

Epidemiology and Clinical Characteristics of Ulcerative Colitis in Chaharmahal and Bakhtiari Province, Iran

Hamid Gheibipour^a , Ali Ahmadi^{b*} , Ghorbanali Rahimian^c 

^a Modeling in Health Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran

^b Department of Epidemiology and Biostatistics, Faculty of Public Health, Shahrekord University of Medical Sciences, Shahrekord, Iran

^c Cellular and Molecular Research Center, Faculty of Medicine, Shahrekord University of Medical Sciences, Shahrekord, Iran

*Correspondence should be addressed to Dr Ali Ahmadi, Email: aliahmadi2007@gmail.com

A-R-T-I-C-L-E-I-N-F-O

Article Notes:

Received: Oct 07, 2019

Received in revised form:

Dec 19, 2019

Accepted: Dec 21, 2019

Available Online: Jun 01, 2020

Keywords:

Chaharmahal and Bakhtiari
Colitis

Colitis, Ulcerative

Epidemiology

Inflammatory Bowel Diseases

Intestinal Disease

Iran

A-B-S-T-R-A-C-T

Background & Aims of the Study: Ulcerative colitis (UC) is an inflammatory bowel disease, which is spreading continuously. This study aimed to determine the epidemiologic profile of the patients with UC in Chaharmahal and Bakhtiari province, Iran, as a database for other researches.

Materials and Methods: This descriptive cross-sectional study was performed on the profiles of the patients with a definitive diagnosis of UC during 2012-2016 in Chaharmahal and Bakhtiari in 2019. All the samples were selected through the census method. The data consisted of demographic characteristics, clinical features, as well as colonoscopy and histopathology results, and other symptoms which were collected based on the checklists. The data were analyzed in SPSS software (version 22); moreover, the qualitative and quantitative variables were reported using frequency and percentage as well as mean and standard deviation, respectively.

Results: This study analyzed 177 UC patients with a mean age of 38.31 ± 11.69 years. According to the findings, the 31-40-year-old group was the most vulnerable age group. Regarding gender, 59.3% of the patients were male. The mean duration between the onset of the symptoms and diagnosis was reported as 7 ± 11.51 years. The most common symptoms were bleeding (72%) and abdominal pain (53%). Moreover, erythema (63.27%) and erosion (54.8%) were the most prevalent complications based on the pathologic findings. Extra-intestinal manifestations were reported among 18.36% of the cases. Considering the involved locations, pancolitis (36.72%) and the inflammation of rectosigmoid (35.6%) were the most common types.

Conclusion: The results of this study were similar to the findings of other investigations in terms of demographic characteristics. On the other hand, the clinical symptoms and complications of the disease were different from those in some previous studies.

Please cite this article as: Gheibipour H, Ahmadi A, Rahimian G. Epidemiology and Clinical Characteristics of Ulcerative Colitis in Chaharmahal and Bakhtiari Province, Iran. Arch Hyg Sci 2020;9(2):88-96

Background

Ulcerative colitis (UC) is an inflammatory bowel disease (IBD), which is spreading continuously and affects the rectum and the

mucous of the intestine (1). Moreover, it is characterized by diarrhea, abdominal pain, weight loss, rectal hemorrhage (2), repetitive remission, and relapse (3).

The inflammatory bowel diseases (IBDs) have affected 1.5 and 2.2 million people in the

United States and Europe, respectively, followed by thousands of individuals throughout the world (4, 5). Epidemiologic studies demonstrated this disease progression in developed countries (6). Although there is a dearth of epidemiologic data in developing countries, it seems that a similar trend is present in these regions leading to the universal emergence of UC (5, 7). In this regard, the annual incidence of this disease has been reported to elevate during the two recent decades. In Asia and the Eastern Mediterranean region, the incidence was revealed as 6.3 cases per 100,000 person-years (8, 9).

A meta-analysis in Iran demonstrated that the prevalence of UC was 15 individuals per 100,000 people. In addition, the incidence of this disease in two provinces of Arak and Hormozgan was estimated at 3.04 and 3.25 cases per 100,000 population (10). Another study revealed an incidence of 4.98 cases per 100,000 people in Kerman province located in southeast Iran (11).

