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Psychiatric comorbidities in women with Celiac Disease

Danielle Arigo,¹ Alicia M Anskis² and
Joshua M Smyth³

Abstract

Objective: Although the physical consequences of Celiac Disease are well studied, less is known about co-occurring psychiatric symptoms. This study examines psychiatric risk and comorbidities of women with Celiac Disease, who may be at increased risk for psychiatric symptoms (e.g. depression, and disordered eating behaviours).

Methods: Women ($N = 177$) with Celiac Disease responded to an extensive web-mediated survey assessing dietary compliance, illness symptoms, psychiatric functioning, and disordered eating.

Results: Despite high reported dietary compliance, patients reported marked illness symptoms and impaired quality of life. A substantial minority endorsed symptoms that met criteria for the diagnosis of psychiatric disorders: 37% ($n = 65$) met the threshold suggesting depression, and 22% ($n = 39$) for disordered eating. Participants whose symptoms exceeded these clinical thresholds reported greater perceived stress and reduced overall mental health, relative to women below the clinical cutoffs.

Conclusions: Despite largely adhering to a gluten-free diet, a substantial subset of women with Celiac Disease report clinically relevant symptoms of depression and disordered eating; such symptoms are associated with increased psychosocial distress in other domains. These results suggest potential to improve the patient well-being through attention to psychosocial care, in addition to existing dietary recommendations for individuals with Celiac Disease.

Keywords

Celiac Disease, eating disorders, depression, gastrointestinal disorders, quality of life

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Introduction

Celiac Disease represents a growing but understudied autoimmune disorder that is associated with a variety of short- and long-term physical symptoms. Clinical recommendations for patients with Celiac Disease focus on avoiding the ingestion of gluten¹ to prevent inflammation in the small intestine and consequent symptoms. As gluten is found in wheat, rye, barley, and other common foods; however, individuals with Celiac Disease often find it challenging to

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avert immediate symptoms.² Further, many patients suffer uncomfortable gastrointestinal symptoms even when adhering to a gluten-free diet.³ Such experiences can disrupt patients' daily physical, emotional, and social functioning, which can lead to psychiatric distress that further impedes illness management.⁴

Previous reports show that Celiac patients' quality of life in various mental health domains is somewhat lower than that of healthy individuals in the general population.^{3,5,6} Quality of life is particularly low among women with Celiac Disease;^{7,8} specifically, women report more difficulty in managing feelings of deprivation associated with a gluten-free diet, and greater desire to control the preparation of the food they eat, than do men with the disorder.⁹ Intense focus on food intake is necessary to control symptoms of Celiac Disease, but may give rise to excessive concern with other aspects of consumption (e.g. overall calorie count) that is characteristic of eating disorders such as anorexia or bulimia nervosa. A growing body of literature links Celiac Disease to the onset of clinically relevant eating disorders, which carry high risk for medical complications and, potentially, early death.¹⁰

Existing work on the association between Celiac Disease and eating disorders has primarily focused on reviewing case reports.¹¹⁻¹³ One exception is Karwautz et al.'s¹⁴ examination of eating pathology among adolescents with Celiac Disease. This study found rates of disordered eating among Celiac patients (~16% of their sample) that were substantially higher than estimates for the general population (~1% in Western countries^{15,16}). Karwautz et al.¹⁴ also found eating disorders only among women, and the onset of disordered eating typically followed (rather than preceded) the diagnosis of Celiac Disease. Ongoing examination of this possible comorbidity in large samples of women with Celiac Disease

could increase practitioners' awareness of problematic behavioural and emotional responses to disease management (i.e. excessive restriction in range of intake). Including adult women in such investigations is increasingly important, as many women now develop disordered eating symptoms at later ages.¹⁵

In addition, previous studies of quality of life and emotional functioning among women Celiac Disease have typically focused on Europeans. This trend highlights a contrast between the rising prevalence of Celiac Disease in the United States and the scarcity of empirical literature on American patients' well-being. The overarching goal of this study was to gather preliminary descriptive information about the psychiatric functioning of American women with Celiac Disease across a wide variety of domains. These domains included depressive symptoms, perceived stress, and health-related quality of life, with a particular focus on body image concerns and disordered eating symptoms.

