81)	0.485
	P-value	0.840 ^u	0.889 ^t	0.361 ^u	0.487 ^t	
Chest pain	No N=9	50.22 \pm 16.216 50.00 (19-69)	56.33 \pm 22.605 63.00 (6-81)	65.22 \pm 18.485 50.00 (50-94)	55.22 \pm 19.299 63.00 (25-88)	0.13
	Yes N=29	57.90 \pm 20.024 56.00 (19-88)	62.10 \pm 19.154 63.00 (25-94)	60.93 \pm 28.041 75.00 (6-100)	58.59 \pm 18.946 56.00 (25-94)	0.593
	P-value	0.303 ^t	0.454 ^t	0.688 ^u	0.730 ^u	
Heart burn	No N=18	52.61 \pm 20.141 56.00 (19-81)	58.28 \pm 21.543 59.50 (6-81)	65.22 \pm 24.628 81.00 (19-94)	56.06 \pm 18.791 56.00 (25-94)	0.057
	Yes N=20	59.20 \pm 18.392 56.00 (31-88)	62.95 \pm 18.486 66.00 (25-94)	59.00 \pm 27.336 72.00 (6-100)	59.35 \pm 19.198 56.00 (25-94)	0.765
	P-value	0.488 ^u	0.476 ^t	0.320 ^u	0.597 ^t	
Regurgitation	No N=20	52.35 \pm 17.889 56.00 (19-81)	59.00 \pm 21.106 59.50 (6-81)	60.90 \pm 25.018 59.50 (19-94)	52.95 \pm 19.787 50.00 (25-94)	0.111
	Yes N=18	60.22 \pm 20.389 56.00 (31-88)	62.67 \pm 18.784 66.00 (25-94)	63.11 \pm 27.587 75.00 (6-100)	63.17 \pm 16.593 59.50 (25-94)	0.933
	P-value	0.426 ^u	0.790 ^u	0.812 ^u	0.095 ^t	
Vomiting	No N=20	53.85 \pm 21.524 56.00 (19-88)	58.15 \pm 22.839 59.50 (6-94)	57.75 \pm 26.915 62.50 (6-94)	56.20 \pm 20.075 56.00 (25-94)	0.593
	Yes N=18	58.56 \pm 16.667 56.00 (38-88)	63.61 \pm 16.081 66.00 (31-94)	66.61 \pm 24.696 78.00 (19-100)	59.56 \pm 17.731 59.50 (31-94)	0.244
	P-value	0.460 ^t	0.405 ^t	0.292 ^u	0.590 ^t	
Dysphagia	No N=22	57.23 \pm 19.046 56.00 (19-88)	60.95 \pm 17.576 63.00 (25-94)	58.45 \pm 27.457 72.00 (6-100)	58.50 \pm 18.559 56.00 (25-94)	0.745
	Yes N=16	54.50 \pm 20.080 56.00 (19-88)	60.44 \pm 23.238 69.00 (6-81)	66.75 \pm 23.674 81.00 (19-94)	56.81 \pm 19.746 56.00 (25-94)	0.124
	P-value	0.673 ^t	0.665 ^u	0.230 ^u	0.743 ^u	
Diagnosis	1- N=13	50.23 \pm 20.138 44(19-81)	57.15 \pm 22.923 56(6-81)	60.54 \pm 26.171 50(19-94)	51.15 \pm 16.314 50(25-81)	0.121

2- N=3*	52.33±23.861 63(25-69)	58.33±25.325 63.00(31-81)	75.00±22.605 81.00(50-94)	66.67±23.861 56.00(50-94)	0.172
3-N=22	60.05±18.123 56(31-88)	63.18±17.842 66.00(25-94)	61.00±26.796 75.00(6-100)	60.50±19.279 56.00(25-94)	0.905
P-value	0.227 ^u	0.391 ^t	0.867 ^u	0.153 ^t	

^t t-test ^u Mann-Whitney test * Excluded from analysis cause too small group N ^f Friedman test

1-Disorders of out flow (achalasia and out flow obstruction) N=13

2-Disorders of peristalsis(spastic): (jackhammer and distal esophageal spasm) N=3*