The role of genetic and environmental factors, such as geography, viral infection, food allergy, and medical reactions has been suggested in the occurrence of this disease. Nonetheless, the significance of none of the mentioned factors was shown (12, 13). The reports demonstrate a considerable increase in the number of patients among Iranians. The latter change might be due to the altered lifestyle, more closeness to Western societies, dietary habits, change in environmental conditions, and even improved diagnostic tools (14, 15).

Daryani et al. conducted a study on 200 patients and revealed that UC in Iran was highly similar to that in other parts of the world regarding demographic characteristics. However, they stated that the relapse rate and extraintestinal manifestations (EIMs) in Iran were higher than those in other investigations (6).

In Iran, the epidemiologic and clinical evaluations of UC patients have not been taken

into consideration due to the lack of a disease recording system. As a result, the conditions and profile of these patients, risk factors, and sequels are not clear. Furthermore, no comprehensive investigations have been carried out on UC patients in Chaharmahal and Bakhtiari province. Therefore, the current study aimed to determine the epidemiologic profile of UC patients in Chaharmahal and Bakhtiari province, Iran.

Materials & Methods

This descriptive cross-sectional study was performed on 177 patients diagnosed with definite UC during 2012-16. The sampling was completed through the census method, and the list of all patients was obtained from medical and pathological diagnosis centers, medical documents of the hospitals, and the offices of related physicians. Afterward, the patients whose UC was confirmed by a gastroenterologist (ICD-10: K51.5) were included in the study. The data were collected using a checklist approved by gastroenterologists and an epidemiologist; in addition, a database was defined in excel.

The extracted data included the demographic characteristics of the patients, which cover such information as age, gender, and clinical variables. Moreover, medical information was obtained, which included a familial history of UC, history of taking medication, smoking, taking contraceptives, medication consumption, the annual number of attacks, the annual number of hemorrhages, weight, history of appendectomy, colonoscopy findings, and receiving Remicade. The inclusion criteria were: 1) residency in Chaharmahal and Bakhtiari province, and 2) a definite diagnosis of UC based on histopathology and clinical symptoms. On the other hand, the patients without a confirmed diagnosis of UC and those who were suspicious of UC were excluded from the study.

Statistical Analysis

The data were analyzed in SPSS software (version 22); moreover qualitative and quantitative variables were reported using frequency and percentage, as well as mean and standard deviation (SD), respectively.

Results

According to the findings, the mean±SD age of the patients was 38.31±11.99 years (age range: 19-76 years). Moreover, 59.3% of the cases were male with a male to female ratio of 1.45. In addition, the mean values of weight and time from disease initiation until diagnosis were 69.95±12.49 kg and 11.51±7 years, respectively.

Table 1 indicates the demographic characteristics and some risk factors among the patients in this study. Regarding educational level, the highest frequency of disease was

found in individuals with bachelor degrees and higher (33.9%), whereas the lowest frequency was found in illiterate individuals (8.5%). In terms of occupational status, the patients belonged to the groups of housewives (26%), employees (22.6%), and students (3.4%), as well as self-employed (29.1%), and unemployed individuals (7.9%).

Furthermore, it was observed that 75 (42.4%), 33 (18.64%), 55 (31%), and 21 (11.86%) cases had a history of smoking cigarettes, medication consumption, taking nonsteroidal anti-inflammatory drugs, and consuming contraceptive medications, respectively. Among the patients in the present study, 24 (13.55%) cases had a familial history of UC, 20 (11%) ones had a history of appendectomy, 6 (3.38%) individuals needed colectomy, and 31 (17.5%) of them had received Remicade.

Table 2 demonstrates UC distribution based on age group and gender in this study. According to the results of the current study,

Table 1) Frequency distribution of the demographic characteristics and clinical features of patients with ulcerative colitis in Chaharmahal and Bakhtiari province, Iran

Variable	Frequency (%)	
Gender	Male	105 (59.3)
	Female	72 (40.7)
Educational Level	Illiterate	15 (8.5)
	Elementary	22 (12.4)
	Junior High School	35 (19.8)
	High School Diploma	40 (22.6)
	University Degrees	60 (33.9)
Occupational Status	Self-employed	53 (29.1)
	Employee	40 (22.6)
	Farmer	18 (10.2)
	Housewife	46 (26)
	Unemployed	14 (7.9)
	Student	6 (3.4)
Smoking	75 (42.4)	
Medication Consumption	33 (18.64)	
Nonsteroidal Anti-inflammatory Drugs	55 (31)	
Taking Contraceptives	21 (11.86)	
Familial History of Ulcerative Colitis	24 (13.55)	
History of Appendectomy	20 (11)	
Colectomy	6 (3.38)	