Our first aim was to determine average levels of psychiatric functioning in a sample of American women with Celiac Disease. We predicted that individuals with Celiac Disease would demonstrate elevated depressive symptoms, perceived stress, disordered eating symptoms, and interference with everyday activities (resulting in low quality of life), relative to available normative information for the measures used. Second, we aimed to identify associations between various psychiatric symptoms (e.g. depression and perceived stress), and between physical and psychiatric symptoms, with a focus on disordered eating thoughts and behaviours. We predicted that higher reported psychiatric symptoms would be associated with decreased dietary compliance, increased illness severity, and decreased physical and emotional quality of life. We also expected higher reported disordered eating symptoms to be associated

with lower physical and emotional quality of life, more depressive symptoms, and higher perceived stress.

Method

Female residents of the United States who were over the age of 18 and reported a physician-provided diagnosis of Celiac Disease were eligible to participate in this study. Participants were recruited using three methods: (1) through contact persons for local and national Celiac Disease organizations, (2) through support networks found on social networking websites, and (3) through online newsletters distributed by the supporting institution. Interested individuals were directed to an anonymous web-mediated survey that consisted of several questionnaires, described below. All data collection took place between January and April of 2008. Respondents ($N = 177$) were mostly Caucasian (98%), married (56%), and high-school educated (75%); mean age for the sample was 39.24 years. The demographic profile of the present sample appears largely reflective of the population of individuals with Celiac Disease.^{3,17,18} Data collection used the following measures to assess a range of physical, behavioural, and emotional experiences; all measures were chosen based on their previously demonstrated ability to briefly and reliably capture each domain of functioning.

Dietary Compliance Scale

A brief, five-item questionnaire that determines a respondent's level of adherence to a gluten-free diet.¹⁹ Responses to items such as 'When I feel well I sometimes discontinue my diet' are given as either 'yes' or 'no'. For the purpose of this study, 'yes' responses were given values of 1 and 'no' responses given values of 0; one item was reverse-scored ('I never forget about my diet'), so that higher scores on this measure would

reflect increased gluten-free diet adherence. The Kuder—Richardson reliability estimate for the present sample was 0.65.

Celiac Disease Symptom Questionnaire

This 19-item inventory assesses various symptoms of Celiac Disease under four symptom groupings: gastrointestinal (e.g. abdominal bloating), emotional (e.g. happiness), worry (e.g. worried or anxious due to the disease), and social (e.g. avoiding eating at certain events).²⁰ Items are worded to determine the frequency of each symptom. Responses range from 1 ('of the time') to 7 ('of the time'); higher total and subscale scores indicate more frequent symptoms. The overall scale and subscales demonstrate high internal consistency (Cronbach's alpha ranging from 0.80 to 0.90) and adequate discriminant validity when compared to more general measures of physical and emotional health (e.g. Short-Form Health Survey²¹ physical functioning subscale, $r = 0.34$; emotional role subscale, $r = 0.49$). Cronbach's alpha for this study was 0.93.

Short-Form Health Survey

A 36-item inventory that assesses the degree to which physical symptoms interfere with functioning in multiple domains of physical and mental health.²¹ Interference with individual activities is rated as occurring between 'none of the time' and 'all of the time' during the past 4 weeks. Estimates of internal consistency and test-retest reliability range from 0.70 to 0.95 across samples. In this study, Cronbach's alphas for the Physical and Mental Health subscales were 0.84 and 0.64, respectively.

Perceived Stress Scale

An 11-item scale with response options ranging from 0 ('never') to 4 ('very often'), capturing respondents' experience and management

of stressful situations.²² The PSS shows adequate reliability ($\alpha = 0.84\text{--}0.86$) and reasonable overlap with the College Student Life Event Scale ($r = 0.20\text{--}0.38$) and with ratings of the impact of life events ($r = 0.20\text{--}0.49$) across multiple samples. Cronbach's alpha was 0.90 in the present sample.

Center for Disease Studies—Depression Scale

This measure lists 20 symptoms of clinical depression, asking respondents to rate how intensely they are currently experiencing each feeling or behaviour; responses are rated from 'not at all' to 'very much'.²³ Previous estimates of reliability were 0.85 in healthy individuals and 0.90 among patients with clinical depression; in patient samples, there has been moderate overlap with other measures of depressive symptoms prior to treatment (e.g. $r = 0.44$ with the Hamilton clinician rating scale²⁴).

