Original Article

Clinical Characteristics of Celiac Disease Patients in Qassim Region

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Abstract

Objective: It is well known that celiac disease has a negative influence on patients' health and quality of life. It has a wide range of presentation from symptomless to multiple organ dysfunction but mainly gastrointestinal symptoms. Consequently, it is considered a main cause of mortality, morbidity, and health burden. We aim to evaluate the quality of life affected in gluten-free diet and to identify the serological characteristics of celiac disease patients in the Qassim Region of Saudi Arabia and King Fahad Specialist Hospital. **Methods:** This is a cross-sectional-based study conducted in King Fahad Specialist Hospital, Saudi Arabia, composed of 58 patients with celiac disease for 9 years between August 2011 and August 2020. **Results:** Fifty-eight patents were included (79.3% females and 65.5% married), who were divided according to their ages into five groups. Abdominal pain, diarrhea, and/or weight loss were the major patient complaints. A total of 64% of the patients had a +ve (tTG) IgA test at the time of diagnosis, while 17% were -ve. Of the studied patients, 78% reported that they had undergone a duodenal biopsy sampling. No other significant abnormalities were detected between females and males or among the five diagnosed age groups. **Conclusion:** Patients with celiac disease reported poor health-related quality of life across the board. However, social interaction, emotional role functioning, and emotional well-being were the most important factors.

Keywords: Celiac disease, life quality, gluten-free diet

Introduction

Celiac disease (CD) is a genetic disorder that causes inflammation of the small intestines upon consuming a gluten-containing diet. It is characterized by the presence of specific human leukocyte antigen (HLA) genes and CD4 T cells that respond to specific peptides, among other circulation peptides. While HLA genes

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and wheat intake play a major role in determining disease development, studies showed that non-HLA genes and some environmental factors also play a role in disease development.

CD has characteristic symptoms, the most common of which are abdominal pain/bloating, diarrhea, chronic fatigue, flatulence, and anemia.[1] It also has extra-intestinal features, which include anxiety, depression, and fatigue. There are no effective treatments for celiac disease except a gluten-free diet (GFD). Gluten is found in products like wheat, rye, and barley, which are an essential part of people's diets.[2]

The diagnosis of CD must be confirmed by histology biopsy, which is taken from the proximal parts of the duodenum to determine if there are many deposits of immunoglobin at the concentrated tissue transglutaminase (TG2) in immunochemistry, or morphometry is performed to verify the villous height-crypt depth ratio. If it is less than 2, it is considered to be an atrophic and active disease.[3] The other way to confirm the diagnosis is to do a serology test to check for the IgA auto-antibody to TG2 and the IgG antibody to the deamidated gliadin peptides. Interestingly, the tests can also detect if the patient adheres to a GFD or not.[4] CD has a long delay diagnosis from the first symptom that occurs, a delay of 9.7 years average from the first symptom and 5.8 years from the first doctor visit. This delay may increase the burden on the patient and the family and should be shortened.[5] Quality of life in CD patients is very important, especially among children and adolescents. A study conducted in Saudi Arabia found that CD patients have a lower quality of life than the control group, regarding the physical functioning, emotional functioning, and well-being. The study detected that children who adhere more to a GFD have a better quality of life than their counterparts who do not.

A review article was published in 2017, discussing the concept of celiac disease pathogenesis and prevention. Almost 1,000 children were found to be genetically at risk with positive HLA-DQ2/DQ-8. Breastfeeding during an introduction to gluten or having a GFD did not have any effect on developing CD or intervention.[6] In addition, a study conducted in the United Kingdom used the EQ-5D for the first time there. The study looked for the quality of life before and after the diagnosis of CD. It detected that the mean age at diagnosis was 39 for those diagnosed before the serology test was conducted, which is before the year 2000, and the mean age rose to 44 after that year. More than half of the participants were relieved of pain while conducting the questionnaire (after diagnosis); on the other hand, only 22% felt fine before diagnosis.[7]

Since our research was conducted in King Fahad Hospital in Qassim, Saudi Arabia, it is noteworthy that no quality-of-life research had previously been conducted in the region, nor had there been any research involving characteristics to describe the disease. However, the prevalence in the Qassim Region was one of the highest in the country, reaching about 3.1%.[8] The prevalence of CD is 1–2% worldwide, and it is quite common in some societies. This study focuses on the quality of life in patients with CD who adhered to a gluten-free diet for the previous 12 months. We aim in our study to evaluate how the quality of life was affected by a gluten-free diet and to identify the serological characteristics of celiac disease patients in the Qassim Region and King Fahad Specialist Hospital (KFSH).

