

Patient burden and treatment experience in celiac disease

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Background

- Currently, strict adherence to a Gluten-Free Diet (GFD) is the sole treatment option for patients with celiac disease (CeD). Despite GFD adherence, many patients' CeD symptoms and complications persist, compelling the use of medical services, which is in addition to the costs of maintaining a GFD.¹⁻⁵
- Few studies have explored patients' perceptions of the extent of the symptom and treatment-related burden of CeD, which is important for further development of treatments for CeD.

Study objective

- To assess the burden of CeD and treatment experience through a patient survey.

Methods

- A cross-sectional burden of illness survey was conducted in collaboration with patient advocates, clinicians, outcomes researchers and patients with CeD.
- Survey content was informed by CeD literature and patient interviews (n=10), recruited via advocacy groups. Sixty-minute interviews were conducted to obtain insight into CeD symptoms and impacts, obstacles to GFD adherence, and key concepts for inclusion in the survey.
- The online survey was pilot tested with 5 patients to evaluate comprehensiveness and usability prior to launch.
- Survey content:
 - De novo questions were developed to evaluate issues such as: pathway to diagnosis, barriers to health care resources, symptoms, complications, comorbidities and diet.
 - Several patient-reported outcome (PRO) measures were included to assess core concepts related to CeD experience:
 - » CeD symptoms: Celiac Symptom Index (CSI)⁶
 - » Impact of CeD symptoms: Impact of Celiac Disease Symptom Questionnaire (ICDSQ)⁷
 - » Adherence to a GFD: Celiac Dietary Adherence Test (CDAT)⁸
 - » Impact of a GFD: Impact of a Gluten-Free Diet Questionnaire (IGFDQ)⁹
 - » Work productivity/impairment: Work Productivity and Activity Impairment Questionnaire: Specific Health Problem (WPAI-SHP)⁹
 - » Overall health-related quality of life (HRQoL): PROMIS Global Health (Physical, Mental)¹⁰
- Participants from the USA were recruited through online panels and recruiters to complete the survey. Adult patients were eligible to participate if they had self-reported biopsy-confirmed CeD (or serology with family history of CeD) and were on a GFD for at least 6 months.
- Data were analyzed using SAS v9.4 to produce descriptive summary statistics.

Table 1. Sociodemographic and clinical characteristics

Characteristic	USA (N=100)
Age – mean (SD)	37.2 (10.6)
Gender – female, n (%)	60 (60.0)
Race, n (%)	
White – Caucasian or White other	78 (78.0)
Black – Caribbean/African/African-American or Black other	5 (5.0)
Asian – Chinese or Asian other	3 (3.0)
American Indian or Alaska Native	8 (8.0)
Other	6 (6.0)
Ethnicity, n (%)	
Hispanic or Latino	22 (22.0)
Employment status, n (%)	
Employed full-time	68 (68.0)
Employed part-time	10 (10.0)
Student	8 (8.0)
Seeking employment	1 (1.0)
Unemployed	1 (1.0)
Retired	2 (2.0)
Self-employed	4 (4.0)
Stay at home	6 (6.0)
Education, n (%)	
No formal qualifications	1 (1.0)
Left school between age 16-18 with qualifications (GCSEs, high school diploma, GED or equivalent)	6 (6.0)
Technical/vocational qualification from a college or job	10 (10.0)
2-year college diploma	20 (20.0)
Bachelor's degree	41 (41.0)
Graduate degree (master's, doctoral, professional)	18 (18.0)
Other	4 (4.0)
Marital status, n (%)	
Single	25 (25.0)
Partnership	5 (5.0)
Married	66 (66.0)
Divorced/separated	4 (4.0)
Self-reported symptom severity, n (%)	
Mild	27 (27.0)
Moderate	30 (30.0)
Severe	31 (31.0)
Very severe	12 (12.0)

GCSE, General Certificate of Secondary Education; GED, General Educational Development.