3-Disorders of peristalsis (hypomotility): Absent peristalsis, ineffective, inconclusive ineffective N=22

Table 4: Beck anxiety inventory assessments³

Variables	Category	BAI					P-value
		No N=1	Mild N=9	Moderate N=16	Severe N=8	Extreme N=4	
Gender	Female N=14	0(0%)	3(21.4%)	7(50%)	2(14.3%)	2(14.3%)	0.875
	Male N=24	1(2.6%)	6(25%)	9(37.5%)	6(25%)	2(8.3%)	
Age		47	38.33±13.6 38(21-70)	34.56±6.38 33(25-47)	37.00±12.13 33.5(23-60)	37.75±7.41 37(31-46)	0.601*
Residence	Rural N=9	1(11.1%)	2(22.2%)	5(55.6%)	0(0%)	1(11.1%)	0.236
	Urban N=28	0(0%)	7(25%)	11(39.3%)	7(25%)	3(10.7%)	
Level of education	Primary / Secondary N=10	0(0%)	4(40%)	5(50%)	0(0%)	1(10%)	0.247
	Bachelor's degree N=28	1(3.6%)	5(17.9%)	11(39.3%)	8(28.6%)	3(10.7%)	
Work	Not Employed N=11	0(0%)	2(18.2%)	4(36.4%)	3(27.3%)	2(18.2%)	0.742
	Employed N=26	1(3.6%)	7(26.9%)	12(46.2%)	4(15.4%)	2(7.7%)	
Chest pain	No N=9	0(0%)	1(11.1%)	3(33.3%)	3(33.3%)	2(22.2%)	0.438
	Yes N=29	1(3.4%)	8(27.6%)	13(44.8%)	5(17.2%)	2(6.9%)	
Heart burn	No N=18	1(5.6%)	4(22.2%)	5(27.8%)	5(27.8%)	3(16.7%)	0.331
	Yes N=20	0(0%)	5(25%)	11(55%)	3(15%)	1(5%)	
Regurgitation	No N=20	1(5%)	4(20%)	7(35%)	5(25%)	3(15%)	0.703
	Yes N=18	0(0%)	5(27.8%)	9(50%)	3(16.7%)	1(5.6%)	
Vomiting	No N=20	0(0%)	6(30%)	8(40%)	4(20%)	2(10%)	0.868
	Yes N=18	1(5.6%)	3(16.7%)	8(44.4%)	4(22.2%)	2(11.1%)	
Dysphagia	No N=22	0(0%)	5(22.7%)	12(54.5%)	4(18.2%)	1(4.5%)	0.243
	Yes N=16	1(6.2%)	4(25%)	4(25%)	4(25%)	3(18.8%)	
Diagnosis	1- N=13	1(7.7%)	3(23.1%)	3(23.1%)	4(30.8%)	2(15.4%)	0.497
	2- N=3	0(0%)	1(33.3%)	1(33.3%)	1(33.3%)	0(0%)	
	3-N=22	0(0%)	5(22.7%)	12(54.5%)	3(13.6%)	2(9.1%)	

*Kruskal Wallis test

Table 5: Beck Depression inventory assessments

Category	BDI					P-value	
	No N=1	Mild N=11	Moderate N=10	Severe N=7	Extreme N=9		FISHER EXACT TEST
Gender	Female N=14	0(0%)	6(42.9%)	4(28.6%)	1(7.1%)	3(21.4%)	0.486
	Male N=24	1(4.2%)	5(20.8%)	6(25%)	6(25%)	6(25%)	
Age	Mean ± SD Median (Min- Max)	38.00	37.45±12.2 35(25-70)	41.6±8.43 40.5(32-60)	29.29±4.68 30(21-36)	35.67±8.59 32(23-47)	0.031*
Residence	Rural N=9	1(11.1%)	2(22.2%)	1(11.1%)	1(11.1%)	4(44.4%)	0.255
	Urban N=28	0(0%)	9(32.1%)	9(32.1%)	6(21.4%)	4(14.3%)	
Level of education	Primary / Secondary N=10	1(10%)	4(40%)	1(10%)	1(10%)	3(30%)	0.264
	Bachelor's degree N=28	0(0%)	7(25%)	9(32.1%)	6(21.4%)	6(21.4%)	
Work	Not Employed N=11	0(0%)	4(36.4%)	3(27.3%)	1(9.1%)	3(27.3%)	0.879
	Employed N=26	1(3.8%)	7(26.9%)	7(26.9%)	6(23.1%)	5(19.2%)	
Chest pain	No N=9	0(0%)	1(11.1%)	5(55.6%)	1(11.1%)	2(22.2%)	0.258
	Yes N=29	1(3.4%)	10(34.5%)	5(17.2%)	6(20.7%)	7(24.1%)	
Heart burn	No N=18	0(0%)	3(16.7%)	6(33.3%)	2(11.1%)	7(38.9%)	0.096