Methodology

This is a cross-sectional study among the Qassim population and KFSH aiming to identify the quality of life and characteristics of adult celiac disease patients. Patient information was obtained from medical records. This study was approved by Bioethics Committee of Scientific & Medical Research at Qassim University, Qassim, Saudi Arabia.

Study population and sampling

The study included adult celiac disease patients among Al-Qassim's population and patients admitted and diagnosed in the gastroenterology department at KFSH from August 2011 to August 2020.

Inclusion criteria

All patients over 18 years old and diagnosed with celiac disease in the Qassim region were included in the study. All patients over 18 years old who had a confirmed diagnosis of celiac disease at KFSH by clinical, radiological, endoscopic, and histopathological information were eligible to participate.

Exclusion criteria

Those in the pediatrics age group with incomplete medical records at the time of the study were excluded.

Fifty-eight patients were included in our study, with the majority of them (65.5%) ranging from 18 to 24 years. They were divided into five groups according to their age. It was believed that each group had specific factors that might affect their compliance. We checked all patient data, including demographic information, height, and weight upon admission. Additionally, we noted any additional co-morbidities present, such as diabetes, hypertension, or dyslipidemia. Colonoscopy and radiological findings were recorded.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) and Excel. The results were displayed with the use of simple percentages (%). A probability level (*P* -value) of 0.05 or less was used to indicate statistical significance.

Results

Baseline characteristics of included patients

Baseline characteristics of involved patients are shown in [Table 1]. Fifty-eight celiac disease (CD) patients completed our questionnaire. Of them, 46 (79.3%) were female and 36 (65.5%) were married. Participants were divided into five

Table 1: Baseline characteristics of involved patients

Parameter	Gender		All cases [*n*=58] (%)	*P**
	Female [*n*=46]	Male [*n*=12]		
Marital status				
Single	16	4	20 (34.5%)	0.18
Married	30	8	36 (65.5%)	
Age at diagnosis (years)				
18-24	32	6	38 (65.5%)	<0.001
25-34	6	3	9 (15.5%)	
35-44	4	2	6 (10.3%)	
45-54	0	1	1 (1.7%)	
>55	4	0	4 (7%)	
Presenting symptom				
Abdominal pain	36	9	45 (77.6%)	<0.001
Diarrhea	3	1	4 (7%)	
Weight loss	3	1	4 (7%)	
Asymptomatic	4	1	5 (8.4%)	
Main differential diagnosis				
IBD	6	4	10 (17.2%)	0.011
Appendicitis	1	1	2 (3.4%)	
CD	10	1	11 (19%)	
Gastroenteritis	7	1	8 (13.8%)	
Others	2	1	3 (5.2%)	
None	20	4	24 (41.4%)	
History of prior abdominal pain				
No	40	11	51 (87.9%)	<0.001
Yes	6	1	7 (12.1%)	
CD history of first-degree relatives				
No	36	9	45 (77.6%)	<0.001
Yes	10	3	13 (22.4%)	
Diagnosis time				
<5 years	19	3	22 (37.9%)	0.47
>5 years	27	9	36 (62.1%)	
Duodenal biopsy				
Normal finding	11	2	13 (22.4%)	0.044
Positive finding	24	4	28 (48.2%)	
Not done	11	6	17 (22.4%)	
Current NSAID intake				
No	40	8	48 (82.8%)	<0.001
Yes	6	4	10 (17.2%)	

CD=Celiac disease, IBD=Inflammatory bowel disease, NSAID=Nonsteroid anti-inflammatory drugs. *A *P* -value of <0.05 was considered as significant

groups according to their age of diagnosis: Group 1 (18–24) years, n = 38 (65.5%); Group 2 (25–34) years, n = 9 (15.5%); Group 3 (35–44) years, n = 6 (10.3%); Group 4 (45–54) years, n = 1 (1.7%); and Group 5 (>55) years, n = 4 (7%). The most frequently presented symptoms were abdominal pain, diarrhea, and/or weight loss, whereas four patients were asymptomatic. The main differential diagnoses were inflammatory bowel disease (IBD), gastroenteritis, or appendicitis. Nearly 88% of involved patients experienced no previous abdominal pain before diagnosis. Forty-eight (83%) patients were not on current (NSAID) therapy.

