ORIGINAL ARTICLE

Epidemiology of Inflammatory Bowel Disease in Southern Peninsular Malaysia

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ABSTRACT

Aim: To record the incidence and prevalence of inflammatory bowel disease (IBD), its social demographics, clinical characteristics and treatment, in the state of Johor, Malaysia.

Methods: Hospital Sultanah Aminah, Johor Bahru, is the only public hospital in Johor with a Gastroenterology service. Data on all existing and new IBD patients managed by the Gastroenterology Unit in 2016 were collected. Incidence and prevalence of IBD in 2016 were then calculated based on the estimated population of Johor and Johor Bahru.

Results: Twenty-five new cases of IBD were diagnosed in 2016. Among the 25 cases, 13 cases were Crohn's disease (CD), 10 were ulcerative colitis (UC) and two were IBD Unclassified (IBDU). The crude incidence of IBD, CD, UC and IBDU were 0.68, 0.36, 0.27, and 0.05 per 100,000 population respectively. Ethnic Indians had the highest incidence of IBD at 4.21 followed by Malays and Chinese at 0.56 and 0.18 per 100,000 population respectively. A total of 156 IBD cases were captured. Amongst them, 85 cases were UC, 68 cases were CD and three cases were IBDU, hence the prevalence of IBD, UC, CD and IBDU were 4.27, 2.33, 1.86 and 0.08 per 100,000 population respectively. Similarly, Indians had the highest prevalence at 16.84, followed by Chinese at 4.06 and Malays at 3.44 per 100,000 population.

Conclusions: The incidence of IBD in Johor is comparable to that of a previous study in northern Peninsular Malaysia. The ethnicity preponderance is similar to the previous studies conducted in Malaysia.

> **KEY WORDS:**
> *IBD, inflammatory bowel disease, Johor, incidence, prevalence*

INTRODUCTION

Inflammatory bowel disease (IBD) is traditionally considered a Western disease, with 2.5 to 3 million people affected in Europe, and 1.4 million people in the United States.[1,2] IBD is regarded as uncommon among Asians. However, studies have recognised that IBD incidence and prevalence have been increasing in Malaysia, and the Asia-Pacific, for several decades.[3,4]

Data regarding IBD incidence and prevalence in Malaysia are limited: one study by Ida et al., in 2015 was conducted in the Kinta Valley, in northern peninsular Malaysia.[3] Geographically diverse studies on IBD epidemiology are needed to reflect the true burden of disease in our society, allocate healthcare resources, and facilitate further research. In this study, we aimed to record the incidence and prevalence of IBD, its social demographics, clinical characteristics and treatment, in the state of Johor, Malaysia. Johor is the southernmost region of Peninsular Malaysia, covering an area of 19,016 square kilometres. The state has the third largest population in Malaysia, estimated at 3,655,100 in 2016. The official ethnic identification includes 1,948,168 Malays (53.3%), 1,107,495 Chinese (30.3%), 237,581 Indians (6.5%), 80,412 from other ethnic groups (2.2%) and 285,097 non-citizens (7.8%). Johor Bahru is Johor's capital and largest city, home to 1,514,342 people in 2016.[5]

MATERIALS AND METHODS

This was a retrospective review of all IBD patients managed by the Gastroenterology unit in Hospital Sultanah Aminah, Johor Bahru (HSAJB) in 2016. HSAJB is the only public hospital in Johor with a gastroenterology service, so our unit cares for the majority of IBD patients in this large state.

Research registration

This study was registered with the National Medical Research Register of Malaysia (NMRR) and approved by the Medical Research and Ethics Committee (MREC); research number NMRR-17-48-33832.

Data Collection

All existing and new IBD patients managed by the HSAJB gastroenterology unit in 2016 were included. Cases were collected from the clinic census. All patients aged 12 years and above, diagnosed with IBD by physicians or gastroenterologists that fulfilled clinical, endoscopic and histological diagnostic criteria, were included. IBD cases not captured in the clinic census, not referred to the gastroenterology unit, not seen by or discussed with a physician or gastroenterologist were excluded. No personal identifiers were collected, maintained or analysed as part of this study.

Table I: Characteristics of IBD cases incident in Johor in 2016

Characteristics	UC	CD
Number of patients	10	13
Disease Extent		Not applicable
- Proctitis (E1)	3 (30.0%)	
- Left Sided (E2)	1 (10.0%)	
- Extensive (E3)	6 (60.0%)	
Age of Diagnosis in years	Not applicable	
- 16 and below (A1)		1 (7.6%)
- 17 to 40 (A2)		6 (46.2%)
- 40 and above (A3)		6 (46.2%)
Disease Location	Not applicable	
- Ileal (L1)		0 (0%)
- Colonic (L2)		5 (38.5%)
- Ileocolonic (L3)		7 (53.8%)
- Upper Gastrointestinal (L4)		0 (0%)
- L1 + L4		1 (7.7%)
Disease Behaviour	Not applicable	
- Non-stricturing, Non-penetrating (B1)		9 (69.2%)
- Stricturing (B2)		2 (15.4%)
- Penetrating (B3)		2 (15.4%)
Perianal involvement (p)	Not applicable	2 (15.4%)

