

# Sociodemographic Characteristics, Smoking, and Family History of Patients with Inflammatory Bowel Disease, Northern Part of Iraq

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## Abstract

**Background:** Inflammatory bowel disease (IBD) is a long chronic condition of the gastrointestinal tract that includes Crohn's disease and ulcerative colitis. The incidence rate of IBD increases globally. The exact pathogenesis of IBD is not known and has yet to be discovered. **Materials and Methods:** This study was conducted in Kurdistan region of Iraq (Erbil, Duhok, Sulaimaniyah, and Halabja) from July 2021 to July 2022. Sociodemographic variables (gender, age, education level, employment status, marital status, and residency) plus smoking habits and family history were collected by a questionnaire and reviewed in 83 patients with IBD and 170 matched controls, followed by statistical comparison in both studied groups. A combination of clinical, radiographic, histological, and endoscopic assessment from medical records was used for the diagnosis of IBD. **Results:** Of all IBD patients, 56.6% (47) were male and 43.4% (36) were female. Statistically no significant differences were identified, among patients and controls, for gender, age, marital status, level of education, and employment, whereas significant differences were identified for residency, smoking, and family history, and *P* value was 0.019, 0.016, and 0.001, respectively. **Conclusions:** Smoking and family history were determined as a risk factor for the development of IBD and the odds ratios (95% confidence interval) were 1.916 (1.126–3.260) and 3.260 (1.596–6.658), respectively.

**Keywords:** Crohn's disease, family history, Kurdistan region, smoking, ulcerative colitis

## INTRODUCTION

Inflammatory bowel disease (IBD) includes both Crohn's disease (CD) and ulcerative colitis (UC), which are long-term inflammatory condition of the gastrointestinal tract.<sup>[1,2]</sup> Abdominal pain, persistent diarrhea, blood per rectum, and mucus in feces are among the most common symptoms of IBD.<sup>[3]</sup> Precise etiology and pathogenesis of these conditions are not known; however, it is considered to be multifactorial and a cure is yet to be discovered.<sup>[4]</sup> Recent studies revealed that the pathogenesis of IBD is influenced and functionally integrated by an individual's genetic susceptibility, external environment, intestinal microbial flora, and immunological responses.<sup>[5,6]</sup>

Family history is considered as one of the top risks of the development of IBD, which increases the incidence rate of the disease 10- to 15-fold times in the unaffected first-degree relatives and about 3-fold in close relatives.<sup>[7]</sup>

According to the epidemiological data, smoking is the central cause of many diseases including cancer, diseases of cardiovascular or respiratory system, diabetes mellitus, and IBD.<sup>[8-10]</sup>

IBD has been considered as a global public health issue over the past 10 years.<sup>[11,12]</sup> IBD, formerly thought to be a Western disease, is becoming prevalent in the developing nations.<sup>[13]</sup> According to a 2012 systematic study, Europe has the highest annual incidence of IBD, followed by North America, Asia, and Middle East.<sup>[14]</sup> Therefore, the incidence pattern of IBD has shifted during the

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past 20 years, increasing the incidence in previously low incidence regions such as Asia and the Middle East as well as continuing to rise in the West.<sup>[15,16]</sup> Urbanization and the move to a Western diet in dietary patterns are believed to be responsible for this trend.<sup>[17]</sup> In Iraq, especially Kurdistan region, there are a few epidemiological studies available about sociodemographic characteristics and environmental and biological factors of IBD. Thus, the present study aimed to determine the risk factors related to IBD in Kurdistan region of Iraq, according to some sociodemographic data and comparing them to other geographical regions, countries, and populations.