Table 2) Distribution of ulcerative colitis patients based on age and gender in Chaharmahal and Bakhtiari province, Iran

Age group (year)	All patients Frequency (%)	Gender Frequency (%)		P-Value 0.2
		Male	Female	
11-20	5 (2.8)	3 (60)	2 (40)	
21-30	39 (22)	21 (53.8)	18 (46.2)	
31-40	73 (41.2)	39 (53.4)	34 (46.6)	
41-50	40 (22.6)	25 (62.5)	15 (37.5)	
51-60	13 (7.3)	11 (84.6)	2 (15.4)	
>61	7 (4)	6 (85.7)	1 (14.3)	
Total	177 (100)	105 (59.3)	72 (40.7)	

Table 3) Frequency distribution of clinical signs of ulcerative colitis in Chaharmahal and Bakhtiari province, Iran

Variable	Frequency (%)	Gender		P-Value	
		Male	Female		
Clinical findings	Haemorrhage	128 (72)	83 (64.8)	44 (35.2)	0.97
	Abdominal Pain	95 (53)	60 (63)	35 (37)	0.08
	Urinary Urgency	67 (37)	49 (73.1)	18 (26.9)	0.17
	Need Hospitalization	50 (28.24)	40 (80)	10 (20)	0.04
	Tenesmus	46 (26)	34 (73.9)	12 (26.1)	0.26
	Anaemia	38 (21.46)	28 (72)	10 (28)	0.4
	Diarrhoea	19 (10.73)	8 (42.1)	11 (57.9)	0.07
History of Appendectomy	Fever and Weight Loss	3 (1.69)	3 (100)	0	0.29
	Need Colectomy	20 (11.15)	15 (75)	5 (25)	0.33
Chronic Sequels	Need Colectomy	6 (3.41)	6 (100)	0	0.13
	Severe Haemorrhage	13 (7.34)	10 (76.9)	3 (25.1)	0.53
	Toxic Megacolon	2 (1.12)	2 (100)	0	0.46
Extraintestinal Manifestations	Perforation	0	0	0	0
	Hepatobiliary	19 (10.73)	11 (57.89)	7 (42.11)	0.61
	Skin	8 (4.51)	5 (62.5)	3 (37.5)	0.81
	Coagulative	6 (3.38)	5 (83.33)	1 (16.67)	0.66
	Musculoskeletal	5 (2.82)	3 (60)	2 (40)	0.95
	Ocular	0	0	0	0
	Respiratory	0	0	0	0

the highest disease frequency was reported in the age group of 31-40 years. On the other hand, the age groups of 11-20, 61-70, and over 70 years were revealed to have the lowest frequency of the disease.

In addition, it was indicated that older ages until the age of 31-40 years had a slight elevation in disease frequency followed by a decrease after this age since the lowest rate of the disease was in the group over 60 years of age.

Table 3 summarizes the clinical characteristics, chronic side effects, and EIMs of UC among the patients in this study. The most

prevalent disease symptoms in the present study were hemorrhage (72%), abdominal pain (53%), urinary urgency (37%), need for hospitalization (28.24%), tenesmus (26%), and anemia (21.46%). Furthermore, the least common disease sequels included fecal incontinence (1%), fever and weight loss (1.69%), diarrhea (10.73%), and mucus repel (18%).

Moreover, 11.15% and 3.41% of the patients were reported to have a history of appendectomy and colectomy, respectively. Severe hemorrhage (7.34%) was the most common sequel, and toxic megacolon was found as the least prevalent sign among the

Table 4) Frequency distribution of the chronic sequels of ulcerative colitis and affected locations of the colon among patients in Chaharmahal and Bakhtiari province, Iran

