

Health Related Quality of Life in Patients with Crohn's Disease: A case control Study

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Research

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Abstract

Background The study objective was to compare health-related quality of life (HRQoL) between participants with Crohn's Disease (CD) and healthy controls (CONs).

Methods A case-control study was conducted in adults with CD and CONs in Saudi Arabia (aged between 18-60 years). Sociodemographic data (age, sex, age at diagnosis) were collected. The following additional information was collected for the CD group: the onset of disease, treatment, and symptomology associated with CD. The validated Arabic version of the SF-36 was used to assess HRQoL.

Results The study included 109 CD patients and 370 CON participants. Participants with CD had significantly lower HRQoL scores in the physical functioning [CD=75 (50-90) vs CON=85 (60-95)], role physical [CD=50 (0-100) vs CON=100 (50-100)], role emotional [CD=67 (0-100) vs CON= 67 (33-100)], vitality [CD= 50 (30-58) vs CON=50 (40-60)], social functioning [CD=63 (50-75) vs CON=75 (50-88)], bodily pain [CD=70 (45-90) vs CON=80 (68-100)], general health [CD=55 (40-65) vs CON=65 (55-75)], physical [CD=63 (52-75), vs CON=75 (63-85)], and mental domains [CD=51 (32-69) vs CON=63 (55-72)] than the CON group ($p<0.02$). In the CD group, participants with loss of appetite had lower HRQoL scores in the physical functioning [loss appetite=60 (40-80) vs no loss appetite=83 (65-90)], role physical [loss appetite=25 (0-75) vs no loss appetite=50 (25-100)], social functioning [loss appetite=63 (50-75) vs no loss appetite=75 (50-88)], physical [loss appetite=57 (45-68) vs no loss appetite=69 (56-78)], and mental domains [loss appetite=47 (30-67) vs no loss appetite=59 (44-72)] than participants without loss of appetite ($p<0.04$).

Conclusion Individuals with CD had lower HRQoL than CON participants. Loss of appetite is associated with a lower HRQoL score.

Introduction

Crohn's disease (CD) is a chronic autoimmune disease in which the immune system attacks different segments of the intestine (1). CD is characterized by robust relapses, immunologic alterations and further intestinal manifestations of great magnitude, in addition to being incurable(1). The most significant symptoms of CD are persistent diarrhea and rectal bleeding (1). Patients with CD may experience periods when the symptoms flare up and cause pain (which is called relapse) followed by periods of remission when patients do not feel any symptoms.

There is no cure for CD; however, medical nutritional treatment is focused on reducing the number of relapses, and nutritional therapy helps to improve the complications associated with the disease, such as osteoporosis and malnutrition (1, 2). Malnutrition was observed in more than 60% of patients with CD (3). Malnutrition occurs as a result of medications, poor food intake due to gastrointestinal symptomology, inflammation, and malabsorption, and it is the main factor associated with nutrient deficiency, anemia and loss of muscle mass (1–3). Loss of muscle mass (sarcopenia) was associated with poor physical

function in different populations (4). Malnutrition, symptoms associated with relapses and complications associated with CD may negatively affect health-related quality of life (HRQoL) (2).

Many studies in the US, Canada and Europe have reported reduced general and disease-specific HRQoL in patients with CD (2, 5). There are many factors influencing HRQoL in patients with CD, such as disease symptoms (fatigue), disease activity, number of relapses, and poor sleep quality (2, 6). One study examined and compared HRQoL in 31 patients with CD and 19 patients with ulcerative colitis using a disease-specific HRQoL tool in the eastern province of Saudi Arabia (7). The study found that disease activity, disease duration and education level were variables associated with poor HRQoL in patients with CD (7). In addition to the physical factors that may contribute to poor HRQoL in patients with CD, mental and emotional factors such as depression and anxiety have been negatively associated with HRQoL in patients with CD. The prevalence of depression and anxiety was observed as more than 60% among patients with CD (8).