Table II: Demographics and characteristics of IBD patients prevalent in Johor in 2016

Characteristics	UC	CD
Number of patients	85	68
Median age, in years	48 ± 25	40 ± 24
Median age at diagnosis, in years	40 ± 23	31 ± 26
Median duration of the disease, in years	6 ± 9	3 ± 7
Gender		
- Male	41 (48.2%)	34 (50%)
- Female	44 (51.8%)	34 (50%)
Ethnicity		
- Malay	36 (42.4%)	29 (42.6%)
- Chinese	32 (37.6%)	13 (19.1%)
- Indian	16 (18.8%)	23 (33.8%)
- Others	1 (1.2%)	3 (4.4%)
Extraintestinal involvement	7 (8.2%)	7 (10.3%)
History of IBD-related surgery	4 (4.7%)	17 (25%)
Number of Patients with Relapse(s) in 2016	28 (32.9%)	30 (44.1%)
- 1 relapse	19 (22.4%)	24 (35.3%)
- 2 relapses	8 (9.4%)	6 (8.8%)
- 3 relapses	1 (1.2%)	0 (0.0%)
Dual Energy X-ray Absorptiometry (DEXA) Scan		
- Not done	83 (97.6%)	60 (88.2%)
- Normal	1 (1.2%)	2 (2.9%)
- Osteopenia	0 (0.0%)	3 (4.4%)
- Osteoporosis	1 (1.2%)	3 (4.4%)
History of CT scan	9 (10.6%)	35 (51.5%)
History of barium study	2 (2.4%)	19 (27.9%)
History of MRI scan	1 (1.2%)	5 (7.4%)
Side effects of treatment	10 (11.8%)	9 (13.2%)
Medications:		
- Oral corticosteroids	69 (81.2%)	62 (91.2%)
- Oral mesalamine	84 (98.8%)	61 (89.7%)
- Mesalamine suppositories	34 (40%)	4 (5.9%)
- Thiopurine	54 (63.5%)	63 (92.6%)
- Methotrexate	6 (7.1%)	3 (4.4%)
- Anti-Tumour Necrosis Factor	2 (2.4%)	16 (23.5%)

Table III: Montreal classification for ulcerative colitis and Crohn's disease of prevalence cases

	UC	CD
Disease Extent		Not applicable
- Proctitis (E1)	13 (15.3%)	
- Left Sided (E2)	34 (40.0%)	
- Extensive (E3)	38 (44.7%)	
Age of Diagnosis in years	Not applicable	
- 16 and below (A1)		9 (13.2%)
- 17 to 40 (A2)		34 (50.0%)
- 40 and above (A3)		25 (36.8%)
Disease Location	Not applicable	
- Ileal (L1)		6 (8.8%)
- Colon (L2)		17 (25.0%)
- Ileocolonic (L3)		42 (61.8%)
- Upper Gastrointestinal (L4)		1 (1.5%)
- L1 + L4		1 (1.5%)
Disease Behaviour	Not applicable	
- Non-stricturing, Non-penetrating (B1)		36 (52.9%)
- Stricturing (B2)		21 (30.9%)
- Penetrating (B3)		10 (14.7%)
Perianal involvement (p)	Not applicable	8 (11.8%)

The investigators reviewed every case note in detail and collected data describing social demographics, clinical characteristics and treatment. The Montreal classification was used to describe the age (A), disease location (L) and behaviour (B) of Crohn's disease as well as the extent of disease (E) of ulcerative colitis.[6]

Data Analysis

The incidence of IBD, Crohn's disease (CD), ulcerative colitis (UC) and IBD unclassified (IBDU) in HSAJB in 2016 was calculated using the number of new cases in 2016 as the numerator, and the estimated population of Johor as the denominator. The prevalence was calculated using the total number of existing and new cases in 2016 as the numerator, and the estimated population of Johor as the denominator. The incidence and prevalence of the major ethnic groups in Johor were calculated using each respective population as the denominator.

Data for patients originating from the district of Johor Bahru were extracted and the incidence and prevalence of IBD, CD, UC and IBDU were analysed, using the estimated population of Johor Bahru as the denominator. The estimated populations of Johor and Johor Bahru were obtained from the Department of Statistics of Malaysia, as detailed above.[5] Data analyses were performed using SPSS Statistics Version 21. Categorical variables were analysed and expressed in percentages, and continuous variables in mean or median.

RESULTS

Incidence of IBD in 2016

The HSAJB gastroenterology unit diagnosed 25 new patients with IBD in 2016. Among these patients, 13 had Crohn's disease (CD), ten had ulcerative colitis (UC) and two had IBD unclassified (IBDU). The baseline demographics included a median age of 40±23 years, a male to female ratio of 13:12, and an ethnic composition of 11 Malays, two Chinese, ten Indians, and two from other ethnic groups. Table I shows the clinical characteristics of the patients with UC and CD based on the Montreal classifications.