Variable	Frequency (%)	Gender		P-Value	
		Male	Female		
Chronic Sequels	Erythema	125 (70.62)	73 (58.4)	52 (41.6)	0.69
	Friability	81 (45.76)	49 (60.5)	32 (39.5)	0.77
	Ulcer	72 (40.66)	46 (63.9)	26 (36.1)	0.3
	Erosion	64 (36.15)	41 (64.1)	23 (35.9)	0.33
	Exude	55 (31.07)	39 (70.9)	16 (29.1)	0.03
	Granularity	44 (24.8)	26 (59.1)	18 (40.9)	0.97
	Spontaneous Hemorrhage	28 (15.81)	18 (64.3)	15 (35.7)	0.56
	Pseudopolyps	12 (6.77)	9 (75)	3 (25)	0.36
	Petechiae	5 (2.82)	3 (60)	2 (40)	0.97
	Pancolitis	66 (37.28)	40 (60.6)	26 (39.4)	0.78
Affected Location in Colon	Rectosigmoid	66 (37.29)	37 (56.1)	29 (43.9)	0.49
	Colon (Left Side)	39 (23.16)	27 (69.2)	12 (30.8)	0.15
	Rectum	14 (7.9)	8 (57.1)	6 (42.9)	0.86
	Transverse	1 (0.56)	1 (100)	0	0.23

patients in this study. None of the cases in this investigation were diagnosed with perforation.

Out of the study patients, 18.64% of them complained of EIMs due to UC, and the most common manifestations were in hepatobiliary (10.73%), dermal (4.51%), coagulative (3.38%), and musculoskeletal systems (2.82%). It should be noted that ocular and pulmonary side effects were not observed in any of the individuals. In the present study, the mean numbers of UC attacks and hemorrhages were 63.1 ± 1.22 and 1.29 ± 0.45 times a year, respectively.

Table 4 shows the affected locations in the colon and UC chronic sequels according to the pathologic findings of the patients. The most frequent affected locations of colon entailed pancolitis (37.28%), rectosigmoid (37.28%), and left colon (23.16%), whereas the least common cases were transverse (0.56%) and rectum (7.9%). Regarding the chronic sequels of UC shown by histopathology, the most prevalent side effects were erythema (70.62%), friability (45.76%), ulcer (40.66%), erosion (36.15%), exude (31.07%), granularity (24.8%), and spontaneous hemorrhage (15.81%). In addition, the least frequent sequels of the disease were reported as petechiae (2.82%) and pseudopolyps (6.77%).

Discussion

The present study was performed in Shahrekord University of Medical Sciences, Sharekord, Iran, to determine the epidemiology of UC and develop a research base in this regard in Chaharmahal and Bakhtiari province. The results showed that 59.3% of the cases were male with a male to female ratio of 1.45, which reveals the gender dominance of males.

This finding was consistent with the results of the studies conducted by Taherkhani et al. in Ahvaz (16); however, it was not in line with the results of the study performed by Ghadiri et al. in Ahvaz, and the study carried out by Zahedi et al. (18). Therefore, the role of gender as an important variable should be taken into consideration in data collection.

The evaluation of the educational level of the patients demonstrated that the majority of them had bachelor degrees and higher, which is consistent with the findings of the study performed by Ghadiri et al. (17). However, it could not be concluded that disease prevalence is higher among educated people of the society. This might indicate that the rate of referrals, follow-ups, and disease treatments are more prominent in individuals with higher

educational levels.

The results concerning age showed that the age groups of 31-40 and 61-70 years obtained the highest (34.5%) and lowest (1.7%) rates of the disease, respectively. Moreover, the youngest and oldest referred patients were 19 and 76 years old, respectively. Disease prevalence augmented gradually by age during the age of 19-40 years, which was in line with the results of a study carried out by Amani et al. (19). Moreover, the mean age of the cases in the current study was 38.31 years, which was congruent with the findings of a study by Zahedi et al. (18).

According to the obtained results, 25% of the patients were smokers (Table 1). The mentioned finding was consistent with the results of a study performed by Ghadiri et al. in which they showed that 22.1% of the UC patients smoked or were passive smokers (16). Moreover, it was in line with the findings of a study carried out by Malekzadeh et al. (20).

Furthermore, a history of medication consumption was reported by 18.64% of the patients in this study, which is remarkably higher than the findings obtained from a study by Amani et al. in Ardabil (19). The discrepancy in results might be explained by the higher rate of medication consumption by males, compared to females in Iran, and the ratio of males, which was higher in the present study.

According to our results, 12.1% of the patients had a history of taking contraceptives, which is lower than that in the study performed by Ghadiri et al. (52.4%). The difference could be attributed to the lower number of females in the current study leading to a lower rate of taking contraceptives (16).