However, limited studies have examined HRQoL in adult patients with CD in Saudi Arabia (7, 9). Studies have reported poor HRQoL in patients with CD, but these studies had several limitations, such as small sample size and/or no control group (7, 9). The objective of the current study was to assess HRQoL in patients diagnosed with CD in Saudi Arabia, compare HRQoL between CD patients and CONs and examine the factors that may influence HRQoL in patients diagnosed with CD.

Methods

Study Population

A case-control study conducted among Saudi adult participants with CD (n=109) and healthy adult controls (CONs) (n=370) (aged between 18-60) was conducted in Saudi Arabia. Participants with CD were recruited from the Irritable Bowel Syndrome support group in Saudi Arabia. The members of the Irritable Bowel Syndrome support group included approximately 150 patients with CD. The CON group was recruited from the community. The inclusion criteria of the study were any Saudi citizen aged 18-60 years old with CD. The exclusion criteria were any individuals with an additional medical diagnosis (e.g., rheumatism, depression, short bowel syndrome, diabetes mellitus, hypertension) for the CD groups and any individuals with health conditions that may influence HRQoL, such as diabetes mellitus, chronic abdominal pain, or depression. The research instrument was an online Arabic self-administered questionnaire distributed via patient support group WhatsApp messages. All participants provided consent prior to participating in the study. Ethics approval was obtained from The Research Ethics Committee (H-01-059) at Princess Nourah bint Abdulrahman University.

Sociodemographics

The socio-demographic characteristics were age, sex, area of residence, education level, employment, and marital status.

Disease History

Additional information was collected from the CD group: age at diagnosis; symptoms related to the disease, including gastrointestinal symptomology (bloody diarrhea, abdominal pain, cramps) and other symptoms reported in different studies (fever, fatigue, mouth ulcer, infection/inflammation in eyes, joint or skin); and drug treatment (7, 9). Malnutrition was defined as loss of fat and muscle mass, nutritional deficiencies, poor food intake and unintentional weight loss (3). Two additional questions were added to subjectively screen for malnutrition (loss of appetite, weight loss) in the CD group.

Health-related Quality of Life

The Arabic version of the Medical Outcomes Study Short Form 36-Item questionnaire (SF-36) was used to assess HRQoL in CD and CON participants (10, 11). The SF-36 is a validated tool that was used to measure HRQoL in healthy individuals and individuals with diseases, such as CD and multiple sclerosis (2, 10, 12). The SF-36 consists of 36 questions constituting 8 scales: physical functioning (PF), role limitations due to physical function (RP), role limitations due to emotional problems (RE), bodily pain (BP), general health perception (GH), vitality (VT), social functioning (SF), and role emotional (RE). Two domains were calculated from the scales (11-13). Physical domain scores were computed as the average of the PF, RP, BP and GH scales (11, 12). Mental domain scores were computed as the average of MF, RE, SF and VT scales (11, 12). Scores for each domain ranged from 0 to 100, with a higher score defining a more favorable health state (11-13).

Statistical Analysis

Statistical analysis was performed by SAS JMP (14.2.0). A p-value < 0.05 was considered to indicate a significant difference between the groups. The Shapiro-Wilk test was performed to assess normality. Chi square tests were used to compare the categorical variables between the CD and CON groups. For HRQoL (SF-36), the Mann-Whitney test was used to compare the groups. In the CD group, HRQoL was assessed between participants (by sex, age at diagnosis (≤ 20 years old / >20 years old), above and below the median number of symptoms (≤ 5 symptoms/ >5 symptoms), loss of appetite (yes/no), and weight loss (yes/no)). Multivariate regression was performed to adjust the differences in age, sex and area of residence between the groups. The model included SF-36 (log transformed) as the dependent variable and group and demographic data (age, sex and area of living) as independent variables.

Results

Sociodemographic Characteristics

A total of 479 participants, 109 patients with CD and 370 healthy individuals, were included in the study. **Table 1** shows the demographic data in the CD and CON groups. Two participants with CD were diagnosed at age < 10 years old and older than 30 years. The majority of participants with CD (98%) were diagnosed between 10 and 20 years old (n=54) and 21 and 30 years old (n=53).

