

Carol Rees Parrish, MS, RDN, Series Editor

# The Overlap Between Eating Disorders and Gastrointestinal Disorders



Theresa Hedrick

**Eating Disorders (EDs) have a direct physiological effect on the gastrointestinal (GI) tract and microbiota, which can lead to GI dysfunction. Additionally, there is a higher prevalence of EDs among individuals with disorders affecting the GI tract compared to those without GI disorders. Several simple screening tools exist to help clinicians identify EDs and should be utilized before prescribing a restrictive diet. If an ED is detected, connections to an ED-specialized registered dietitian nutritionist and mental health provider should be facilitated. This article reviews the connection between eating disorders and GI disorders as well as provides ways to identify and manage EDs in the GI population.**

## INTRODUCTION

Ideally, eating is a flexible behavior that balances internal needs (e.g., hunger and satiety cues, food preferences, nourishment needs, etc.) with external constraints (e.g., food availability, personal schedule, acceptable social behavior, etc.). It is generally a neutral to positive experience to the person eating. Thoughts about desired foods and meal planning are a part of daily life, but do not take up a disproportionate amount of time relative to other tasks. Disordered eating involves food-related

behaviors that have a negative physiological and/or psychological impact, yet do not meet the criteria for an eating disorder diagnosis. Examples include rigid self-imposed rules around food, feelings of anxiety, guilt or shame associated with eating, frequent dieting, a preoccupation with food, a loss of control around food, and restricting intake to compensate for eating “bad” foods. The severity of these behaviors exists along a continuum, and some of these behaviors are socially acceptable despite not being supportive of health. An eating disorder (ED) is a specific severity of disordered eating that meets the criteria outlined in the American Psychiatric Association’s (APA) Diagnostic and

---

Theresa Hedrick, MS, RDN, LD  
Registered Dietitian Nutritionist, Oregon  
Nutrition Counseling, LLC, Corvallis, OR

Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).<sup>1</sup>

The consequences of EDs can affect any body system, with impacts on the gastrointestinal (GI) tract being particularly prevalent.<sup>2,3</sup> Postprandial fullness and abdominal distention are the most common GI complaints among individuals with EDs, followed by bloating, early satiety, abdominal pain, nausea, constipation, heartburn, and gastritis.<sup>3</sup> EDs can occur before, during or after the onset of GI symptoms.<sup>4</sup>

Individuals with GI disorders are more likely to display disordered eating than healthy controls;<sup>5</sup> those with irritable bowel syndrome (IBS) in particular are more likely to engage in disordered eating behaviors (missed meals, irregular mealtimes, not eating when hungry, vomiting after eating) than healthy controls.<sup>7-9</sup> Dietary restriction to manage GI symptoms may be an expected adaptive response in some patients given that up to 90% of individuals with IBS attribute their GI symptoms to certain foods.<sup>10</sup> It may also be a maladaptive coping mechanism in others as the severity and duration of IBS have been positively correlated with the number of ED symptoms/characteristics self-reported on a standardized questionnaire.<sup>11</sup>

EDs have one of the highest mortality rates of any psychiatric illness.<sup>3,12</sup> There are numerous adverse physiological consequences of EDs; psychological comorbidities such as self-harm and suicide are common. Therefore, it is important to consider EDs when managing GI patients. This article reviews reasons GI conditions and EDs overlap, as well as how to identify EDs in the GI patient and intervene for those individuals.

### Why Eating Disorders and GI Disorders Overlap

EDs may exacerbate pre-existing GI disorders. There is evidence of an increased prevalence of EDs compared to the general population in individuals with conditions such as celiac disease, Ehlers-Danlos syndrome, and postural orthostatic tachycardia syndrome.<sup>13-15</sup> Associations have also been seen between EDs and both food allergies and inflammatory bowel disease.<sup>16,17</sup> Once an ED has developed, it can be difficult to discern which symptoms are due to the concurrent disease state versus the ED.

There is some evidence that gut microbiota could have a role in the initiation and progression of anorexia nervosa (AN) by acting on the gut-brain axis to distort hunger and satiety cues, alter brain function, and disrupt gut barrier function.<sup>18</sup> Restricted food intake in AN may contribute to dysbiosis by lowering microbial diversity, decreasing butyrate-producing bacteria, and increasing mucin-degrading bacteria.<sup>12,18,20</sup> Additional research is needed to further elucidate the bidirectional relationship between AN and the microbiota, examine the role of and effects on the microbiota in other EDs, and investigate potential microbiota-targeted interventions.