The findings of this study demonstrated that 3.38% of the individuals required colectomy, which was in line with the results of the studies conducted by Makharia et al. (21) and Zahedi et al. in Kerman (18). In addition, it was observed that 11.2% of the patients had a history of appendectomy.

The latter result was consistent with the findings of a study carried out by Amani et al. in Imam Hospital, Ardabil, Iran, which revealed appendectomy history in 5% of the patients (19). Moreover, it was in line with the findings of a study by Zahedi et al. in which they found appendectomy history in 5.9% of the cases (18).

In the current study, 13% of the patients were reported to have a familial history of UC, whereas none of the cases had a familial history in the study by Sharma et al. (21). In the same line, Makhari et al. observed that 3% of the cases had a history of chronic intestinal diseases (22). The mentioned inconsistency may result from the difference in the role of inheritance and environmental risk factors in diverse countries. In this study, inheritance played a more significant role in disease transmission, compared to other investigations.

In the present study, the most prevalent clinical symptoms of UC included hemorrhage (72%) and abdominal pain (53%). On the other hand, the least common disease sequels were fecal incontinence (1%), fever and weight loss (1.69%), diarrhea (10.73%), and mucus repels (18%). In a study conducted in West of Iran, dysentery, rectorrhagia, and painful defecation were among the most frequent symptoms, whereas fever and vomit were the least prevalent signs.

In the current study, anemia was reported in 21.46% of the individuals, which is consistent with the findings of the mentioned study in the West of Iran. However, diarrhea was found in 10.73% of the patients showing a lower rate than that observed in the study conducted in the West of Iran. Moreover, abdominal pain was observed in 53% of the cases in this study, whereas in the West of Iran, 37.3% of the patients reported this pain (23).

The discrepancies between the results of this study and those of other investigations could be attributed to the diversities in study samples, the number of patients, bias in remembering by the participants, and accuracy in data collection. Sharma et al. observed abdominal pain,

tenesmus, weight loss, diarrhea, and urgency in 58%, 60%, 73%, 97%, and 55% of the patients, respectively (21).

The IBDs can affect all parts of the body and may be accompanied by several EIMs that mostly occur in the joints, skin, and hepatobiliary system (24-27). Different studies reported EIMs in 6-47% of the IBD patients (28-31). In this study, 18.64% of the cases were affected by EIMs of UC in the hepatobiliary (10.73%), coagulation (3.38%), and musculo-skeletal systems (2.82%), as well as skin (4.51%).

Sharma et al. found EIMs in 40% of the individuals with musculoskeletal sequelae which were the most prevalent manifestations (21). In the study performed by Makharia et al., EIMs were reported in more than half of the participants (50.6%), and a variety of side effects were revealed in the aforementioned study (22). The latter difference might be related to the type of disease pathogen. Regarding the location of disease, in the present study, pancolitis was the most prevalent type, which was consistent with the results of a study carried out by Makharia et al. (22). However, in the study conducted by Sharma et al., the left side of the colon and rectum were the most commonly affected sites, respectively (21). Although the reason for this difference is not clear, it could be due to the diversities in the genetic and immune systems of the people.

This study considers the positive ulcerative cases in histopathology, and it did not rely merely on clinical signs and the complaints of patients, which is one of its strengths. On the other hand, the limitations of the current study included incomplete records of hospital documents and the distribution of patients throughout the province. These problems are recommended to be overcome by initiating a system for recording patients. Moreover, the referral of some patients to the adjacent provinces and lack of access to their data are considered as other limitations, which can be solved by linking the information of patients to

a national system.

Conclusion

According to the results of the present study, the demographic characteristics of the patients with UC were highly similar to those in other studies. However, this study differs from other studies in terms of some sequelae and clinical aspects. Therefore, prospective population-based studies are recommended to provide more accurate epidemiologic and clinical data. Furthermore, this study could be considered a high-quality base for improving and developing clinical and epidemiologic studies on UC; moreover, the interested researchers can utilize the patients' data presented in this study.

Footnotes

Acknowledgements

The authors would like to thank the Research Deputy of Shahrekord University of Medical Sciences, Shahrekord, Iran, and the modeling research center for their financial supports. Furthermore, they would acknowledge the patients for their cooperation in this study.