Figure 1. Most commonly reported obstacles to maintaining a GFD

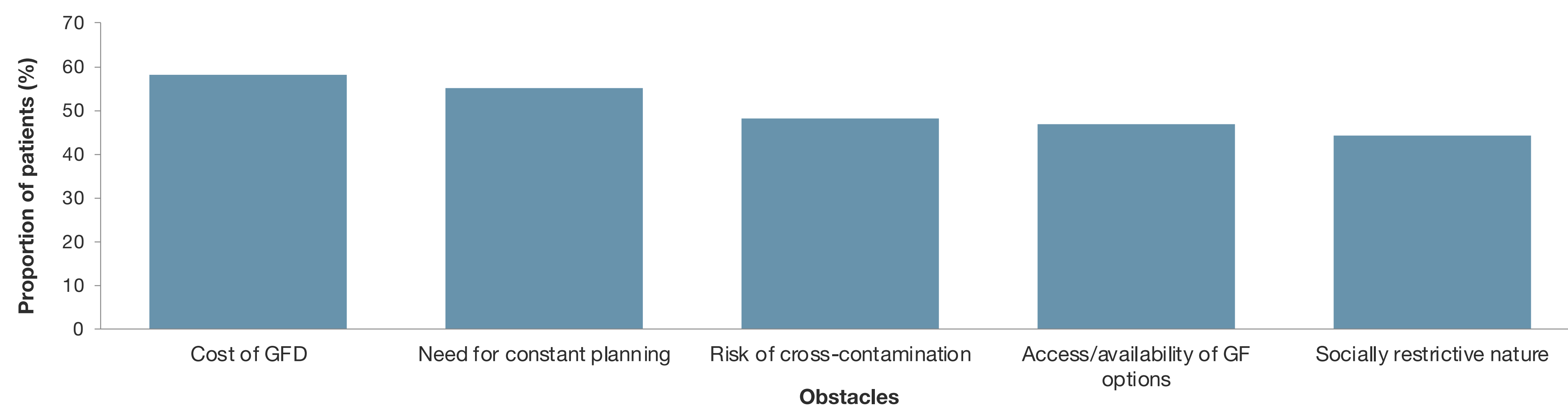
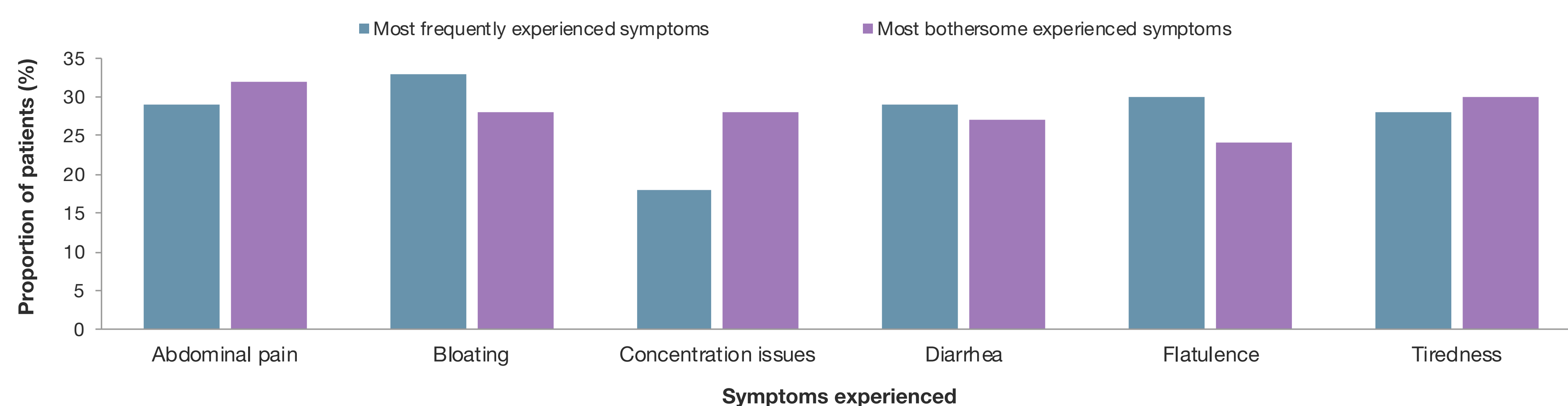


Figure 2. Most frequent and bothersome symptoms experienced (reported as “quite a bit” or “very much” in the past month)



Results

Demographic and clinical characteristics

- One-hundred US participants (60% via online panels, 40% via recruiters) completed the survey, with 27% self-reporting their CeD as mild, 30% as moderate, 31% as severe and 12% as very severe. Participants' demographics are presented in **Table 1**. 80% were diagnosed by biopsy (20% serology alone) and mean (standard deviation [SD]) time since diagnosis was 8.6 (9.2) years.

Diagnosis experience

- Patients reported experiencing symptoms or complications, on average, for 4.6 years before obtaining diagnosis. Most common symptoms leading to diagnosis were abdominal pain (69%), diarrhea (64%), bloating (46%), acid reflux (36%) and nausea (34%), with abdominal pain (55%) noted as the most bothersome.
- On average, it took 2.2 years for patients to receive a confirmed diagnosis. Obstacles to prompt diagnosis included: physician's lack of awareness of CeD (35%), lack of time or delay in seeking care (33%), misdiagnosis of another condition (27%) and barriers to healthcare such as cost/access (27%).

Follow-up care and adherence to a GFD

- 76% of patients were referred to a gastroenterologist after diagnosis, and approximately one-quarter received a referral to a dietician (26%) or nutritionist (22%).
- Most patients (76%) reported adhering “often” or “always” to a GFD, with roughly half (52%) finding adherence to be “somewhat” to “very much” difficult. Most common obstacles to maintaining a GFD are presented in **Figure 1**.