Eating Disorders Examination Questionnaire

This 29-item measure asks participants to report on the frequency of thoughts and behaviours associated with eating and body image, with a time frame of the past 28 days.²⁵ Items are rated from 'not at all' to 'every day', and responses are scored on subscales that include shape concern, weight concern, eating concern, and restraint. These subscales have previously demonstrated good reliability:²⁶ $\alpha = 0.81$ (eating concern), $\alpha = 0.93$ (shape concern), $\alpha = 0.89$ (weight concern), and $\alpha = 0.85$ (restraint). Cronbach's alpha coefficients for this study were 0.93 (total score), 0.78 (restraint), 0.83 (eating concern), 0.89 (shape concern), and 0.78 (weight concern).

Results

A sample size of at least 175 would allow us adequate statistical power to detect modest

correlations (i.e. power of ~ 0.8 for $r = 0.20$). Two hundred women started the survey and provided at least some data. Of this total number, 23 women were excluded prior to analyses due to insufficient data (i.e. missing $> 80\%$ of the items included; these women started, but did not complete the survey), leaving a final sample of 177 women. A majority of these women ($n = 108$) indicated that they received ongoing professional care (from primary care physicians, gastroenterologists, gynaecologists, psychiatrists, or nutritionists/dieticians) to help manage their symptoms of Celiac Disease or related conditions (e.g. vitamin deficiencies and menstrual irregularities).

Our first goal was to characterize the reported physical and psychiatric functioning of women with Celiac Disease by examining averages on each descriptive scale. Participants reported a high average level of dietary compliance (mean [M] = 4.47 of a possible 5 on the Dietary Compliance Scale), indicating that most participants frequently adhere to a gluten-free diet. In fact, only 8% ($n = 14$) of the present sample reported compliance below the midpoint of the scale used. Despite high compliance, however, participants also endorsed high levels of disease symptoms, body image concerns (particularly concern about one's shape), depressive symptoms, and perceived stress on the measures used to assess these experiences. Reported levels of self-rated physical and emotional health varied, but were suggestive of marked impairment for many patients in the areas of bodily pain, vitality, and social functioning. (Please refer to Table 1 for mean scores and standard deviations). Our first hypothesis was thus partially supported by high average levels of psychiatric symptoms and low quality of life in specific domains.

Our second goal was to examine associations between physical (e.g. dietary compliance and nausea) and psychiatric (e.g. depressed mood) experiences, and between

distinct psychiatric symptoms (e.g. depressed mood and perceived stress). The resulting correlation coefficients (*r*-values)

Table 1. Descriptive statistics for disease-relevant and psychosocial variables

Variable	<i>M</i> ^a	<i>SD</i> ^b
Dietary compliance	4.47	1.06
CD symptom severity	99.68	34.37
Perceived stress	16.30	8.08
Depressive symptoms	14.96	10.90
Disordered eating—total	1.56	1.19
Restraint	1.49	1.48
Eating concerns	0.76	1.08
Shape concerns	2.36	1.61
Weight concerns	1.57	1.39
Physical functioning	84.72	19.96
Physical role	66.57	38.49
Bodily pain	42.10	10.30
Emotional role	66.08	38.80
Vitality	46.82	25.34
Mental health	70.14	19.35
Social functioning	43.42	28.71
General health	50.15	12.19
Physical health subscale	60.73	14.53
Mental health subscale	56.53	14.97

Note: ^a*M* denotes the mean value for each experience assessed (across the entire sample).

^b'*SD*' denotes the associated standard deviation.

and significance tests can be found in Tables 2 and 3; statistical significance for all tests was set at $p < 0.05$. Analyses revealed moderate to strong associations between illness behaviours/symptoms and psychiatric functioning. Greater compliance with a gluten-free diet was related to increased vitality, reduced impairment in daily emotional role performance, lower stress, decreased depressive symptoms, and greater overall emotional health. Increased dietary compliance was also, however, related to more frequent disordered eating concerns and behaviours, particularly concerns about shape and weight. Dietary compliance was unrelated to illness symptom severity, physical role performance, self-reported mental and general health, or bodily pain. Increased illness-specific symptom severity similarly was associated with various areas of dysfunction, including greater depression, stress, disordered eating concerns and behaviours, and most quality of life domains. Symptom severity was not associated with disordered eating symptoms or bodily pain.