Funding

The current study was extracted from a thesis titled "Modeling the Determining Factors of the Incidence and Prevalence of Ulcerative Colitis in Chaharmahal and Bakhtiari Province, Iran: A Prospective Cohort Study" with the research code of 917. The study protocol was approved by Shahrekord University of Medical Sciences, Shahrekord, Iran, in December 2017 with the ethical code of IR.SKUMS.RE.1396.239.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

References

- Farmer RG, Easley KA, Rankin GB. Clinical patterns, natural history, and progression of ulcerative colitis. *Dig Dis Sci* 1993;38(6):1137-46. [PMID: 8508710](#)
- Fakhoury M, Negrulj R, Mooranian A, Al-Salami H. Inflammatory bowel disease: clinical aspects and treatments. *J Inflamm Res* 2014;7:113-20. [PMID: 25075198](#)
- Andersen V, Olsen A, Carbonnel F, Tjønneland A, Vogel U. Diet and risk of inflammatory bowel disease. *Dig Liver Dis* 2012;44(3):185-94. [PMID: 22055893](#)
- Cosnes J, Gower-Rousseau C, Seksik P, Cortot A. Epidemiology and natural history of inflammatory bowel diseases. *Gastroenterology* 2011;140(6):1785-94. [PMID: 21530745](#)
- Molodecky NA, Soon S, Rabi DM, Ghali WA, Ferris M, Chernoff G, et al. Increasing incidence and prevalence of the inflammatory bowel diseases with time, based on systematic review. *Gastroenterology* 2012;142(1):46-54.e42. [PMID: 22001864](#)
- Bernstein CN, Blanchard JF, Rawsthorne P, Wajda A. Epidemiology of Crohn's disease and ulcerative colitis in a central Canadian province: a population-based study. *Am J Epidemiol* 1999;149(10):916-24. [PMID: 10342800](#)
- Ng SC, Tang W, Ching JY, Wong M, Chow CM, Hui A, et al. Incidence and phenotype of inflammatory bowel disease based on results from the Asia-pacific Crohn's and colitis epidemiology study. *Gastroenterology* 2013;145(1):158-65.e2. [PMID: 23583432](#)
- Prideaux L, Kamm MA, De Cruz PP, Chan FK, Ng SC. Inflammatory bowel disease in Asia: a systematic review. *J Gastroenterol Hepatol* 2012;27(8):1266-80. [PMID: 22497584](#)
- Thia KT, Loftus EV Jr, Sandborn WJ, Yang SK. An update on the epidemiology of inflammatory bowel disease in Asia. *Am J Gastroenterol* 2008;103(12):3167-82. [PMID: 19086963](#)
- Shayesteh AA, Saberifirozi M, Abedian S, Sebghatollahi V. Epidemiological, demographic, and colonic extension of ulcerative colitis in Iran: a systematic review. *Middle East J Dig Dis* 2013;5(1):29-36. [PMID: 24829667](#)
- Zahedi MJ, Darvish Moghadam S, Hayat Bakhsh Abbasi M, Dehghani M, Shafiei Pour S, Zydabady Nejad H, et al. The incidence rate of inflammatory bowel disease in an urban area of Iran: a developing country. *Middle East J Dig Dis* 2014;6(1):32-6. [PMID: 24829703](#)
- Kurina L, Goldacre M, Yeates D, Gill L. Depression and anxiety in people with inflammatory bowel disease. *J Epidemiol Community Health* 2001;55(10):716-20. [PMID: 11553654](#)
- Corrao G, Tragnone A, Caprilli R, Trallori G, Papi C, Andreoli A, et al. Risk of inflammatory bowel disease attributable to smoking, oral contraception and breastfeeding in Italy: a nationwide case-control study. *Int J Epidemiol* 1998;27(3):397-404. [PMID: 9698126](#)
- Aghazadeh R, Zali MR, Bahari A, Amin K, Ghahghaei F, Firouzi F. Inflammatory bowel disease in Iran: a review of 448 cases. *Arch Iran Med* 2004;7(3):210-6. [Link](#)
- Mohammadi HR, Airamloo M. Clinical and epidemiological characteristics in ulcerative colitis patients referred to Imam Hospital, 1995-2000. *Tehran Univ Med J* 2001;59(4):80-5. [Link](#)
- Taherkhani R, Ahmadi B, Farshadpour F, Esmailizadeh M, Dolatshahi M, Makvandi M, et al. Epidemiologic characteristics and frequency of anatomical pattern of ulcerative colitis in patients referred to Imam Khomeini Hospital During Years 2007 to 2011. *Jundishapur Sci Med J* 2014;13(3):275-82. [Link](#)
- Ghadiri A, Esmaeili H, Hashemi SJ, Masjedizadeh A, Alavinejad P, Shayesteh AA. A study on epidemiological features and clinical manifestations among Crohn and ulcerative colitis patients admitted to treatment centers of Ahvaz, Iran. *Jundishapur Sci Med J* 2016;15(1):19-33. [Link](#)
- Zahedi MJ, Darvish-Moghadam S, Haiatbakhsh M, Dalirsani Z. Demographic and clinical features of ulcerative colitis patients in Kerman city during 2005-2007. *J Kerman Univ Med Sci* 2015;16(1):45-53. [Link](#)
- Amani F, Movahed V, Tabarraie Y. Epidemiologic study of 80 patients with ulcerative colitis referred to Imam hospital in Ardabil city during 2004-2010. *Adv Biores* 2014;5(1):131-6. [Link](#)
- Malekzadeh MM, Vahedi H, Gohari K, Mehdipour P, Sepanlou SG, Ebrahimi Daryani N, et al. Emerging epidemic of inflammatory bowel disease in a middle income country: a nation-wide study from Iran. *Arch Iran Med* 2016;19(1):1-14. [Link](#)
- Sharma J, Sharma B, Sharma R, Mahajan S, Raina R, Sharma P. The profile of inflammatory bowel disease in natives of Western Himalayas. *Trop Gastroenterol* 2017;38(2):115-21. [Link](#)
- Makharia GK, Ramakrishna BS, Abraham P, Choudhuri G, Misra SP, Ahuja V, et al. Survey of inflammatory bowel diseases in India. *Indian J Gastroenterol* 2012;31(6):299-306. [Link](#)
- Ghanadi K, Valizadeh J, Hasanvand A. Epidemiological and clinical aspects of ulcerative colitis in west of Iran: a cross sectional study.