Immunological profile and patient diagnosis

Immunological profile is shown in [Table 2]. Thirty-seven (64%) of the participants in our sample had a positive tissue transglutaminase (tTG) IgA test at the time of diagnosis, while only 17% had a negative test which indicated a high sensitivity to the tTG IgA test to screen and initially confirm diagnosis. The serum total IgA test was positive in only 10 patients; however, most of the included participants reported not doing this test at the time of diagnosis. Deamidated gliadin peptide (DGP) IgA and IgG were not commonly reported at either the first or last visit. DGP IgA was positive in one female in the first visit. About 78% of patients reported that they had undergone a duodenal biopsy sampling; however, just 48% of patients confirmed their diagnosis by a positive finding on the biopsy.

Medical history of chronic and auto-immune diseases

Medical conditions in involved patients are shown in [Figure 1]. Most patients (82.7%) reported no other medical

Table 2: Immunological profile of participating patients

Parameter	Gender		All cases [*n*=58] (%)	*P**
	Female [*n*=46]	Male [*n*=12]		
tTG IgA				
Negative	7	3	10 (17.2%)	0.012
Positive	30	7	37 (63.8%)	
Not done	9	2	11 (19%)	
Total IgA				
Negative	7	0	7 (12.1%)	<0.001
Positive	7	3	10 (17.2%)	
Not done	32	9	41 (70.6%)	
DGP IgA				
First visit				
Negative	2	0	2 (3.4%)	<0.001
Positive	1	0	1 (1.7%)	
Not done	43	12	55 (94.8%)	
Last visit				
Negative	2	0	2 (3.4%)	<0.001
Positive	2	0	2 (3.4%)	
Not done	42	12	54 (93.1%)	
DGP IgG				
First visit				
Negative	3	0	3 (5.1%)	<0.001
Positive	1	0	1 (1.7%)	
Not done	42	12	54 (93.1%)	
Last visit				
Negative	2	0	2 (3.4%)	<0.001
Positive	1	0	1 (1.7%)	
Not done	43	12	55 (94.8%)	

DBG=Deamidated gliadin peptide, tTG=Tissue transglutaminase. *A *P* value of <0.05 was considered as significant

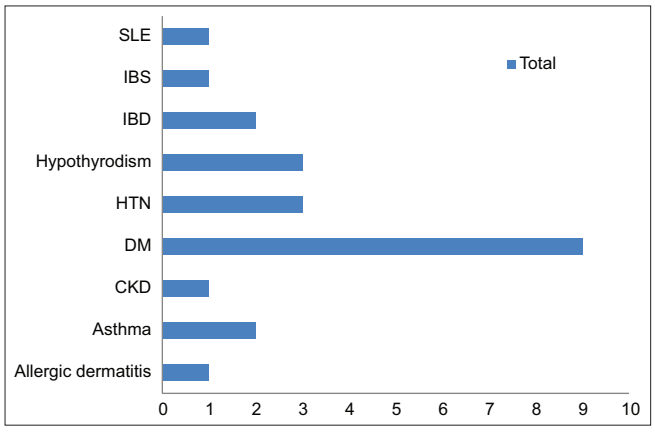

Figure 1: Underlying medical conditions in involved patients

history of auto-immune disease. Five patients in the first group (18–24 years) admitted having a positive history for diabetes mellitus (DM) type 1. One patient had a history of systemic lupus erythematosus (SLE), another with asthma, and one male patient had a history of allergic contact dermatitis. Twenty-seven participants reported no history of chronic illness. Despite this, 24 were found to have a history of hypertension, hypothyroidism, DM, chronic kidney disease, irritable bowel syndrome, or anemia. Six female patients were found to be anemic when investigated.

Hematological investigations

Underlying autoimmune and chronic co-morbidities are shown in [Table 3]. The average hemoglobin in female patients was (12.1 ± 2.1) g/dL, while hematocrit was (36.9 ± 6.1)%. No other significant abnormalities were detected between females and males or among the five diagnosis age groups. Ferritin was found to be significantly higher in male CD patients (88.7 ± 34.9) than females [(19.5 ± 20.7) ng/mL], *P* value <0.001. Average serum iron in all study participants was (9.1 ± 5.1) µmol/L. No significant difference was found regarding serum iron level, $P = 0.12$.

Thyroid profile investigations

Two female patients reported a medical history of hypothyroidism. The average serum TSH level in all patients was (3.2 ± 2.16) mIU/L. Both T3 and T4 serum levels were within normal limits [(14.2 ± 2.6) and (4.7 ± 0.6) nmol/L, respectively]. No significant difference was found between the two gender groups.

Osteoporosis and DEXA scan

Only one female patient was confirmed to have osteoporosis through serological investigations and positive findings on the DEXA scan. The average serum vitamin D level was (27.5 ± 29.3) ng/mL. No statistical difference was found between male and female patients; however, the serum vitamin D level was higher in female patients (30.2 ± 31.6) than male CD patients [(14.7 ± 6.6) ng/mL]. The serum calcium level was found to be within normal levels for both groups [(2.3 ± 0.22) mmol/L].