	Yes N=20	1(5%)	8(40%)	4(20%)	5(25%)	2(10%)	
Regurgitation	No N=20	1(5%)	4(20%)	5(25%)	4(20%)	6(30%)	0.633
	Yes N=18	0(0%)	7(38.9%)	5(27.8%)	3(16.7%)	3(16.7%)	
Vomiting	No N=20	1(5%)	6(30%)	3(15%)	5(25%)	5(25%)	0.421
	Yes N=18	0(0%)	5(27%)	7(38.9%)	2(11.1%)	4(22.2%)	
Dysphagia	No N=22	1(4.5%)	7(31.8%)	5(22.7%)	5(22.7%)	4(18.2%)	0.755
	Yes N=16	0(0%)	4(25%)	5(31.2%)	2(12.5%)	5(31.2%)	
Diagnosis	1- N=13	0(0%)	2(15.4%)	4(30.8%)	2(15.4%)	5(38.5%)	0.253
	2- N=3	0(0%)	1(33.3%)	0(0%)	0(0%)	2(66.7%)	
	3- N=22	1(2.6%)	8(36.4%)	6(27.3%)	5(22.7%)	2(9.1%)	

*Kruskal Wallis test - (NCCP) non-cardiac chest pain.

DISCUSSION

Esophageal motility disorders affect patient quality of life and are often associated with mental illness, which compounds the burden on patients and their social circles. In this study, we assessed patients with proven esophageal motility disorders for depression, anxiety, and quality of life.

To our knowledge, this is one of the earliest studies to address the issue of mental health associated with esophageal motility disorders in the Middle East and Africa. It is also one of the very few papers that have studied the quality of life and psychiatric issues associated with individual esophageal motility disorders. This includes not only achalasia but also other disorders of peristalsis such as ineffective motility and spastic disorders.

Our findings showed that, regardless of etiology, most patients with esophageal motility disorders experienced impairment across all examined domains. All but one of the subjects in our study suffered from various degrees of anxiety and depression, with a significant percentage experiencing extreme degrees of anxiety (10.5%) and depression (23.7%). Quality of life was affected in all four domains.

These findings align with previous studies, such as Nenshi et al. (2010), which found that achalasia patients experienced impairment across all aspects of life, with vitality and emotional health being the most affected (42.2%, 51.2%) and physical function being the least affected (73.8%). Similarly, Garrigues et al. (2010) observed impairment in quality of life among achalasia patients. However, our study results differed from Garrigues et al. (2010) in that males were more significantly affected in the environmental domain, while females had significantly lower scores in the physical health domain.

Loosen et al.'s (2021) study found a significant association between achalasia and depression [11], while Mohammad et al. (2019) and Bai et al. (2021) found that both anxiety and depression were more common among GERD patients [9,10]. Tandarto et al. (2020) demonstrated a correlation between GERD and impaired quality of life [20], while Jang et al. (2016) found that GERD patients showed lower self-esteem and QOL scores and higher scores of depression, anxiety, and occupational stress relative to those observed in GERD negative subjects [21]. Ma et al (2023) showed significant impairment of the MOS item short form health survey (SF-36) for quality-of-life assessment, and the Hospital Anxiety and Depression Scale (HADS) among GERD patients with ineffective esophageal motility before treatment [22].