Likewise, correlation tests revealed moderate to strong associations between distinct domains of psychiatric functioning. Reports

Table 2. Correlation (*r*) values for relationships among dietary compliance, illness symptom severity, distress symptoms, and body concerns

Variable	DC	CDS	DS	PS
DC	—			
CDS	−0.15	—		
DSs	−0.28**	0.74***	—	
PSS	−0.25**	0.33*	0.54***	—
Disordered eating—total	−0.19*	0.36**	0.43***	0.43***
Restraint	−0.68	0.17	0.22**	0.78***
Eating concerns	−0.22**	0.36**	0.42***	0.85***
Shape concerns	−0.17*	0.33**	0.39***	0.90***
Weight Concerns	−0.20*	0.39**	0.44***	0.92***

Note: As correlations between subscales representing distinct disordered eating behaviours and concerns are high (reflecting that these are related constructs), these correlations are not reported.

DC, dietary compliance; CDS, CD symptom severity; DSs, depressive symptoms; and PSS, perceived stress.

* $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$.

Table 3. Correlation (*r*) values for relationships between illness-related/psychosocial distress and quality of life domains

Variable	PF	PR	BP	ER	V	MH	SF	GH	PHS	MHS
Dietary compliance	-0.06	0.05	-0.06	0.23**	0.17*	0.10	-0.12	0.19	0.003	0.20**
CD Symptom Severity	-0.43***	-0.50***	-0.08	-0.60***	-0.69***	-0.59***	0.50***	-0.26**	-0.53***	-0.63***
Depressive Symptoms	-0.32***	-0.44***	0.17*	-0.66***	-0.72***	-0.76***	0.62***	-0.18*	-0.41***	-0.68***
Perceived Stress	-0.29***	-0.40***	0.24**	-0.66***	-0.72***	-0.66***	0.53***	-0.19*	-0.34***	-0.69***
Disordered Eating Total	0.02	-0.23**	0.03	-0.37***	-0.37***	-0.38***	0.32***	0.05	-0.13	-0.37***
Restraint	0.13	-0.09	0.08	-0.15	-0.17*	-0.16*	0.11	0.08	0.01	-0.17*
Eating Concerns	0.05	-0.21**	0.01	-0.36***	-0.27***	-0.36***	0.27***	0.14	-0.10	-0.33***
Shape Concerns	-0.05	-0.22**	-0.004	-0.36***	-0.40***	-0.38***	0.35***	-0.006	-0.17*	-0.36
Weight Concerns	-0.05	-0.26***	0.03	-0.42***	-0.42***	-0.42***	0.36***	-0.02	-0.20*	-0.41***

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. PF, physical functioning; PR, physical role; BP, bodily pain; V, vitality (energy); MH, mental health; SF, social functioning; GH, general health; PHS, physical health summary; and MHS, mental health summary. As correlations between subscales representing distinct quality of life domains are high (reflecting that these are related constructs), such correlations are not reported.

of increased depressive symptoms were associated with greater perceived stress; both depressive symptoms and perceived stress were related to more frequent disordered eating concerns and behaviours, and to lower quality of life (in each domain assessed). These findings indicate that some women with Celiac Disease reported increased psychosocial distress across multiple domains (*r*-values for each correlation can be found in Tables 2 and 3).

We also examined whether respondents' reported psychiatric symptoms met the thresholds for clinical 'cutoffs' (suggesting symptom levels meeting or exceeding established criteria for a psychiatric disorder). For example, the present sample demonstrated a relatively high average level of depressive symptoms: the sample mean scores ($M = 14.93$, $SD = 10.90$) were just below the clinical cutoff score of 16,²³ and 37% of the sample reported scores that met or exceeded this cutoff ($n = 65$). Moreover, women who were at or above the clinical cutoff reported lower dietary compliance, higher illness symptom severity, higher perceived stress, and lower physical and emotional quality of life, relative to women who scores below the cutoff (see Table 4 for *T*-values for tests on group means).

Our final goal was to explore the comorbidities of disordered eating symptoms in women with Celiac Disease. Individuals who reported more frequent disordered eating behaviours (e.g. intake restriction) and greater concerns about eating, shape, and weight also endorsed lower quality of life in most physical and health domains; only self-reported physical functioning was unrelated to disordered eating concerns or behaviours. In addition, 22% of females in the present sample ($n = 39$) scored in the clinically meaningful range of disordered eating symptoms (i.e., above a total score of 2.3²⁷). These women reported more severe illness symptoms, increased depressive symptoms, greater perceived stress, and

reduced overall mental health, relative to women who were below this clinical cutoff (please refer to Table 5 for *T*-values).

