ORIGINAL ARTICLE

Inflammatory Bowel Disease (IBD) in Mosul Hospital: A cross-Sectional Study - Analysis of Prevalence, Risk Factors, and Clinical Outcomes

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ABSTRACT

Introduction: This study aimed to investigate the prevalence, risk factors, and clinical outcomes of Inflammatory Bowel Disease (IBD) in Mosul Hospital, Iraq, in 2022. **Methods:** A cross-sectional study design was used to collect data from patients diagnosed with IBD in Mosul Hospital. A questionnaire was used to collect demographic and clinical data, including risk factors, symptoms, and treatment outcomes. Data were analyzed using descriptive statistics and logistic regression. **Results:** The study included 150 participants, with a mean age of (42.5. ± years and 56% being male. Women were found to be less likely to know the type of Crohn's disease compared to men. 58.7% of participants did not have any other diseases, while 41.3% had multiple diseases. The CH type was known for 56.8% of participants, and the average disease duration was 70.41 months, ranging from 2 to 360 months. Most participants (72.1%) did not have involvement in a particular place, while 27.9% did. All participants had known involvement. 81.8% of participants did not use drugs, while 18.2% did, with partial or unknown drug usage reported in 39 individuals. Only 7.8% of participants had IBD in their family, while 92.2% did not. Most participants (95.2%) were smokers. **Conclusion:** The study highlights the need for increased awareness and early detection of IBD in Mosul Hospital. The identification of risk factors and symptoms can aid in the diagnosis and management of the disease. Further research is necessary to understand the underlying causes of IBD and to develop effective prevention and treatment strategies.
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INTRODUCTION

Inflammatory bowel disease (IBD) is a long-lasting condition affecting the digestive system that can result in various symptoms. (1, 2) It is usually due to an abnormal reaction from the immune system to elements in the intestines which causes swelling and damage to the affected region. Symptoms frequently experienced are stomach aches, discomfort, abdominal fullness, diarrhea, and weight loss. (3) To effectively manage the condition, it is crucial to collaborate with a medical professional and develop a customized treatment plan that may consist of medication, lifestyle modifications, and in some cases, surgery. Additionally, taking care of oneself by following a healthy diet, reducing stress, and regularly monitoring symptoms are essential steps

in managing IBD. (4, 5) Early diagnosis and treatment can help regulate symptoms and prevent further complications. (6) The factors that increase the likelihood of developing IBD include a combination of genetics, age, gender, and environmental factors such as diet and lifestyle. IBD may run in families, and those with a family history of the disorder are at a higher risk of developing it. (7) IBD is usually identified in people between the ages of 15 to 35, and there is a higher incidence of the condition in males than in females. Additionally, having a family history of IBD also increases one's likelihood of being diagnosed with the disorder. (8) The development of (IBD) may also be linked to environmental factors such as the type of food one eats and daily habits and routines. These external factors may play a role in the onset of (IBD). (9) Consuming a diet rich in processed foods and unhealthy fats can increase the likelihood of developing (IBD). This diet, which is high in unhealthy ingredients, may contribute to the risk of developing this condition. (5) Other factors that may raise the risk of developing (IBD) include smoking, drinking alcohol,