Our study adds to the literature by demonstrating that a proven esophageal motility disorder is associated with impairment across all domains of quality of life, regardless of etiology. Interestingly, we found no relationship between a specific symptom and the degree of anxiety, contrary to Carlson et al.'s (2020) findings, which demonstrated that esophageal hypervigilance and anxiety scale score carried a predictive relationship of brief esophageal dysphagia questionnaire that was two-fold higher than having a major motor disorder. Kim, Chung H., et al.'s (1996) study found that depression and anxiety were not different among patients with dysphagia due to outflow obstruction, peristalsis disorders, and those without findings in endoscopy, barium or manometry.

Roland et al. (1996) evaluated 51 patients with psychiatric problems and upper GI somatization symptoms by esophageal transit time, 13 of whom had abnormal or delayed transit time. Manometry was performed on those with abnormal results, but two patients refused. The result was that 10 of the 11 tested patients had major motor abnormalities by manometry,

indicating a relationship between psychiatric problems and motor disorders [23].

The study may have had some limitations. According to the guidelines for treating such patients, the appropriate therapy should have been selected before performing invasive procedures (Upper GI endoscopy and Barium swallow). This could explain the small sample size, which was our main limitation. The patient in our low-income country could not afford the high cost of this examination. Moreover, the study did not receive any funding. However, our research's strengths were being the first center in Egypt and conducting novel research work.

Our study highlights the significant impact of esophageal motility disorders on patients' quality of life and the associated burden of depression and anxiety. These findings reinforce the importance of screening for psychological distress in patients with underlying esophageal motility disorders. Thus, proper psychological support can be provided in conjunction with medical, endoscopic, or surgical interventions.

Our results emphasize the importance of studying gastrointestinal tract motility disorders and carrying out more research in this field. Unfortunately, it is underestimated in our society.

CONCLUSION

In all our studied patients, all domains of quality of life are affected, especially physical and environmental domains, and those with outflow obstruction were more affected than others. All our studied patients had variable degrees of anxiety and depression affecting their mental health.

Our study's results are consistent with previous research, highlighting the association between esophageal motility disorders and mental health-related outcomes. These disorders result in a poorer quality of life for patients.

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Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee

of Ain Shams University (Date: March 17th, 2022 / No: FMASU R 48/2022).

Author Contributions

All authors contributed to the study conception and design. Material preparation, data collection were performed by [Enaam Ali AlMoafy], [Fairouz Tawfik] and [Sally Waheed Elkhadry]. Data analysis and table, figures presentation were performed by [Sally Waheed Elkhadry]. The first draft of the manuscript was written by [Enaam Ali AlMoafy] and [Mohammad Almohamady Khaskia] and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Research highlights:

1. Our study's results are consistent with previous research, highlighting the association between esophageal motility disorders and mental health-related outcomes.
2. These disorders result in a poorer quality of life for patients.

REFERENCES

1. Yadlapati R, Kahrilas PJ, Fox MR, Bredenoord AJ, Prakash Gyawali C, Roman S, et al. Esophageal motility disorders on high-resolution manometry: Chicago classification version 4.0 ©. *Neurogastroenterology & Motility*. 2020;33(1). <https://doi.org/10.1111/nmo.14058>
2. Gyawali CP, Carlson DA, Chen JW, Patel A, Wong RJ, Yadlapati RH. ACG Clinical Guidelines: Clinical Use of Esophageal Physiologic Testing. *Am J Gastroenterol*. 2020;115(9):1412–28. <https://doi.org/10.14309/ajg.0000000000000734>
3. Spechler SJ, Castell DO. Classification of oesophageal motility abnormalities. *Gut*. 2001;49(1):145–51.
4. Tutuian R, Castell DO. Nocturnal acid breakthrough - approach to management. *MedGenMed*. 2004; 6(4):11.
5. Blonski W, Vela M, Safder A, Hila A, Castell DO. Revised Criterion for Diagnosis of Ineffective Esophageal Motility Is Associated With More Frequent Dysphagia and Greater Bolus Transit Abnormalities. *Am J Gastroenterol*. 2008;103(3):699–704.
6. Lee Y-S, Jang B-H, Ko S-G, Chae Y. Comorbid risks of psychological disorders and