Discussion

Fifty-eight patents were included in the study (79.3% females and 65.5% married), and they were divided according to their ages into five groups. Abdominal pain, diarrhea, and/or weight loss were the major patients' complaints. The majority (88%) of the patients had no previous abdominal pain, and 83% were not on NSAID. Of the total patients, 64% had a +ve (tTG) IgA test at the time of diagnosis, and 17% were -ve. All male patients tested negative for both IgA and IgG (both visits). Of the participants, 78% reported that they had undergone a duodenal biopsy sampling; however, 48% confirmed their diagnosis by a positive finding on the biopsy. No previous medical history of auto-immune disease was reported by 82.7% of the patients. Five patients in the first group (18–24) years had a positive history for type 1 DM.

One patient had a history of systemic lupus erythematosus (SLE), another had asthma, and one male patient was found to have a history of allergic contact dermatitis. In regard to chronic illness, 72% reported no history, while 24 did. The average hemoglobin in female patients was (12.1 ± 2.1) g/dL, while hematocrit was (36.9 ± 6.1)%. No other significant abnormalities were detected between females and males or among the five diagnosis age groups. Ferritin was found to be significantly higher in male CD patients (88.7 ± 34.9) than females [(19.5 ± 20.7) ng/mL], *P* -value <0.001. Two female patients had a medical history of

Table 3: Underlying autoimmune and chronic comorbidities

Parameter	Gender		All cases [*n*=58] (%)	*P**
	Female [*n*=46]	Male [*n*=12]		
Medical history of autoimmune disease				
Asthma	1	0	1 (1.7%)	<0.001
Allergic dermatitis	0	1	1 (1.7%)	
DM type 1	4	1	5 (8.6%)	
SLE	1	0	1 (1.7%)	
IBD	1	1	2 (3.45%)	
None	39	9	48 (82.7%)	
Medical history of chronic illness				
HTN	2	1	3 (5.17%)	<0.001
DM†	8	3	11 (18.9%)	
CKD	0	1	1 (1.7%)	
Hypothyroidism	2	0	2 (3.45%)	
IBS	0	1	1 (1.7%)	
Anemia	6	0	6 (10.3%)	
None	21	6	27 (46.5%)	
Hematological profile				
Hemoglobin (g/dL)	12.1±2.1	14.6±1.3	12.5±2.2	<0.001
RBC count (10^6/µL)	4.7±1.6	5.1±0.45	4.85±1.4	0.42
Hematocrit (%)	36.9±6.1	44.8±3.76	38.4±6.6	<0.001
MCV (fL)	82.3±9.4	80.6±18.4	82±11.5	0.68
MCH (pg)	26.47±3.3	28.2±2.8	26.8±3.3	0.12
MCHC (g/dL)	32.3±1.8	32.7±2.19	32.4±1.9	0.54
Iron studies				
Ferritin (ng/mL)	19.5±20.7	88.7±34.9	31±34.8	<0.001
Iron (µmol/L)	8.7±4.9	14.5±2.5	9.1±5.1	0.12
Thyroid profile				
TSH (mIU/L)	3±1.7	4.6±3.91	3.2±2.16	0.36
T_3 (nmol/L)	14.1±2.4	15±3.7	14.2±2.6	0.49
T_4 (nmol/L)	4.6±0.5	5.1±0.9	4.7±0.6	0.65
Osteoporosis				
Vitamin D (ng/mL)	30.2±31.6	14.7±6.6	27.5±29.3	0.17
Calcium (mmol/L)	2.3±0.18	2.4±0.31	2.3±0.22	0.06
DEXA scan				
Positive finding	1	0	1 (1.7%)	<0.001
Negative finding	45	12	57 (98.2%)	

CKD=Chronic kidney disease, DM=Diabetes mellitus, HTN=Hypertension, IBD=Inflammatory bowel disease, IBS=Irritable bowel syndrome, TSH=Thyroid stimulating hormone, SLE=Systemic Lupus Erythematosus, MCH=Mean corpuscular hemoglobin, MCV=Mean corpuscular volume, MCHC=Mean corpuscular hemoglobin concentration. *A *P* -value of <0.05 was considered as significant. †Including both type 1 and 2 DM. Continuous variables are reported as mean±standard deviation

hypothyroidism. The average serum TSH level in all patients was (3.2 ± 2.16) mIU/L.