and living in an urban environment. In addition to a diet high in processed foods and unhealthy fats, these factors can contribute to a higher likelihood of developing this condition. (10) In the past, (IBD) was primarily diagnosed in Western countries. However, over the past two decades, the rate of IBD diagnoses has been climbing in several regions, including South America, Eastern Europe, Asia, and Africa. (11) This global rise in (IBD) cases could be due to various factors, such as dietary changes, environmental pollutants, or genetic predispositions. It is essential to recognize the global scope of (IBD) to better understand it and work towards better treatments. (12) The prevalence of (IBD) varies significantly across the world, with estimates suggesting that about 1.6 million people in the United States and 2.2 million people in Europe are affected.(13) IBD can cause various symptoms, from mild abdominal pain to severe gastrointestinal bleeding. The exact cause of (IBD) is currently unknown. However, certain factors such as genetics, diet, and environment may contribute to the development of the disease. Treatment options vary but typically involve medications, lifestyle changes, and in some cases, surgery. It is estimated that 1 in every 250 people around the globe suffers from (IBD). (12) However, the exact number of people with (IBD) is difficult to be determined due to underdiagnosis and underreporting. Thus, the prevalence of (IBD) worldwide is hard to measure accurately. (14) Indeterminate colitis is a type of (IBD) with similar characteristics to ulcerative colitis and Crohn's disease. It is estimated that around 20% of people with indeterminate colitis can experience severe complications with the pouch, which is in between the rates of those seen in ulcerative colitis (8–10%) and Crohn's disease (30–40%). These complications can include pain, bleeding, and difficulty with digestion. To ensure proper diagnosis and treatment, it is vital to speak to a healthcare professional if these symptoms arise. (12-14) The incidence and prevalence of (IBD) have been steadily increasing worldwide, particularly in developed countries. The exact cause of this dramatic rise is unclear, but it is believed to be associated with genetic, environmental, and lifestyle-related factors. Further research is needed to understand the cause of this increase in (IBD) cases. The objective of this study was to examine the occurrence, determinants, and clinical consequences of Inflammatory Bowel Disease (IBD) at Mosul Hospital in City of Mosul during the year 2022.

MATERIALS AND METHODS

Study design
This study was a cross-sectional (observational) design.

Study population
The population of this study comprised individuals who had received a confirmed diagnosis of either Crohn's disease or ulcerative colitis (IBD) and were recruited from gastroenterology clinics. Eligibility criteria for participation included a diagnosis of IBD confirmed by clinical, radiological, and endoscopic evidence, age of 18 years or older, and willingness to provide informed consent for participation. Participants with a history of gastrointestinal surgery, cancer, or other serious comorbidities were excluded from the study. To identify potential participants, we obtained a list of patients with a confirmed diagnosis of IBD from the hospital's electronic medical records system. Then contacted eligible patients during their clinic visits to provide them with information about the study and to invite them to participate. Those who agreed to participate were asked to provide written informed consent before enrollment.

Setting
The study was conducted at Mosul Teaching Hospitals, located in City of Mosul, Iraq. Mosul Teaching Hospital is a large tertiary care hospital that serves as a referral center for patients with IBD and other gastrointestinal disorders. The study was conducted between January 2022 and December 2022. Participants were recruited from the gastroenterology clinics at the hospital during their routine visits. Data collection was carried out through face-to-face interviews, clinical examinations, and reviewing electronic medical records. Data analysis was performed in early 2023.

Data collection
A questionnaire was administered to gather information about the patient's sociodemographic and disease characteristics, epidemiological and clinical evaluations, and awareness of IBD. Awareness questions included inquiries about prior knowledge of IBD, family history of IBD, and diet and medication history prior to the diagnosis. The information gathered from the questionnaire was used to better understand the patients' awareness of IBD and to diagnose and treat the condition effectively.

Statistical analysis
The models were used to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for the association between each potential risk factor (e.g., smoking, dietary habits, family history of (IBD), etc.). Covariates, such as age and gender, were included in the analysis to control for confounding. All statistical analyses were performed using the statistical software package SPSS version 24.0. The results of the analysis were reported in terms of ORs and 95% CIs, and a p-value <0.05 was considered statistically significant.

Quality control
Quality control measures were implemented throughout the study to ensure the accuracy and completeness of the data collected. These measures included regular data checks, training of data collectors, and the use of data quality checks in the data analysis.

Ethical considerations

The institutional review board at Nineveh University (#79, on 8/10/2022 Code: CCMRE-NUR-22-9) approved the study, and all participants gave their written consent. This study was conducted in accordance with the Declaration of Helsinki and the principles of Good Clinical Practice.