Symptoms and disease burden

- 75% of patients reported experiencing CeD symptoms more than once per month, and 57% reported at least one episode of symptomatic gluten exposure within the last month.
- As seen in **Figure 2**, the most commonly reported symptoms experienced either “quite a bit” or “very much” over the past month included bloating (33%), flatulence (30%), diarrhea (29%), abdominal pain (29%) and tiredness (28%); the most bothersome of these symptoms was abdominal pain (32%) followed by bloating (28%).

PRO instrument results

- As seen in **Table 2**, mean (SD) CSI and ICDSQ scores suggest symptom burden and impact on daily functioning.
- Mean CDAT scores suggest fair to poor adherence, while mean IGFDQ scores indicate the impact of a GFD on dietary choices, social activities and emotional wellbeing. Thirty-one patients had excellent/very good adherence (CDAT<13).
- Mean WPAI-SHP percentage scores for absenteeism, impairment while working, work productivity loss and overall activity impairment were as follows: 18.4, 39.9, 47.4, and 44, respectively. As comparisons, the US general population estimates are 3.5, 13.0, 15 and 22.1, and estimates for patients with Crohn's disease (CD) are 19.5, 42, 47.5, and 53.5.^{11,12}
- Mean (SD) PROMIS physical and mental health T-scores were 44.2 (7.5) and 47.0 (8.8), respectively, which are similar to the US average of 50 for each.

Study limitations

- Selection bias may exist as participants were recruited through patient advocacy organizations and specialist patient recruitment agencies.
- Potential recall bias from self-reported information.

Table 2. PRO instrument scores

PRO measure (N=100)*	Mean (SD)	Median (IQR)
CSI⁶ total score	41.7 (11.8)	42.0 (14.0)
ICDSQ⁷ total score	7.3 (4.5)	7.1 (6.1)
Daily activities score	1.8 (1.2)	1.6 (1.5)
Social activities score	1.8 (1.2)	2.0 (1.7)
Emotional wellbeing score	1.9 (1.2)	1.8 (1.8)
Physical functioning score	1.8 (1.3)	2.0 (2.0)
CDAT⁸ total score	15.6 (4.7)	16.0 (6.5)
IGFDQ⁹ total score	5.9 (3.3)	5.6 (4.4)
Dietary choices score	2.1 (1.2)	2.0 (1.2)
Social activities score	1.9 (1.2)	2.0 (2.0)
Emotional wellbeing score	1.8 (1.1)	1.8 (1.7)
WPAI-SHP⁹ absenteeism score (n=81)	18.4 (24.0)	9.1 (26.3)
Presenteeism (impairment while working) score (n=80)	39.9 (27.8)	45.0 (50.0)
Work productivity loss score (n=80)	47.1 (31.0)	52.9 (53.3)
Activity impairment score	44.0 (26.4)	50.0 (30.0)
PROMIS¹⁰ physical health t-score	44.2 (7.5)	42.3 (9.1)
Mental health t-score	47.0 (8.8)	45.8 (12.2)

*Sample size n=100 for each instrument, unless otherwise specified (e.g. WPAI-SHP). ⁶CSI scores range from 16 to 80, with higher scores indicating higher severity in symptoms and reduced HRQoL. ⁷ICDSQ includes 4 domain scores, each ranging from 0 to 4. The total score, calculated by averaging the domain scores, ranges from 0 to 16, with high scores suggesting high level of symptom impacts. ⁸CDAT scores range from 7 to 35, with lower scores suggesting better adherence. A total score of 13 suggests excellent or very good GFD adherence, while a total score of >17 suggest fair to poor adherence to GFD. ⁹IGFDQ includes 3 domain scores, each ranging from 0 to 4. The total score, by averaging the domain scores, ranges from 0 to 12 with high scores suggesting high impact. ¹⁰PROMIS-SHP elicits 4 scores expressed as percentages (0 to 100%), with higher values indicating greater impairment and less work productivity. ¹¹PROMIS Global Health scores range from 16.2–67.7 for physical health and 21.2–67.6 for mental health, with higher scores indicating better health. IQR, interquartile range.

Conclusions

- The US sample reported experiencing significant obstacles to prompt diagnosis, inconsistencies in follow-up care, and some level of difficulty adhering to a strict GFD.
- Despite adhering to a GFD, many patients reported experiencing a range of symptoms, with bloating, flatulence, abdominal pain, diarrhea and tiredness being the most frequently reported.
- Overall, results suggest that CeD impacts daily functioning, creates impairment while working and reduces work productivity. WPAI-SHP scores are much higher than the general population estimates, suggesting relatively high impairment comparable to the experience of CD patients, while PROMIS scores were similar to the US average.

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Disclosures

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