EDs can cause GI dysfunction as a direct physiologic result of restricting food intake, purging, or weight loss.<sup>3,5,21</sup> As the body is denied essential nutrients, GI motility is slowed, and GI hormone release is altered.<sup>3,19</sup> Esophageal motility is usually unaffected in AN, but patients can have dysphagia, heartburn, and regurgitation.<sup>2,3,19,21</sup> Delayed gastric emptying is common in AN and bulimia nervosa (BN), as are complaints of early satiety, postprandial fullness, epigastric discomfort, bloating, and nausea.<sup>2,3,19,21</sup> There have been reports of gastric bezoars and need for gastric dilation in AN.<sup>2,21</sup> Gallstones have been reported in those with significant weight loss.<sup>3</sup> Lack of food intake can cause a reduction in the absorptive surface area of the small intestine,<sup>3,21</sup> altered nutrient and ion transport, and increased permeability to macromolecules.<sup>18</sup> Delayed gut transit time is common in AN and BN.<sup>2,19,21</sup> Superior mesenteric artery (SMA) syndrome in AN has also been reported due to loss of the mesenteric fat pad between the abdominal aorta and the SMA.<sup>2,3,19,21</sup> Constipation is common in AN and BN for a variety of reasons including smooth muscle atrophy, electrolyte abnormalities, delayed intestinal transit, sick euthyroid syndrome, and pelvic floor dysfunction.<sup>2,3,19,21</sup> Hepatic injury and noninflammatory fibrotic injury to the pancreas are possible due to malnutrition from AN.<sup>2,21</sup> All of these symptoms will improve with refeeding.<sup>2,3,5</sup>

Specific to BN where purging is done by vomiting, it is common for individuals to experience heartburn, spontaneous vomiting, regurgitation, chest pain, dysphagia, and nocturnal aspiration when lying supine due to weakening of the lower esophageal sphincter.<sup>2,3,19,21</sup> Mallory-Weiss tears

**Table 1. GI Symptoms Associated with Eating Disorders** <sup>2,3,5,19,21,22</sup>

Eating Disorder	Possible GI Symptoms
<b>Anorexia Nervosa (AN)</b>	<ul style="list-style-type: none"> <li>• Dysphagia</li> <li>• Heartburn</li> <li>• Regurgitation</li> <li>• Delayed gastric emptying</li> <li>• Early satiety</li> <li>• Postprandial fullness</li> <li>• Epigastric discomfort</li> <li>• Bloating</li> <li>• Nausea</li> <li>• Gastric bezoars</li> <li>• Gallstones</li> <li>• Delayed gut transit time</li> <li>• Superior mesenteric artery syndrome</li> <li>• Constipation</li> <li>• Hepatic injury</li> <li>• Pancreatic noninflammatory fibrotic injury</li> </ul>
<b>Bulimia Nervosa (BN)</b>	<ul style="list-style-type: none"> <li>• Delayed gastric emptying</li> <li>• Early satiety</li> <li>• Postprandial fullness</li> <li>• Epigastric discomfort</li> <li>• Bloating</li> <li>• Nausea</li> <li>• Heartburn</li> <li>• Spontaneous vomiting</li> <li>• Regurgitation</li> <li>• Dysphagia</li> <li>• Nocturnal choking when supine</li> <li>• Mallory-Weiss tears</li> <li>• Delayed gut transit time</li> <li>• Constipation</li> <li>• Rebound constipation &amp; fluid retention with cessation of laxative abuse</li> </ul>
<b>Binge Eating Disorder (BED)</b>	<ul style="list-style-type: none"> <li>• Heartburn</li> <li>• Regurgitation</li> <li>• Dysphagia</li> <li>• Bloating</li> <li>• Diarrhea</li> <li>• Fecal urgency</li> <li>• Fecal incontinence</li> <li>• Non-alcoholic fatty liver disease</li> <li>• Altered perception of satiety</li> </ul>
<b>Avoidant Restrictive Food Intake Disorder (ARFID)</b>	<ul style="list-style-type: none"> <li>• Loss of appetite</li> <li>• Dysphagia</li> <li>• Esophagitis</li> <li>• GERD</li> <li>• Gastroparesis</li> <li>• Gastritis</li> <li>• Abdominal pain</li> <li>• Nausea</li> <li>• Constipation</li> </ul>