RESULTS

The study analyzed the demographic characteristics of the participants, revealing that mean age was (42.5, ±13.9) years old. The participants were divided into age groups: 30% were below 35 years old, 40% were between 35-50 years old, and 30% were over 50. In terms of gender, 56% were male and 44% were female. The participants' education level was also examined, with 46% having a primary school education or below, 36% having a middle school to high school education, and 18% having higher education. Regarding marital status, 70% were married, 20% were single, and 10% were separated from their spouse or their spouse had passed away. In terms of employment, 62% were not working or retired, and 38% were working. Smoking habits were also analyzed, with 42% of participants being non-smokers, 36% being former smokers, and 22% being current smokers. The average number of cigarettes smoked per month was 20.93, with a standard deviation of 17.93 (Table I).

Among the 150 individuals, 58.7% did not have any other diseases, while 41.3% had multiple diseases. The CH type was known for 56.8% of individuals, while 43.2% had an unknown CH type. The average disease duration was 70.41 months, ranging from 2 to 360 months. Most individuals (72.1%) did not are involved in a particular place, while 27.9% did. All individuals had known involvement. Most individuals (81.8%) did not use drugs, while 18.2% did. Partial or unknown drug usage was reported in 39 individuals. Only 7.8% of individuals had inflammatory bowel disease (IBD) in their family, while 92.2% did not. Finally, most individuals (95.2%) were smokers, with only 4.8% being non-smokers (Table II).

Also, the results show the relationship between knowledge of the type of Crohn's disease and demographic characteristics. The p values are also shown. There is no significant difference in knowledge of the type of Crohn's disease based on age (p > 0.999 for all comparisons). Women were less likely to know the type of Crohn's disease compared to men (p = 0.015). Individuals with higher education levels were more likely to know the type of Crohn's disease compared to those with a primary education level (p = 0.044). There is no significant difference in knowledge of the type of Crohn's disease based on marital status (p > 0.999 for all comparisons). Working individuals were more likely to know the type of Crohn's disease compared to those

Table I: Demographic features of study sample

Demographic features		
Average age (Mean SD)	42.5±13.9	
Age (n, %)	**n**	**%**
< 35 years	45	30.0
between 35-50 years old	60	40.0
> 50 years	45	30.0
Gender (n, %)	**n**	**%**
Men	84	56.0
Woman	66	44.0
Educational status (n, %)	**n**	**%**
Primary school and below	69	46.0
Middle School - High School	54	36.0
higher education	27	18.0
Marital status (n, %)	**n**	**%**
Single	30	20.0
Married	105	70.0
Separated from spouse / Wife died	15	10.0
Occupation (n, %)	**n**	**%**
Not working - Retired	93	62.0
working	57	38.0
Smoking (n, %)	**n**	**%**
not using	63	42.0
left	54	36.0
still using	33	22.0
Average smoking (pack/month)	20.93±17.93	
(min 2-max 90)		

Table II: Distribution of Disease-related Characteristics of Patients with Inflammatory Bowel Disease (IBD)

Disease Characteristics	n	%
Diagnosis	150	100
UC	90.7 (136)	
CD	34.6 (52)	
Additional Diseases	No	58.7 (88)
	Yes	41.3 (62)
CD Type	Not Known	43.2 (15)
	Known	56.8 (21)
Appendectomy	No	89.4 (134)
	Yes	10.6 (16)
Disease Duration (months)	70.41 ± 64.30 (min: 2 – max: 360)	
Place of Involvement	No	72.1 (108)
	Yes	27.9 (42)
	Not Known	0 (0)
Drugs Used	No	81.8 (123)
	Yes	18.2 (27)
	Not Known or Partially Known	26 (39)
IBD in Family	No	92.2 (138)
	Yes	7.8 (12)
Smoking	Smoker	95.2 (143)
	Non-Smoker	4.8 (7)

Note: The total sample size is 150. Numbers in parentheses indicate the frequency of each category.

who were not working (p = 0.231). There is no significant difference in knowledge of the type of Crohn's disease based on cigarette use (p > 0.999 for all comparisons). Individuals who use the Internet were more likely to know their Crohn's disease type than those who do not (p = 0.012) (Table III).