Symptomology and Complications

Figure 1 shows the symptoms associated with CD in participants with CD. Only 7 participants (6%) did not have any symptoms. The majority of the CD group experienced cramps (n=87 (80%)), abdominal pain (n=85 (78%)), and weight loss (n=70 (64%)). The average number of symptoms in participants with CD was 5. The majority of participants with CD (n=105 (96%)) were on medications associated with symptomology.

Health-related Quality of Life

Table 2 shows the HRQoL scores in the participants in the CD and CON groups. Participants with CD had significantly lower scores on the PF, RP, RE, VT, SF, BP, GH, physical, and mental domains than the participants in the CON group ($p < 0.02$).

The Interrelationships between Health-related Quality of Life and Demographic Information (Age, Sex, and Area of Residence)

Table 3 shows the interrelationships between HRQoL and demographic data (age, sex, and area of residence). In the CD group, females had significantly lower scores for VT [F: 45 (25-52); M: 50 (35-60)] and MH [F: 48 (34-56); M: 54 (37-64)] than males ($p < 0.02$).

Age and area of residence were not associated with poor HRQoL.

The Interrelationship between Health-related Quality of Life and Age at Diagnosis in Participants with Crohn's Disease

No significant differences were found in HRQoL scores between participants with CD and age of diagnosis ≤ 20 and > 20 years ($p > 0.05$).

The Interrelationship between Health-related Quality of Life and Symptoms in Participants with Crohn's Disease

Table 4 shows the HRQoL scores and symptoms related to CD in participants with CD. Participants with CD who complained of fewer than 5 symptoms had higher scores for the RP, RE, physical, and mental domains than participants with CD who complained of 5 symptoms or more ($p < 0.03$). Weight loss was not associated with reduced HRQoL scores in the CD group ($p > 0.05$). Participants with CD and loss of appetite had significantly lower scores on the PF, RP, SF, physical, and mental domains than participants with CD and did not have loss of appetite (**Table 5**).

Discussion

Poor HRQoL among CD patients has been reported by many studies, but limited studies have examined HRQoL in participants with CD in Saudi Arabia (7, 9). The objective of the current study was to compare HRQoL between participants with CD and healthy control individuals and assess the factors that may

impact HRQoL in the CD group. The current study found that participants with CD had lower HRQoL scores in several domains (PF, RP, RE, VT, SF, BP, GH, physical domain, and mental domain) than CONs. Participants with CD and multiple symptoms (> 5 symptoms) had lower scores on the RP, RE, physical, and mental domains than participants with CD and fewer symptoms associated with CD. Participants with CD and loss of appetite had lower PF, RP, SF, physical, and mental domain scores than participants with CD who did not have loss of appetite.

Poor HRQoL was reported in patients with CD in different countries (2, 6, 7, 9). The current study found that participants who had CD for 10–30 years had poor HRQoL. Several factors related to poor HRQoL in participants with CD have been reported in the literature, such as sex (female), age and age at diagnosis/or duration of the disease (2, 6, 7, 9, 14, 15). Additional factors influencing HRQoL were not assessed in the current study, such as gastrointestinal symptomology, such as abdominal pain, diarrhea, and fever, which are clinical symptoms of disease activity (7, 9). Many studies have shown that disease activity is the major factor influencing HRQoL in patients with CD (2, 6, 7, 14, 15). However, there is not a specific tool to assess disease activity. For example, remission was assessed using the criterion proposed by Mahalli and Alharthi: the absence of bowel symptoms associated with active disease (7). Other studies have measured disease activity using the Harvey-Bradshaw Index, which is a total score of many variables, such as general well-being, severity of abdominal pain, number of liquid/soft stools, abdominal mass and other complications (15, 16). In the current study, we did not assess disease activity, but we used the symptomology, e.g., number of symptoms, weight loss, and loss of appetite. The current study showed that participants with CD and a higher number of symptoms (> 5 symptoms) or the presence of loss of appetite more often had lower HRQoL.