## MATERIALS AND METHODS

This is a descriptive cross-sectional study, which was conducted in Kurdistan region of Iraq (Erbil, Duhok, Sulaimaniyah, and Halabja); from each city, two private clinics were selected, and the duration of the study was from July 2021 to July 2022. The criteria for the diagnosis of IBD were a combination of clinical, radiographic, histological, and endoscopic assessment, and the collected data were reviewed by three independent physicians, while exclusion criteria were colitis from other causes. Additionally, anyone who had any of the following criteria were disqualified: pregnant women, nursing mothers, people who had undergone a total colectomy in the past, people who were taking experimental medications, people who had cancer or any other concurrent end-stage organ disease, and addicts. To identify the sociodemographic profile and for the purpose of collecting data, we prepared a questionnaire that included variables such as gender, age, education level, employment status, marital status, residency, smoking habits, and family history as shown in Table 1; this study has not investigated about the religion, ethnic group, income, migration, and alcoholism. All conscripts who were not given an IBD diagnosis were considered to be a part of the control population.

Our study population included 83 patients with IBD and their 170 adult healthy controls. Descriptive statistics crosstab option was used to analyze the sociodemographic variables. There was no imputation of missing values. The statistical analysis was conducted using SPSS version 25 (IBM Corp., Armonk, NY, USA), and *P* values < 0.05 were considered as a statistical significance. This sample size allowed estimates of relative risk with a 95% confidence interval (CI) and a margin of error <5%. The relative risk determined through odds ratio (OR) and also Medcalc online calculator was used to confirm the OR.

## Ethical approval

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with patients' verbal and analytical approval before sample was taken. The study protocol and the subject information and consent form

**Table 1: Definition of variables used**

Type of variable	Characteristics	Type of response
Sociodemographic	Gender	Male Female
	Age (years)	Age between 18 and 20 Age between 21 and 29 Age between 30 and 39 Age between 40 and 49 Age older than 50
	Marital status	Single Married Divorced
	Level of education	Studying or graduated Never studied High degree
	Employment status	Employed Unemployed Retired Student
Environmental	Smoking status	Smoker Never smoker Ex-smoker
Biological variable	Family history	Positive (present) Negative (not present)
Response variable	Type	Case (IBD) Control (no IBD)

were reviewed and approved by a local ethics committee (Salahaddin University, College of Science), and samples were obtained on request according to the document number 1685/35/7 (21/02/2022).

## RESULTS

Of all IBD patients, 56.6% (47) were male and 43.4% (36) were female, whereas the number of male in the control group was 54.7% (93) and of female was 45.3% (77). Briefly, the highest percentage of IBD observed in the following subgroups: age group (21–29 years), which was 39.8%; married, 78.3%; educated, 59.0%; employed, 49.4%; and patients in urban area, 98.8%.

No significant differences were identified between patients with IBD and controls in terms of gender, age, marital status, education, and employment, as shown in Table 2, whereas significant differences were identified for the type of residency between patients and controls (*P* value of 0.019): 98.8% and 91.2% of the participants were in the urban area for patients and controls, respectively, and 1.2% and 8.8% were in the rural area for patients and controls, respectively. The OR for residency was OR = 0.126, 95% CI = 0.016–0.97, as shown in Table 3.

As shown in Table 4, smoking and family history showed significant differences among patients of IBD and controls, and *P* values were 0.010 and 0.001, respectively. The results in Tables 5 and 6 show that the OR for smoking and family history was 1.916, 95% CI = 1.126–3.260, and 3.260, 95% CI = 1.596–6.658, respectively.

**Table 2: Demographic characteristics of the IBD patients versus the control population, in the northern part of Iraq**

Characteristic		Case (n = 83) and %	Control (n = 170) and %	P value Phi value
Gender	Male	56.6% 47	54.7% 93	0.773 -0.018
	Female	43.4% 36	45.3% 77	
Age (years)	18–20	6.0%	13.5%	0.102
	21–29	39.8%	27.1%	0.175
	30–39	26.5%	24.7%	
	40–49	20.5%	21.2%	
	>50	7.2%	13.5%	
Marital status	Single	14.5%	18.8%	0.638
	Married	78.3%	72.9%	0.060
	Divorced	7.2%	8.2%	
Education	Studying or graduated	59.0%	54.7%	0.370 0.089
	Never studied	32.5%	30.6%	
	High degree	8.4%	14.7%	
Employment	Employed	49.4%	43.5%	0.648
	Unemployed	33.7%	35.9%	0.081
	Student	13.3%	18.2%	
	Retired	3.6%	2.4%	
Residency	Rural	1.2%	8.8%	0.019
	Urban	98.8%	91.2%	0.147