- gastroesophageal reflux disorder using the national health insurance service—National Sample Cohort: A STROBE-compliant article. *Medicine*. 2018;97(18):e0153.
7. Wiklund I. Review of the Quality of Life and Burden of Illness in Gastroesophageal Reflux Disease. *Dig Dis*. 2004;22(2):108–14.
 8. Vakil N, van Zanten SV, Kahrilas P, Dent J, Jones R, the Global Consensus Group. The Montreal Definition and Classification of Gastroesophageal Reflux Disease: A Global Evidence-Based Consensus. *Am J Gastroenterol*. 2006;101(8):1900–20.
 9. Mohammad S, Chandio B, Soomro AA, Lakho S, Ali Z, Ali Soomro Z, et al. Depression and Anxiety in Patients with Gastroesophageal Reflux Disorder With and Without Chest Pain. *Cureus*. 2019;
 10. Bai P, Bano S, Kumar S, Sachdev P, Ali A, Dembra P, et al. Gastroesophageal Reflux Disease in the Young Population and Its Correlation With Anxiety and Depression. *Cureus*. 2021;
 11. Loosen SH, Kandler J, Luedde T, Kostev K, Roderburg C. Achalasia is associated with a higher incidence of depression in outpatients in Germany. Hashimoto K, editor. *PLoS ONE*. 2021; 16(4):e0250503.
 12. Ben-Meir A, Urbach DR, Khajanchee YS, Hansen PD, Swanstrom LL. Quality of life before and after laparoscopic Heller myotomy for achalasia. *Am J Surg*. 2001;181(5):471–4.
 13. Dhand, NK & Khatkar MS. Statulator: An online statistical calculator. Sample Size Calculator for Estimating a Single Mean. 2014; Accessed 22 January 2024 at <http://statulator.com/SampleSize/ss1M.html>
 14. Beck AT. An Inventory for Measuring Depression. *Arch Gen Psychiatry*. 1961;4(6):561. <https://doi.org/10.1001/archpsyc.1961.01710120031004>
 15. Ghareeb AG. Manual of the arabic BDI-II. Cairo, Egypt: Angle Press; 2000.
 16. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. *J Consult Clin Psychol*. 1988;56(6):893–7. <https://doi.org/10.1037/0022-006X.56.6.893>
 17. Al-Shatti DrTS. Psychometric Properties of the Arabic Version of the Beck Anxiety Inventory in the State of Kuwait. *JEPS*. 2015;16(2):431–63. <https://doi.org/10.12785/jeps/160213>
 18. World Health Organization. Division of Mental Health and Prevention of Substance Abuse. WHOQOL: measuring quality of life. *World Health Organization*; 1997. p. WHO/MSA/MNH/PSF/97.4.
 19. Dalky HF, Meininger JC, Al-Ali NM. The Reliability and Validity of the Arabic World Health Organization Quality of Life-BREF Instrument Among Family Caregivers of Relatives With Psychiatric Illnesses in Jordan. *J Nurs Res*. 2017;25(3):224–30. <https://doi.org/10.1097/JNR.000000000000146>
 20. Tandar K, Tenggara R, Christya F, Steffanus M. Correlation between Quality of Life and Gastroesophageal Reflux Disease. *MKB*. 2020; 52(2):81–6. <https://doi.org/10.15395/mkb.v52n2.2003>
 21. Jang S-H, Ryu H-S, Choi S-C, Lee S-Y. Psychological factors influence the gastroesophageal reflux disease (GERD) and their effect on quality of life among firefighters in South Korea. *Int J Occup Environ Health*. 2016;22(4):315–20. <https://doi.org/10.1080/10773525.2016.1235675>
 22. Ma Y, Cai R, Liu Z, Zou X, Qiao Z. Clinical efficacy and mechanism of transcutaneous neuromodulation on ineffective esophageal motility in patients with gastroesophageal reflux disease. *Neurogastroenterology Motil*. 2023;35(3). <https://doi.org/10.1111/nmo.14464>
 23. Roland J, D'Haenen H, Ham H, Peters O, Piepsz A. Oesophageal motility disorders in patients with psychiatric disease. *Eur J Nucl Med Mol Imaging*. 1996;23(12):1583–7. <https://doi.org/10.1007/bf01249620>