Lower HRQoL scores in the mental domain have been reported in many studies, especially on the emotional and social scales (14, 17). The mental scores were the lowest in the Greek and Italian cohorts and highest in the Danish group (14). One similar result between the current study and the European study showed that women had lower HRQoL scores than men, especially on mental scales. Another study found that men had a higher HRQoL than women with CD in the remission period, yet HRQoL was reduced equally in both sexes in the relapse period (18). In general, men emotionally cope better with the disease than women (18).

Strong evidence has shown that malnutrition is associated with poor HRQoL in populations such as elderly individuals, cancer patients and liver disease patients (19–21). Malnutrition can be assessed using different tools that assess malnutrition based on medical history (e.g., gastrointestinal symptoms, presence of disease, weight loss, poor food intake) and physical symptoms (e.g., sarcopenia and fat mass loss) (22). The current study did not assess malnutrition; however, the study found that many malnutrition symptoms are associated with poor HRQoL, such as loss of appetite and the number of symptoms associated with CD (such as diarrhea and abdominal pain). Loss of appetite can be a result of the gastrointestinal symptoms that are associated with the active phase of the disease (23). Further research is needed to assess the influence of malnutrition on HRQoL in patients with CD.

Poor HRQoL is associated with disability, as reported in various studies (2, 6, 7, 9, 14, 15). The World Health Organization approved the definition of disability as a part of the International Classification of Functioning, Disability and Health framework (24). Disability was observed in patients with inflammatory bowel disease (24). In addition to reduced HRQoL, different factors lead to disability in patients with CD, such as poor sexual function, poor sleep quality, and body image (25). Although the current study did not assess disability in patients with CD, the study found that many variables may be associated with disability in patients with CD, including reduced HRQoL score, gastrointestinal symptomology and loss of appetite. Further studies are necessary to assess disability in patients with CD and the factors that may be associated with disability, such as sleep quality.

The limitations of the current study include not assessing disease activity due to not having access to patients' medical charts. However, disease activity was previously assessed in Saudi Arabia (7). In addition, there are no reference norms for SF-36 scores in Saudi Arabia. Although the control group was identified as being free of disease, they do not reflect the norms of HRQoL in Saudi Arabia. In addition, European studies have compared HRQoL in patients with irritable bowel disease to that in healthy controls in the same country (14, 15). There are no recent SF-36 data from healthy participants in Saudi Arabia. Only one study was conducted in 1998 at Saudi ARAMCO Company in the eastern province of the Kingdom of Saudi Arabia (10). The study sample did not represent the Saudi lifestyle. Therefore, we were not able to compare our study group to this study sample. The SF-36 score was significantly higher than that in both the CD and CON groups.

Conclusion

In conclusion, HRQoL is reduced among Saudi CD patients compared to that in the CON participants. Participants with CD and multiple symptoms (> 5 symptoms) or reported loss appetite had lower SF-36 scores. These findings highlight importance of HRQOL analysis as an assessment tool to assess overall health in patients with CD. Future studies need to be conducted to assess the influence of malnutrition on HRQoL in patients with CD in Saudi Arabia.

Abbreviations

BP, Bodily pain

CD, Crohn's disease

CON, Controls

GH, General health

HRQoL, Health related quality of life

MH, Mental health

RE, Role emotional

PF, Physical functioning

RP, Role physical

SF, Social functioning

VT, Vitality

Declarations

Ethics Approval and Consent to Participate

Ethics approval was obtained from The Research Ethics Committee (H-01-059) at Princess Nourah bint Abdulrahman University.

Availability of Data and Materials

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

Manar AlQahtani: data collection, contributed to intellectual/scientific interpretation, wrote manuscript, approved final version of manuscript.

Reema AlHarbi: data collection, contributed to intellectual/scientific interpretation, wrote manuscript, approved final version of manuscript.