- Springerplus 2016;5(1):1588. [PMID: 27652161](#)
24. Vavricka SR, Schoepfer A, Scharl M, Lakatos PL, Navarini A, Rogler G. Extraintestinal manifestations of inflammatory bowel disease. *Inflamm Bowel Dis* 2015;21(8):1982-92. [Link](#)
25. Larsen S, Bendtzen K, Nielsen OH. Extraintestinal manifestations of inflammatory bowel disease: epidemiology, diagnosis, and management. *Ann Med* 2010;42(2):97-114. [PMID: 20166813](#)
26. Levine JS, Burakoff R. Extraintestinal manifestations of inflammatory bowel disease. *Gastroenterol Hepatol* 2011;7(4):235-41. [PMID: 21857821](#)
27. Evans PE, Pardi DS. Extraintestinal manifestations of inflammatory bowel disease: focus on the musculoskeletal, dermatologic, and ocular manifestations. *Medscape Gen Med* 2007;9(1):55. [PMID: 17435655](#)
28. Bernstein CN, Blanchard JF, Rawsthorne P, Yu N. The prevalence of extraintestinal diseases in inflammatory bowel disease: a population-based study. *Am J Gastroenterol* 2001;96(4):1116-22. [PMID: 11316157](#)
29. Ricart E, Panaccione R, Loftus EV Jr, Tremaine WJ, Harmsen WS, Zinsmeister AR, et al. Autoimmune disorders and extraintestinal manifestations in first-degree familial and sporadic inflammatory bowel disease. A case-control study. *Inflamm Bowel Dis* 2004;10(3):207-14. [PMID: 15290913](#)
30. Danese S, Semeraro S, Papa A, Roberto I, Scaldaferrì F, Fedeli G, et al. Extraintestinal manifestations in inflammatory bowel disease. *World J Gastroenterol* 2005;11(46):7227-36. [PMID: 16437620](#)
31. Mendoza J, Lana R, Taxonera C, Alba C, Izquierdo S, Díaz-Rubio M. Extraintestinal manifestations in inflammatory bowel disease: differences between Crohn's disease and ulcerative colitis. *Med Clin* 2005;125(8):297-300. [PMID: 16159555](#)