**Table 2. Eating Disorder Screening Questions**<sup>23</sup>

ESP (Eating Disorder Screen for Primary Care)	SCOFF (Sick, Control, One, Fat, Food)
<ul style="list-style-type: none"> <li>Are you satisfied with your eating patterns? (A “no” to this question is considered an abnormal response).</li> </ul>	<ul style="list-style-type: none"> <li>Do you make yourself Sick because you feel uncomfortably full?</li> </ul>
<ul style="list-style-type: none"> <li>Do you ever eat in secret? (A “yes” to this and all other questions is considered an abnormal response).</li> </ul>	<ul style="list-style-type: none"> <li>Do you worry you have lost Control over how much you eat?</li> </ul>
<ul style="list-style-type: none"> <li>Does your weight affect the way you feel about yourself?</li> </ul>	<ul style="list-style-type: none"> <li>Have you recently lost more than One stone (14 lb or 7.7 kg) in a three-month period?</li> </ul>
<ul style="list-style-type: none"> <li>Have any members of your family suffered with an eating disorder?</li> </ul>	<ul style="list-style-type: none"> <li>Do you believe yourself to be Fat when others say you are thin?</li> </ul>
<ul style="list-style-type: none"> <li>Do you currently suffer with, or have you ever suffered in the past with an eating disorder?</li> </ul>	<ul style="list-style-type: none"> <li>Would you say that Food dominates your life?</li> </ul>

may occur<sup>21</sup> and individuals with BN may be at risk for Barrett’s esophagus from frequent exposure of esophageal mucosa to acidic emesis.<sup>3,5</sup>

When laxatives are used to purge in BN, it is common to see electrolyte abnormalities, dizziness, and dehydration.<sup>3,19,21</sup> Individuals can also experience rebound constipation and fluid retention (cathartic colon syndrome) if laxatives are stopped.<sup>3,19,21</sup>

In binge eating disorder (BED), binge behavior can lower esophageal sphincter pressure, exacerbating heartburn and regurgitation, while the acid reflux can potentially lead to dysphagia.<sup>19</sup> Other possible impacts of BED on the GI system include bloating, diarrhea, fecal urgency, fecal incontinence, non-alcoholic fatty liver disease, and altered perception of satiety.<sup>2,5,19,21</sup>

The most common GI complaints in those with ARFID are nausea, constipation, loss of appetite, and abdominal pain.<sup>22</sup> Dysphagia, esophagitis, gastroesophageal reflux disease (GERD), gastroparesis, and gastritis have also been reported.<sup>22</sup> See Table 1 for a list of GI symptoms associated with each type of ED.

Recovery from an ED can also trigger GI issues. When an individual increases their energy intake after restricting food intake, it can take weeks to months for their slowed motility to return to normal depending on how quickly the individual’s nutritional status and weight

are restored.<sup>3,5</sup> Because they are trying to eat an increased amount with a slowed transit time, they can experience early satiety, postprandial fullness, abdominal pain/discomfort, bloating, and distention. These symptoms are disconcerting to the individual experiencing them. However, if they continue to consume enough to meet their energy needs despite the increase in GI symptoms, motility will normalize, and symptoms will resolve. This generally happens within a month of eating enough to fully meet energy needs.<sup>3</sup> If the individual is eating more than they used to, but is still in a relative energy deficit, this phase can be drawn out.