Reem AlAsmari: data collection, contributed to intellectual/scientific interpretation, wrote manuscript, approved final version of manuscript.

Lamya AlNowaiser: data collection, contributed to intellectual/scientific interpretation, wrote manuscript, approved final version of manuscript.

Ebtehal AlThunayan: data collection, contributed to intellectual/scientific interpretation, wrote manuscript, approved final version of manuscript.

Abeer Salman Alzaben: Supervision of data collection, data analysis and intellectual/scientific interpretation, wrote manuscript, corresponding author approved final manuscript.

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Tables

Due to technical limitations, tables are only available as a download in the supplemental files section.

Figures

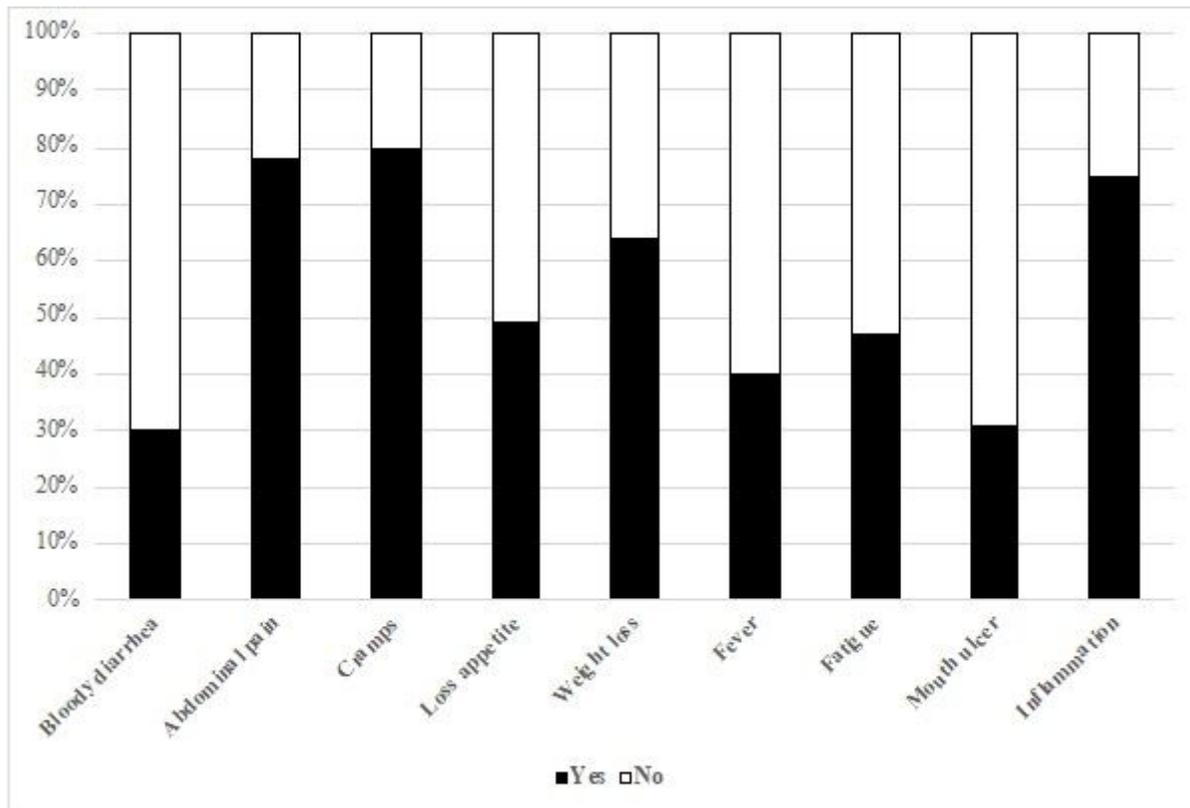


Figure 1

Symptoms (Gastrointestinal Symptoms, Loss Appetite, Weight Loss, Fever, Fatigue, Mouth Ulcer, Inflammation,) in Individuals with Crohn's Disease.

Supplementary Files

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