Many studies have investigated health-related quality of life in patients with CD, and they report contradictory results. The disagreements in these reported results may be due to the different tools used for assessing health-related quality of life among the different age groups and ethnicities of the study sample.[9-11]

A majority of CD cases are not diagnosed clinically; however, a minority have been diagnosed.[12] All sub-scales aside from overall health saw lower female scores than male scores, nevertheless. According to another study, women scored much lower than men and experienced significantly more gastrointestinal symptoms.[13] Female celiac patients' poor health-related quality of life status was independent from the results of their biopsies. Compared to patients with classical symptoms, CD patients with atypical silent symptoms exhibited a much higher health-related quality of life. As a result, treating symptomatic people can greatly enhance their quality of life in terms of their health.[14]

In conclusion, patients with celiac disease reported poor health-related quality of life across the board. However, social interaction, emotional role functioning, and emotional well-being were the most important factors. In fact, with the exception of overall health, women performed worse than men on every sub-scale. Age groups, educational level, and health-related quality of life did not correlate.

Ethical approval

This study was approved by Bioethics Committee of Scientific & Medical Research at Qassim University, Qassim, Saudi Arabia.

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Conflicts of interest

There are no conflicts of interest.

References

1. Majsiak E, Choina M, Gray AM, Wysokiński M, Cukrowska B. Clinical manifestation and diagnostic process of celiac disease in poland-comparison of pediatric and adult patients in retrospective study. Nutrients 2022;14:491.
2. Caio G, Volta U, Sapone A, Leffler DA, De Giorgio R, Catassi C, *et al.* Celiac disease: A comprehensive current review. BMC Med 2019;17:142.
3. DaFonte TM, Gleeson E, Morson T, Olshan KL, Moran CJ, Leonard MM. No Increased risk of taking additional intestinal mucosal research biopsies from the duodenum during pediatric endoscopy. J Pediatr Gastroenterol Nutr 2023;76:480-2.
4. Elli L, Zini E, Tomba C, Bardella MT, Bosari S, Conte D, *et al.* Histological evaluation of duodenal biopsies from coeliac patients: The need for different grading criteria during follow-up. BMC Gastroenterol 2015;15:133.
5. Norström F, Lindholm L, Sandström O, Nordyke K, Ivarsson A. Delay to celiac disease diagnosis and its implications for health-related quality of life. BMC Gastroenterol 2011;11:118.
6. Tye-Din JA, Galipeau HJ, Agardh D. Celiac disease: A review of current concepts in pathogenesis, prevention, and novel therapies. Front Pediatr 2018;6:350.
7. Majsiak E, Choina M, Golicki D, Gray AM, Cukrowska B. The impact of symptoms on quality of life before and after diagnosis of coeliac disease: The results from a Polish population survey and comparison with the results from the United Kingdom. BMC Gastroenterol 2021;21:99.
8. Albasri AM, Ansari IA. Pattern of cancers in adolescent and young adults.: A 15-year retrospective study at King Fahad Hospital, Al-Madinah Al-Munawwarah, Saudi Arabia. Saudi Med J 2021;42:449-53.
9. Altobelli E, Paduano R, Gentile T, Caloisi C, Marziliano C, Necozione S, *et al.* Health-related quality of life in children and adolescents with celiac disease: Survey of a population from central Italy. Health Qual Life Outcomes 2013;11:204.
10. Barrio J, Román E, Cilleruelo M, Márquez M, Mearin ML, Fernández C. Health-related quality of life in spanish children with coeliac disease. J Pediatr Gastroenterol Nutr 2016;62:603-8.
11. Myléus A, Petersen S, Carlsson A, Hammarroth S, Högberg L, Ivarsson A. Health-related quality of life is not impaired in children with undetected as well as diagnosed celiac disease: A large population based cross-sectional study. BMC Public Health 2014;14:425.
12. Casellas F, Rodrigo L, Vivancos JL, Riestra S, Pantiga C, Baudet JS, *et al.* Factors that impact health-related quality of life in adults with celiac disease: A multicenter study. World J Gastroenterol 2008;14:46-52.
13. Nachman F, del Campo MP, González A, Corzo L, Vázquez H, Sfoggia C, *et al.* Long-term deterioration of quality of life in adult patients with celiac disease is associated with treatment noncompliance. Dig Liver Dis 2010;42:685-91.
14. Sarkhy A, El Mouzan MI, Saeed E, Alanazi A, Alghamdi S, Anil S, *et al.* Socioeconomic impacts of gluten-free diet among saudi children with celiac disease. Pediatr Gastroenterol Hepatol Nutr 2016;19:162-7.