### Screening for Eating Disorders

There are two validated screening tools to help identify EDs for use in the primary and specialist care settings: the Eating Disorder Screen for Primary Care (ESP) and the Sick, Control, One, Fat, Food (SCOFF) (Table 2).<sup>23</sup> These are not diagnostic; rather, they indicate whether further investigation is warranted. In general, 0-1 abnormal answers rule out an ED. Two or more abnormal answers should prompt a more complex assessment. In addition to the screening tool questions, asking a patient to, “Tell me about your relationship with food,” may be helpful. If further information is needed, asking hypothetical questions to the effect of, “Would you be willing to eat more food if it resolved

*(continued on page 43)*

(continued from page 35)

your GI symptoms?” or “Would you be willing to gain weight if it resolved your GI symptoms?” might also provide insight. Responses that express rigidity, anxiety, shame, fear of judgement around food, or an intense fear of weight gain may indicate an ED. When determining if ED behaviors like vomiting or laxative abuse are present, ask direct, specific questions. Examples of these include, “How often do you make yourself vomit?” and “How often do you use laxatives when you are not constipated?” Individuals with EDs may not volunteer information about these behaviors.

Food-related fear and avoidance in individuals with food intolerance are not always pathological. However, if a patient is not distressed by multiple dietary restrictions that would seem burdensome to

others, it may be a red flag. For example, restricting dairy, wheat, and corn would eliminate many of the foods Americans eat regularly and make it difficult to consume an adequate balanced diet without a tremendous amount of preplanning. If a patient presented restricting those items, but did not feel bothered by the inconvenience or limited choices, it would be a red flag for an ED.

If a patient following a restrictive diet is reluctant to reintroduce foods to their diet, it may represent anxiety about the consequences of food reintroduction or it may be a red flag for an eating disorder. To elucidate, inquire about how restricting is serving them. For a patient afraid of how the food reintroduction may impact their quality of life or activities of daily living, there may be a way to work together and/or with a registered dietitian

**Table 3. Summary of Diagnostic Criteria for Eating Disorders** <sup>1,30</sup>

Eating Disorder	Diagnostic Criteria
<b>Anorexia Nervosa (AN)</b>	<ul style="list-style-type: none"> <li>• Restricted energy intake</li> <li>• Intense fear of gaining weight</li> <li>• Disturbance in the way weight/shape experienced</li> </ul>
<b>Bulimia Nervosa (BN)</b>	<ul style="list-style-type: none"> <li>• Episodes of binge eating</li> <li>• Compensatory behavior to offset food intake</li> <li>• Disturbance in the way weight/shape experienced</li> </ul>
<b>Binge Eating Disorder (BED)</b>	<ul style="list-style-type: none"> <li>• Episodes of binge eating</li> <li>• Marked distress about binge</li> <li>• No compensatory behaviors</li> </ul>
<b>Avoidant Restrictive Food Intake Disorder (ARFID)</b>	<p><i>Eating/feeding disturbance associated with ≥1 of the following:</i></p> <ul style="list-style-type: none"> <li>• Significant weight loss (or failure to gain height or weight as expected in children)</li> <li>• Significant nutritional deficiency</li> <li>• Dependence on enteral feeding or oral supplements</li> <li>• Marked interference with psychosocial functioning</li> </ul>
<b>Other Specified Feeding or Eating Disorders (OSFED) (Previously Eating Disorder Not Otherwise Specified)</b>	<p><i>Behaviors do not meet the strict diagnostic criteria for one of the other eating disorders, but are still significant including:</i></p> <ul style="list-style-type: none"> <li>• Atypical Anorexia Nervosa</li> <li>• Bulimia Nervosa of low frequency and/or limited duration</li> <li>• Binge Eating Disorder of low frequency and/or limited duration</li> <li>• Purging Disorder</li> <li>• Night Eating Syndrome</li> </ul>
<b>Orthorexia*</b>	<ul style="list-style-type: none"> <li>• Pathological preoccupation with healthy eating</li> <li>• Emotional consequences from non-adherence to self-imposed nutrition rules</li> <li>• Psychosocial impairment</li> </ul>

\*Not a separate diagnosis per the DSM-5. Considered an OSFED diagnosis.

nutritionist to empower them to partially or fully liberalize their diet while mitigating the risks. For example, if a patient is worried that reintroducing a food could cause diarrhea while at work, the food reintroduction trial could be done on the weekends and/or the concerns could be offset with the use of a medication or supplement. Or, if abdominal pain is a primary complaint, implementing a medication that lowers visceral hypersensitivity prior to reintroducing foods might be helpful. Feeling strongly about the need to keep the diet limited without being able to give clear concrete reasons as to why, or having an excessive fear of mild GI consequences, may be suggestive of an ED.