**Table 3: Residency and IBD by OR**

Characteristic	Case (n = 83)	Control (n = 170)	P value	OR* (95% CI)
Rural	1.2% 1	8.8% 15	0.019	0.126 (0.016–0.971)
Urban	98.8% 82	91.2% 155		

\*: odds ratio

**Table 4: Environmental factor (smoking) and biological factor (family history) of patients with IBD and controls**

Characteristic		Case (n = 83) and %	Control (n = 170) and %	P value Phi value
Smoking	Smoker	39	107	0.016
	Never smoker	44	63	
Family history	Positive	62	154	0.001
	Negative	21	16	

**Table 5: The relative risk of smoking in patients with IBD and controls**

Characteristic	Case (n = 83)	Control (n = 170)	P value	OR* (95% CI)
Never smoker	39	107	0.016	1.916 (1.126–3.260)
Smoker	44	63		

\*: odds ratio

**Table 6: The relative risk of family history in patients with IBD and controls**

Characteristic	Case (n = 83)	Control (n = 170)	P value	OR* (95% CI)
No family history	62	154	0.001	3.260 (1.596–6.658)
Family history	21	16		

\*: odds ratio

## DISCUSSION

This is the first study to evaluate different variables including sociodemographic, smoking, and family history among patients with IBD and their matched controls, in all provinces of Kurdistan region of Iraq. Thousands of new people are diagnosed with IBD every year throughout the world.<sup>[18]</sup>

Although the basic etiology of IBD is unknown,<sup>[19]</sup> the most widely accepted hypothesis contends that it is caused by a complex etiopathogenic mechanism in which environmental, family or genetics, immune system, microorganisms, and psychology all play a role.<sup>[20]</sup> IBD incidence varies across different demographic groups; hence, a certain type of population will have a particular profile of IBD patients.<sup>[1]</sup> Thus, the present study aimed to determine the sociodemographic characteristics and relative risk of smoking and family history among patients with IBD in the northern part of Iraq.

Generally, immune-mediated diseases often affect more women than men, eight out of 10 individuals with all autoimmune disorders are female.<sup>[21]</sup> Most Western research has revealed an equal gender distribution for UC and CD, whereas the majority of studies in Asia have demonstrated a male predominance for CD.<sup>[22–25]</sup> More recent study in Denmark reported that over all the incidence rates of IBD conditions for females were significantly higher than for males.<sup>[26]</sup> A study in the United Kingdom showed characteristics of 307 patients with IBD: 186 (60.6%) were female and 121 (39.4%) were male.<sup>[27]</sup> In contrast, a study in northern China did not find the gender difference of UC occurrence and reported 1.1:1 as the ratio of male to female.<sup>[28]</sup> Different findings mean that statistics are inconsistent and may be region-dependent.<sup>[21]</sup> In this study, gender and the incidence of IBD are not related statistically and *P* value was 0.773. Most recent previous study in the same population reported the same result,<sup>[11]</sup> whereas two other studies reported a slight female gender predominance for IBD.<sup>[29,30]</sup> These differences may due to the number of the cases, and also the present study includes the patients from all the province of Kurdistan region of Iraq, which are Erbil, Duhok, Sulaimaniyah, and Halabja.

The highest percentage of incidence of the IBD (39.8%) was observed among the patients of age group 21–29 years; this is similar to the finding of other study

in Erbil–Kurdistan region,<sup>[11]</sup> but it does not agree with another study conducted in Asulaimaiyah-Iraqi and Kurdistan-Iraq, which reported the peak age of onset for IBD is 35 years.<sup>[30]</sup> Patients with IBD were often diagnosed in the age range of 20–30 years in the great majority of populations.<sup>[14,15]</sup> Different results reported in other countries, for instance, a study in south New Zealand, reported the age distribution regarding IBD and illustrated bimodal elevations at 20–24 years and 65–69 years.<sup>[31]</sup> It is yet unknown if these variations in age distribution are actual or if they are due to variations in the diagnostic tools and geographical areas.