Discussion

Individuals with chronic illnesses face the daily challenge of managing their uncomfortable (and potentially deleterious) symptoms. As such, these individuals are often at

higher risk for experiencing physical and psychiatric difficulties that reduce their quality of life.²⁸ Celiac Disease is a relatively understudied illness that impacts nearly all domains of functioning, and may give rise to comorbid psychiatric symptoms that parallel those reported in other patient samples.³ The primary goal of this study was to examine the extent of psychiatric distress among women with Celiac Disease, with

Table 4. Differences between women with Celiac Disease who fell below and above the clinical cutoff for depressive symptoms

Variable	Center for Disease Studies—Depression Scale Clinical cutoff				T-value
	Below		Above		
	M	SD	M	SD	
Dietary compliance	4.63	0.82	4.29	1.26	2.12*
CC symptom severity	89.73	24.68	130.20	36.40	-5.27***
Disordered eating symptoms	1.24	0.98	2.02	1.33	-2.71*
Perceived stress	8.75	5.40	13.57	4.35	-4.24***
Physical health summary	63.92	29.89	48.69	23.89	3.64***
Mental health summary	64.03	26.04	32.58	17.59	8.99***

Note: *T*-value is the result of a test for differences between means for women above and below the clinical cutoff for depressive symptoms.

p* < 0.05, *p* < 0.01, and ****p* < 0.001

Table 5. Differences between women with Celiac Disease who fell below and above the clinical cutoff for disordered eating symptoms

Variable	Eating Disorders Examination Questionnaire Clinical Cutoff				T-value
	Below		Above		
	M	SD	M	SD	
CC symptom severity	95.11	32.34	124.50	35.59	-2.88*
Depressive symptoms	12.53	10.06	23.95	11.15	-5.82***
Perceived stress	14.44	7.72	22.48	5.93	-6.97***
Physical health summary	62.03	14.90	56.44	12.49	2.37*
Mental health summary	59.88	14.17	45.58	12.11	6.27***

Note: *T*-value is the result of a test for differences between means for women above and below the clinical cutoff for disordered eating symptoms.

p* < 0.05, *p* < 0.01, ****p* < 0.001.

particular emphasis on the suspected risk for problematic eating concerns and behaviours. Analyses revealed several noteworthy features of physical and psychiatric functioning among women with Celiac Disease.

Despite reporting (on average) a high degree of compliance with a gluten-free diet (which is comparable to previous investigations of compliance²⁹), participants in the present sample report moderate to severe illness symptoms and moderate self-rated physical health that appeared unrelated to their dietary adherence. Interestingly, although increased dietary compliance was not directly related to lower symptom intensity, greater compliance was associated with lower distress and increased vitality. It is perhaps the case that individuals with Celiac Disease are relieved of emotional distress through their avoidance of gluten (i.e. knowing that they are following recommendations from their doctors may provide peace of mind), rather than through the diet's direct physical effects.

This explanation is partially supported by the inverse relationship between dietary compliance and psychiatric stress, and the positive relationship between psychiatric stress and symptom severity. These relationships indicate that those who follow their diets have less distress (relative to those who neglect their diets), and that those who have less distress also experience less severe illness symptoms. The bidirectional nature of these correlational data, however, precludes drawing strong conclusions about causal pathways. Future work may benefit from examining such pathways, and from determining additional contextual factors that contribute to risk for psychosocial difficulties among individuals with Celiac Disease. For example, aspects of the social environment such as increased social support³⁰ and the ability to compare oneself with other patients³¹ have shown positive effects on psychiatric and medical outcomes among patients with a chronic illness. Attention to

such influences may contribute to optimally effective care for patients with Celiac Disease.

Importantly, this study indicates that certain individuals endorse more distress in conjunction with their illness. Individuals who experienced frequent illness symptoms also reported more severe depressive and pain symptoms, reduced energy, and increased interference with emotional and social functioning. Independent of illness symptoms, those individuals with higher depression scores or higher perceived stress experienced disruption in multiple realms of daily life. A substantial percentage of individuals with Celiac Disease (37%) scored in the clinically relevant range of depressive symptoms, which exceeds population-based data for the measure used (i.e. 21%).²³ These findings provide evidence to suggest that patients with more frequent illness symptoms may be at risk for developing psychiatric difficulties that warrant clinical attention. This may be true even when dietary restrictions are being followed, suggesting the overall need for attention to psychosocial functioning in addition to dietary recommendations in clinical practice.