Alternatively, reluctance to add foods back to the diet may indicate an ED that is capitalizing on a medically or socially acceptable reason to restrict food. Making statements about being “healthy” and adopting vegetarian or vegan diets are some ways that people with EDs begin restricting in socially acceptable ways.<sup>24,25</sup> A registered dietitian nutritionist can conduct an in-depth assessment of nutrition status and food-related behaviors when a physician’s practice setting does not allow time for detailed determination.

It is important to screen for ED risk before further restricting an individual’s diet. It is generally not recommended to initiate an elimination diet in a patient with an ED or a history of an ED. However, there may be instances where it is appropriate to guide a patient through a modified version of a necessary diet, while emphasizing the non-food interventions like psychoeducation, medications or supplements (motility agents, prebiotics, probiotics, herbal supplements, etc.), toilet positioning and routine, hypnotherapy, psychotherapy, etc. This is best done under the supervision of a registered dietitian experienced in eating disorders. Continued screening for EDs is prudent given the association between restrictive diets and ED behaviors.<sup>26</sup> Prevention of EDs is more effective than treatment.

### Diagnosing Eating Disorders

Table 3 shows a synopsis of the diagnostic criteria for anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), avoidant restrictive food intake disorder (ARFID), other specified feeding or eating disorders (OSFED), and orthorexia. Full diagnostic criteria can be found in

the Diagnostic and Statistical Manual of Mental Disorders (DSM–5).<sup>1</sup>

EDs do not always fall neatly into categories. For example, purging by vomiting does not necessarily indicate bulimia nervosa; a diagnosis of anorexia nervosa – binge/purge subtype might be more fitting. Being in a larger body does not indicate binge eating disorder (BED); one could have atypical AN. BN and BED are characterized by objective binges, but individuals with AN may report subjective binges.

### What Clinicians Should Know About Eating Disorders

The initiation of a weight loss diet can lead to the development of an ED.<sup>27</sup> There is a lack of research as to whether restrictive diets could precipitate a similar progression, but a greater adherence to a low-FODMAP diet has been associated with ED behavior.<sup>26</sup>

EDs do not have “a look.” Many individuals with EDs fall within a normal BMI range.<sup>5</sup> Any ED behaviors disclosed to a healthcare provider should be taken seriously. Having ED behaviors dismissed by a healthcare provider because the patient does not appear thin enough may reinforce the ED and delay treatment.

Individuals do not choose to have EDs.<sup>28</sup> There is a strong genetic component to EDs influenced by hormonal, developmental, and environmental pressures to initiate the illness.<sup>28,29</sup> Individuals can choose to recover, but it is often not an easy decision to come to or pursue for a multitude of reasons such as resources, life circumstances, ineffectiveness of prior treatment, and a lack of availability of appropriate programs.

The duration of EDs is protracted, relapses are common, and many individuals with EDs never achieve recovery. If ED behaviors are lessened but not fully resolved, the remaining ED behaviors can continue to cause GI symptoms for the reasons discussed earlier.

Individuals with EDs may knowingly or unknowingly be looking for a physiological cause of their symptoms. Both dismissing and repeatedly evaluating GI complaints can have adverse effects on ED recovery.<sup>3</sup>

Ambivalence towards treatment is common in EDs. The individual may recognize that their eating

Table 4. Resources for Clinicians

Websites
<b>National Eating Disorder Association (NEDA):</b> <a href="http://nationaleatingdisorders.org">nationaleatingdisorders.org</a>
<b>The Academy for Eating Disorders (AED):</b> <a href="http://aedweb.org">aedweb.org</a>
<b>International Association of Eating Disorder Professionals (IAEDP):</b> <a href="http://iaedp.com">iaedp.com</a>
Books
<b>Eating Disorders: A Comprehensive Guide to Medical Care and Complications</b> 4th Edition 2022; edited by Mehler and Andersen
<b>Winning the War Within: Nutrition Therapy for Clients with Eating Disorders</b> 3rd Edition 2020 by Myers ES, Caperton-Kilburn C. Helm Publishing, Inc.
<b>Nutrition Counseling in the Treatment of Eating Disorders</b> 2nd Edition 2013 by Herrin and Larkin

patterns are causing issues, but the ED-related thoughts will minimize the size, scope, and impact of those issues. For these reasons, the clinician may need to provide psychoeducation on the connection between food intake and the function of the GI tract more than once. Due to minimization, individuals with EDs may have difficulty following through on scheduling recommended appointments with ED-specialized providers. Assisting them in making the appointments can be helpful.