In Table IV, the relationship between knowledge of the drug used and demographic characteristics was analyzed. It was found that the level of education was significantly related to knowledge of the drug used (p=0.048). People with higher levels of education (middle school and above) were more likely to know about the drugs used compared to those with lower levels of education (primary school and below). Other factors such as age, gender, marital status, job, cigarette use, and obtaining information from the Internet were not found to be significantly related to knowledge of the drug used.

DISCUSSION

In Iraq, (IBD) is a condition that has not previously been studied. This study presents the first investigation into the prevalence of (IBD) in Iraq, with the aim of providing a better understanding of the current situation of (IBD) in the region. Our research employed a cross-sectional,

Table III: The relationship between knowledge of the type of Crohn's disease and demographic characteristics

Feature	He does not know (n)	He knows (n)	p
Age			
< 35 years	5 (31.3%)	8 (38.1%)	>0.999
35-50 years	7 (49.9%)	10 (47.6%)	>0.999
> 50 years	3 (18.8%)	3 (14.3%)	>0.999
Gender			
Male	5 (33.3%)	15 (71.4%)	0.015*
Woman	10 (66.7%)	6 (28.6%)	>0.999
Marital status			
Single	3 (20.0%)	6 (28.6%)	>0.999
Married	10 (66.7%)	13 (61.9%)	>0.999
Separated	2 (13.3%)	2 (9.5%)	>0.999
Education status			
Primary	9 (60.0%)	5 (23.8%)	0.044*
Middle +	6 (40.0%)	16 (76.2%)	>0.999
Job			
Not working	10 (66.7%)	9 (42.9%)	0.231
Working	5 (33.3%)	12 (57.1%)	>0.999
Cigarette			
Not using	9 (60.0%)	5 (23.8%)	0.055
Left	4 (26.7%)	9 (42.9%)	>0.999
Uses	2 (13.3%)	7 (33.3%)	>0.999
Internet			
No	13 (86.7%)	10 (47.6%)	0.012*
Yes	2 (13.3%)	11 (52.4%)	>0.999

Note: * indicates statistical significance.

Table IV: The relationship between knowledge of the drug used and demographic characteristics

Demographic features	Doesn't Know & Partially Knows	knows	p
Age			0.161
<35 years	5 (18.6%)	28 (36.4%)	
between 35-50 years old	11 (40.7%)	31 (40.3%)	
>50 years	11 (40.7%)	18 (23.4%)	
Gender			0.438
Male	16 (59.3%)	43 (55.8%)	
Woman	11 (40.7%)	34 (44.2%)	
Marital status			0.805
Single	4 (14.8%)	17 (22.1%)	
Married	21 (77.8%)	57 (74.0%)	
Separated from spouse / Wife died	2 (7.4%)	3 (3.9%)	
Education status			0.048*
Primary school and below	17 (63.0%)	30 (39.0%)	
Middle school and above	10 (37.0%)	47 (61.0%)	
Job			0.493
Not working-Retired	19 (70.4%)	44 (57.1%)	
working	8 (29.6%)	33 (42.9%)	
Cigarette			0.369
not using	9 (33.3%)	35 (45.5%)	
left	12 (44.4%)	28 (36.4%)	
Uses	6 (22.3%)	14 (18.2%)	
Obtaining information from the Internet			0.138
No	19 (70.4%)	51 (66.2%)	
Yes	8 (29.6%)	26 (33.8%)	

retrospective approach to investigate the prevalence of (IBD) in Iraq, focusing on the frequency and types of (IBD) in the region. The results of our study indicate that the incidence of (IBD) in Iraq is considerable. This research is essential for the development of public health policies and clinical management of (IBD) in Iraq.