The findings of this study showed that there were no significant differences in sociodemographic factors including marital status, education level, and employment between IBD patients and their matched controls, with *P* values of 0.102, 0.638, 0.370, and 0.648, respectively. These results agree with the results of previous study in the same population.<sup>[11]</sup> However, the highest frequency of IBD was among married, studying or graduated, and employed subgroups, which were 78.3%, 59.0%, and 49.9%, respectively. The results regarding marital status correlated with the findings of a study in United Kingdom that showed characteristics of 307 patients with IBD (165 CD, 142 UC) and classified the patients according to marital status: 201 patients were married, 44 were divorced, 28 were single, 20 were widowed, and 13 were civil partnership.<sup>[27]</sup>

In this study, a significant difference (*P* value of 0.019) founded between the type of residency among patients with IBD and controls and the percentage of urban residence among IBD cases was 98.8% and for rural was 1.2%. The same result reported by a previous study that used population-based data from several Canadian provinces showed that living in a rural area at the time of diagnosis and at birth was linked to a lower incidence of IBD than living in an urban area, with the strongest protective association being seen in the childhood-onset IBD.<sup>[32]</sup> Our results were in line with those of a 40-article systematic review.<sup>[33]</sup> Rurality may protect against IBD through a variety of mechanisms, including food and lifestyle choices, exposure to the environment, and the segregation of people with various genetic risk profiles.<sup>[32]</sup>

In the present study, the *P* value was 0.010 and the OR was 1.916 (95% CI = 1.126–3.260) for smoking when comparing patients to controls. The number of newly diagnosed nonsmoker CD patients has increased in the West over time, and in Europe, the number of newly diagnosed nonsmoker UC patients has increased since the late 1990s.<sup>[34]</sup> Smoking's effects on CD and UC have not been extensively researched in Asia.<sup>[35]</sup> Because of genetic susceptibility variability and the presence of additional risk factors, the impact of smoking on the incidence of IBD may differ globally.<sup>[34]</sup>

A study reported smoking as an independent risk factor for the development of CD.<sup>[11]</sup> A study reported that smoking increases the risk of both types of IBD.<sup>[36]</sup> Another study concluded that smoking affects IBD in two ways: it raises CD risk while lowering UC risk.<sup>[37]</sup> In contrast, the IBD “epidemic” in newly industrialized Asia is in its infancy, especially in regions with significant smoking incidence; as a result, there is an increase in the diagnosis of IBD in smokers.<sup>[34]</sup> Briefly, smoking increases DNA methylation, shortening telomere lengths, and increases oxidative stress, which are the contributing factors in a number of diseases including IBD.<sup>[10]</sup>

Additionally, the results of this study showed significant differences among patients and controls in terms of family history; *P* value was 0.001 and OR was 3.2601 (95% CI = 1.5962–6.6582). This result agrees with the most recent study that reported a family history of IBD (OR = 4.510, 95% CI = 2.19–9.25 and OR = 3.972, 95% CI = 1.58–9.96) were the risk factors for UC and CD, respectively.<sup>[38]</sup> According to the previous meta-analysis and a systematic review, 12% of UC patients have a family history of IBD.<sup>[39]</sup> The apparent rise in family history prevalence may be related to the fact that IBD incidence is actually rising, possibly as a result of both genetic and environmental factors.<sup>[39]</sup>

## CONCLUSIONS

In conclusion, we have offered supporting processes that are biologically plausible; however, it is not the goal of our study to describe the underlying etiologies of IBD. Our results, we believe, will stimulate further research into the impact of various sociodemographic factors, environmental factors, and biological components in the pathogenesis of IBD. Understanding these trends may help us better communicate with our patients about the risk factors associated with IBD pathogenesis and may present innovative treatment and preventative alternatives. The following points were concluded:

1. No significant differences were reported among patients with IBD and controls in terms of gender, age group, marital status, level of education, and employment.
2. There were significant differences between patients and control in terms of residency, smoking, and family history.
3. Smoking and family history were determined as the risk factors for IBD, whereas residency was not determined as a risk factor.

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## Conflict of interest

There are no conflicts of interest.



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