The best chances of ED recovery are when intervention is early and aggressive. The optimal treatment of an ED involves the individual concurrently seeing a registered dietitian nutritionist, mental health provider, and physician, all who specialize in treating EDs.

## CONCLUSION

In summary, EDs have direct physiological effect on the GI tract and microbiota. Several screening tools exist to help clinicians detect EDs and should be used prior to prescribing a restrictive diet. If an ED is suspected, refer the patient to a registered dietitian nutritionist and a mental health provider who specialize in EDs and coordinate care. Several ED professional groups have provider directories to assist in locating nearby ED specialists (see Table 4). ■

## References

1. American Psychiatric Association. Feeding and Eating Disorders. In: Diagnostic and statistical manual of mental disorders, 5th ed. American Psychiatric Association Publishing, Arlington, Virginia. 2013.
2. Hetterich L, Mack I, Giel KE, et al. An update on gastrointestinal disturbances in eating disorders. *Mol Cell Endocrinol.* 2019;497:110318.
3. Mehler PS. Gastrointestinal Complications. In: Mehler PS, Andersen AE ed. *Eating Disorders*, 3rd Edition. Johns Hopkins University Press, Baltimore, Maryland. 2017;126-142.
4. Salvioli B, Pellicciari A, Iero L, et al. Audit of digestive complaints and psychopathological traits in patients with eating disorders: A prospective study. *Dig Liver Dis.* 2013;45(8):639-644.
5. McGowan A, Harer KN. Irritable Bowel Syndrome and Eating Disorders: A Burgeoning Concern in Gastrointestinal Clinics. *Gastroenterol Clin North Am.* 2021;50(3):595-610.
6. Satherley R, Howard R, Higgs S. Disordered eating practices in gastrointestinal disorders. *Appetite.* 2015;84:240-250.

**PRACTICAL  
GASTROENTEROLOGY**

Visit our Website:

[practicalgastro.com](http://practicalgastro.com)