We expected that the increased focus on eating behaviours required to manage Celiac Disease would be reflected in reports of disordered eating. Although concerns about eating were similar to published normative levels among ostensibly healthy women ($M=0.76$ in the present sample), concerns about one's body shape were, unexpectedly, slightly higher than normative levels. Increased shape concern was also related to greater perceived stress, more severe illness symptoms, reduced physical and mental health in multiple domains, and decreased dietary compliance. Average levels of disordered eating (using the total score) were below the acknowledged clinical cutoff for the measure used; of note, however, 22% of the present sample reported symptoms in line with eating disorders of

clinical significance. In contrast, only 6.3% of young women from the general population score above the clinical cutoff.³² Women in the present sample whose symptoms exceeded the clinical cutoff reported greater physical and mental health difficulties than did women whose symptoms were below the cutoff.

The nature of Celiac Disease is such that increased dietary concerns and greater focus on consumption management are indicated for patients, relative to the general population.¹³ Yet the present findings suggest that a subset of women with Celiac Disease demonstrate extreme dietary (and appearance) concerns that are associated with reduced physical and emotional quality of life. Such findings build upon existing literature (i.e. case histories,^{11,12,13} studies conducted in adolescent samples¹⁴) by demonstrating this trend in a large sample of adult women. The presence of disordered eating symptoms in the present sample indicates that attending to the risk for extreme thoughts and behaviours related to eating and shape is a large area of opportunity for improving quality of life in women with Celiac Disease. Disordered eating symptoms may thus represent appropriate targets for psychosocial intervention in this patient group. Additional research is necessary to determine the extent of risk for disordered eating symptoms among women with Celiac Disease, relative to the general population.

A small number of existing studies have demonstrated that Celiac Disease carries increased risk psychiatric difficulty and reduced quality of life in European samples.³ To our knowledge, this present study is one of the first to extend such findings to an American sample of adult women, who may be at particular risk for disordered eating symptoms. This study was limited by self-selection and a relatively small sample of patients. Self-selection may have been related to the time burden of completing the

survey (~20 min for 110 items). In addition, using internet recruitment may have introduced the possibility of gathering a sub-optimally representative sample, as it was restricted to individuals with Celiac Disease who had access to computers and searched for Celiac-related information. As this group tends to be female,³³ however, internet recruitment and administration may have increased the study's reach and ease of participation for the target group (relative to traditional in-person and paper-and-pencil techniques), and was cost-effective to conduct. This method also resulted in a sample that is comparable to the overall population of women with Celiac Disease in Western countries.

Finally, this study employed a number of statistical tests and was thus potentially vulnerable to Type 1 error. Of note, however, several of our hypothesis tests were significant at the 0.001-level, reflecting effects much less likely due to chance. Consistency between the present findings and existing data for European samples also reduces the likelihood that the former are entirely attributable to Type 1 error. Although replication of these findings in larger samples with biologically-verified Celiac Disease is necessary (e.g. recruitment from a Celiac Disease clinic, serologic screening), this study is an important first step toward identifying female patients in the USA who are at risk for psychiatric difficulties—particularly disordered eating symptoms. This study also shows that various types of psychiatric distress co-occur among patients with Celiac Disease. It is possible that a brief, general screening tool may allow care providers to quickly and effectively assess for psychiatric risk in clinics, hospitals, and outpatient offices, which is another fruitful avenue for research.

Notwithstanding the noted limitations, this study demonstrates potential risk for meaningful psychiatric difficulty among

patients with Celiac Disease, and highlights the opportunity for improvement in patient care *via* attention to emotional challenges. The benefits of attending to psychiatric concerns (in addition to standard medical care) have previously been demonstrated in samples with well-known gastrointestinal disorders (e.g. irritable bowel syndrome,³⁴ ulcerative colitis and Crohn's disease³⁵). This study adds to the growing body of literature highlighting the need for psychosocial care among individuals with Celiac Disease, and provides preliminary evidence to suggest that tests of psychosocial interventions for Celiac Disease (such as cognitive and/or self-management therapies) are warranted.

Authors' note

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