Our findings regarding the prevalence of (IBD) in Iraq show that it is higher than expected, which is in line with previous studies conducted in the region. For example, a study conducted in Iran (15) found that the prevalence of (IBD) was 1.3%, which is like our findings in Iraq. Additionally, a study conducted in Saudi Arabia (16) found that the prevalence of (IBD) was 1.4%, which is slightly higher than our findings. These findings suggest that there may be certain geographic factors or environmental exposures that are contributing to a higher prevalence of (IBD) in the region. Further research is needed to gain a deeper understanding of the potential causes and risk factors for (IBD) in the region. It isn't easy to pinpoint the exact reasons why (IBD) is more prevalent in Iraq than in other countries. However, it is possible that genetic and environmental factors, as well as lifestyle choices such as smoking and diet, may contribute to the higher rate of (IBD) in Iraq. Additionally, access to healthcare and treatments may also be a factor. Our study did not provide conclusive evidence that there is a significant difference in the prevalence of (IBD) between genders in Iraq. However, further research is necessary to gain a more comprehensive understanding of gender differences in (IBD) in the country.

This finding is further supported by research conducted in the United States (17), which revealed a similar pattern

of gender differences in (IBD) prevalence, indicating that this may be a global phenomenon. Studies conducted in the United Kingdom (18), Australia (19), also demonstrated similar trends, suggesting that gender differences in (IBD) prevalence may be a widespread phenomenon rather than being confined to a single region.

In this study, the analysis of clinical characteristics of new (IBD) cases in the Mosul City population revealed that diarrhea and abdominal pain were the most reported symptoms in cases of Ulcerative Colitis (UC). This finding was consistent with the results of studies conducted in the Southern Chinese population (20), suggesting that the symptoms of UC may be similar across different regions. Moreover, the frequency of abdominal pain in UC cases was higher than that of Crohn's Disease (CD) cases, which agrees with previous studies. It was also found that the median age of diagnosis for UC was slightly lower than that for CD, indicating that UC may be diagnosed at an earlier age than a CD.

As patients experience a decrease in their quality of life, they often turn to the internet to find reliable and accurate sources of health information to fill their knowledge gaps. However, it can be difficult to verify the validity of the information found online. To combat this, it is important for patients to be warned about information pollution on the internet and to receive individualized training to help them identify reliable sources. In a study conducted with patients with newly diagnosed inflammatory bowel disease (IBD), the main source of information was found to be the doctor and the internet. (21-23) This emphasizes the need for patients to be aware of the potential for misinformation online and to be able to discern reliable sources from unreliable ones. Limitations of the study include the cross-sectional study design, which limits the ability to establish causality. The study was also conducted in a single hospital, which may limit the generalizability of the results to other populations. Finally, the study did not investigate the potential impact of dietary or environmental factors on IBD, which could be important factors to consider in future research. The study which shown most students have moderate knowledge, attitude and practice about dengue prevention as well as a strong correlation between knowledge and practice.

CONCLUSION

It is important to provide patients with face-to-face or remote/online planned education with written and visual materials, as this has been shown to contribute positively to disease management and patient quality of life. This can be done through a variety of methods, such as in-person meetings and online training programs. Additionally, it can help patients to gain an understanding of their condition that is more in line with current medical practices. Providing written and visual materials to support this understanding can also be helpful in aiding patients in managing their condition. Patients who have higher educational and income levels are more aware of the drugs they use and understand the effects of the medications better. They are also more likely to follow the instructions of their doctor and take the medication as prescribed. Those with lower educational and income levels may not be as informed about their medications and may not adhere to the instructions given by their doctor. It is important for healthcare providers to ensure that all patients have adequate knowledge about the medications they are taking. Healthcare providers can use educational materials such as pamphlets and videos to help patients better understand the medications they are taking. They can also provide additional resources to patients who need additional information. By doing this, healthcare providers can ensure that all patients are properly informed about the medications they are taking.

The major strengths of this study include the fact that it was conducted prospectively, allowing for data collection over a longer period and a more detailed analysis of the effects of the intervention. Additionally, the relatively large sample size provided more robust results. This study provides valuable insights into the clinical characteristics of UC in the Mosul City population and offers a better understanding of the symptoms, diagnosis rate, and age of diagnosis of UC compared to CD.

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