7. Bavani NG, Hajhashemy Z, Saneei P, et al. The relationship between meal regularity with Irritable Bowel Syndrome (IBS) in adults. *Eur J Clin Nutr.* 2022.
8. Okami Y, Kato T, Nin G, et al. Lifestyle and psychological factors related to irritable bowel syndrome in nursing and medical school students. *J Gastroenterol.* 2011;46(12):1403-10.
9. Reed-Knight B, Squires M, Chitkara DK, et al. Adolescents with irritable bowel syndrome report increased eating-associated symptoms, changes in dietary composition, and altered eating behaviors: a pilot comparison study to healthy adolescents. *Neurogastroenterol Motil.* 2016;28(12):1915-1920.
10. Hayes P, Corish C, O'Mahony E, et al. A dietary survey of patients with irritable bowel syndrome. *J Hum Nutr Diet.* 2014;27(Suppl 2):36-47.
11. Kayar Y, Agin M, Dertli R, et al. Eating disorders in patients with irritable bowel syndrome. *Gastroenterol Hepatol.* 2020;43(10):607-613.
12. Voderholzer U, Haas V, Correll CU, et al. Medical management of eating disorders: an update. *Curr Opin Psychiatry.* 2020;33(6):542-553.
13. Nikniaz Z, Beheshti S, Farhangi MA, et al. A systematic review and meta-analysis of the prevalence and odds of eating disorders in patients with celiac disease and vice-versa. *Int J Eat Disord.* 2021;54(9):1563-1574.
14. Baeza-Velasco C, Lorente S, Tasa-Vinyals E, et al. Gastrointestinal and eating problems in women with Ehlers-Danlos syndromes. *Eat Weight Disord.* 2021;26:2645-2656.
15. Benjamin J, Sim L, Owens MT, et al. Postural Orthostatic Tachycardia Syndrome and Disordered Eating: Clarifying the Overlap. *J Dev Behav Pediatr.* 2021;42(4):291-298.
16. Jafri S, Frykas TL, Bingemann T, et al. Food Allergy, Eating Disorders and Body Image. *J Affect Disord.* 2021;6.
17. Ilzarbe L, Fabrega M, Quintero R, et al. Inflammatory Bowel Disease and Eating Disorders: A systematized review of comorbidity. *J Psychosom Res.* 2017;102:47-53.
18. Lam YY, Maguire S, Palacios T, et al. Are the Gut Bacteria Telling Us to Eat or Not to Eat? Reviewing the Role of Gut Microbiota in the Etiology, Disease Progression and Treatment of Eating Disorders. *Nutrients.* 2017;9(6):602.
19. Santonicola A, Gagliardi M, Pier Luca Guarino M, et al. Eating Disorders and Gastrointestinal Diseases. *Nutrients.* 2019;11(12):3038.
20. Di Lodovico L, Mondot S, Doré J, et al. Anorexia nervosa and gut microbiota: A systematic review and quantitative synthesis of pooled microbiological data. *ProgNeuro-Psychopharmacol Biol Psychiatry.* 2021;106.
21. Bern EM, Woods ER, Rodriguez L. Gastrointestinal Manifestations of Eating Disorders. *J Pediatr Gastroenterol Nutr.* 2016;63(5):e77-e85.
22. Cooper M, Collison AO, Collica SC, et al. Gastrointestinal symptomatology, diagnosis, and treatment history in patients with underweight avoidant/restrictive food intake disorder and anorexia nervosa: Impact on weight restoration in a meal-based behavioral treatment program. *Int J Eat Disord.* 2021;54(6):1055-1062.
23. Cotton MA, Ball C, Robinson P: Four Simple Questions Can Help Screen for Eating Disorders. *J Gen Intern Med.* 2003;18(1):53-56.
24. Sergentanis TN, Chelmi M-E, Liampas A, et al. Vegetarian Diets and Eating Disorders in Adolescents and Young Adults: A Systematic Review. *Children.* 2021;8(1):12.
25. Zickgraf HF, Hazzard VM, O'Connor SM, et al. Examining vegetarianism, weight motivations, and eating disorder psychopathology among college students. *Int J Eat Disord.* 2020;53:1506-1514.
26. Mari, A, Hosadurg D, Martin L, et al. Adherence with a low-FODMAP diet in irritable bowel syndrome: are eating disorders the missing link? *Eur J Gastroenterol Hepatol.* 2019;31(2):178-182.
27. Memon AN, Gowda AS, Rallabhandi B, et al. Have Our Attempts to Curb Obesity Done More Harm Than Good?. *Cureus.* 2020;12(9):e10275.
28. Steiger H, Booij L. Eating Disorders, Heredity and Environmental Activation: Getting Epigenetic Concepts into Practice. *J Clin Med.* 2020;9(5):1332.
29. Frank GKW, Shott ME, DeGuzman MC. The Neurobiology of Eating Disorders. *Child Adolesc Psychiatr Clin N Am.* 2019;28(4):629-640.
30. Bartel SJ, Sherry SB, Farthing GR, et al. Classification of Orthorexia Nervosa: Further evidence for placement within the eating disorders spectrum. *Eat Behav.* 2020;38.

### Answers to this month's crossword puzzle:

1	E	P	I	G	E	N	E	T	I	C			6	S	I	T				
	P		N		M		X		C		8	V		P		H				
9	I	N	U	10	L	I	N		11	M	O	T	I	L	I	T	Y			
	T		12	S	E	T		13	N		N		S		C		M			
14	H	E	E	D				15	C	E	L	I	A	C		17	18	A	G	E
	E								U		19	C	U	E				U		
20	L	U	21	R	E			22	P	R	E		23	G	R	O	W	T	24	H
	I		E			25	D		O			26	I		A					E
27	A	U	T	O	I	M	M	U	N	E			28	D	R	I	P			
	L		C		U		A		D			30	B		E					A
		31	C	H	A	R	T			32	B	E	A	U	M	O	N	T		
			F			N		33	T	A	X			F		P				I
34	S	C	35	H	L	A	36	F	E	N		37	A	F	F	E	C	T		
	I		E			38	L	E	A		39	P		E		N				I
40	P	I	N	T						41	F	I	B	R	O	S	I	S		