The crude incidence rates of IBD, UC, CD and IBDU were 0.68, 0.27, 0.36, and 0.05 per 100,000 population in 2016, respectively. We observed a UC: CD ratio of 0.77. The highest incidence occurred among ethnic Indians, at 4.21 per 100,000 population, followed by Malays and Chinese, at 0.56 and 0.18 per 100,000 population, respectively.

Prevalence of IBD in 2016

A total of 156 IBD patients were under the care of the HSAJB gastroenterology unit in 2016. Amongst these, 85 had UC, 68 had CD and three had IBDU. The demographics, clinical features and characteristics of UC and CD are presented in Table II and the Montreal classifications are presented in Table III. The prevalence of IBD, UC, CD and IBDU were 4.27, 2.33, 1.86 and 0.08 per 100,000 population, respectively. Ethnic Indians showed the highest prevalence of 16.84 per 100,000 population, followed by Chinese at 4.06 and Malays at 3.44 per 100,000 population.

Sub-analysis of the Incidence and Prevalence of IBD in 2016 for Johor Bahru district

Most of the new patients diagnosed, 16 of the 25, were from the Johor Bahru district. The crude incidence rates of IBD, UC, CD and IBDU in Johor Bahru were 1.06, 0.53, 0.40 and 0.13 per 100,000 population, respectively. Among all patients with IBD, 102 of the 156 were from Johor Bahru, therefore the prevalence of IBD, UC, CD and IBDU in Johor Bahru was 6.74, 3.50, 3.10, and 0.13 per 100,000 population, respectively.

DISCUSSION

From our study, the incidence of IBD in Johor was 0.68 per 100,000 population, while sub-analysis showed the incidence in Johor Bahru district was 1.06 per 100,000 population. The prevalence of IBD in this study was only 4.27 per 100,000 population. The incidence and prevalence of IBD reported by Ida et al in 2015 were 0.68 and 9.24 per 100,000 population, respectively.[3] Although ours is a single-centre, hospital-based study, the incidence was comparable to that of the previous.

northern peninsular Malaysia study. However, our reported prevalence is lower. These figures are an underestimate of the true numbers of IBD in Johor and Johor Bahru district, due to the limitations of the study.

In past decades, the worldwide incidence of UC exceeded that of the CD. In many parts of the world, investigators have noted an increase in the incidence of CD, so the ratio of UC to CD incidence is narrowing. Our study suggested a reversal of the traditional UC to CD incidence: 0.77 among newly diagnosed patients. This has been observed in countries with a high incidence of IBD, such as Australia.[4]

This study showed that ethnic Indians have the highest incidence and prevalence of IBD in Johor. This preponderance is consistent with previous studies conducted in Malaysia.[3,7,8]

Patients with IBD in HSAJB run a similarly complicated course as in Western populations, with almost half (47.1%) of the CD patients experiencing stricturing or penetrating disease, and a quarter (25.0%) undergoing surgery at some stage. Similar to Western populations, most patients (84.7%) with UC had left-sided (E2) to extensive disease (E3).[9] Most patients required corticosteroids (81.2% of patients with UC and 91.2% of patients with CD) and immunomodulators (thiopurines – 63.5% of patients with UC and 92.6% of patients with CD) at some point during their illnesses.

A significant proportion of the patients had one or more relapses in 2016 (32.9% of patients with UC and 44.1% of patients with CD). However, only 2.4% of patients with UC and 23.5% of patients with CD had ever received anti-Tumour Necrosis Factor biologic treatment – the treatment of choice for moderate to severe disease. Treatment of moderate and severe IBD is challenging, with lack of access to biologic agents caused by their considerable cost and limited resources.[10] The percentage of patients with side effects to the prescribed treatment of IBD were fairly acceptable at 11.8% (UC) and 13.2% (CD). The side effects were mainly mild and reversible.

From this study, it appeared that more patients with CD required imaging such as CT scans (51.5% vs 10.6%), barium studies (27.9% vs 2.4%) and MRI scans (7.4% vs 1.2%), compared to UC. A possible implication is that patients with CD receive more cumulative radiation exposure than in UC. Other studies have shown similar findings of higher cumulative radiation exposure among patients with CD, because of higher rates of extraluminal complications, penetrating disease and requirements to evaluate the small bowel.[11,12]

A major limitation of this study is that it is retrospective. We were only able to capture cases that were attending our clinic. Comprehensive electronic medical records are not available in our centre, so patients may have been lost to follow-up, or may have moved to another location, and could not be accounted for. This may explain the unexpectedly low prevalence rate. Furthermore, other private hospitals in Johor have gastroenterology service and may look after a significant proportion of patients with IBD.

Apart from that, Johor is uniquely located in the southern most region of peninsular Malaysia, next to the Republic of Singapore. We do not exclude the possibilities of high population turnover, migration and health tourism, with Johor patients seeking treatment in neighbouring Singapore. We believe the numbers reported in this study are a gross underestimation of the true incidence and prevalence of IBD in our region.

CONCLUSION
The incidence of IBD in Johor is comparable to that of a previous study in northern Peninsular Malaysia. However, given the constraints of this study, more extensive research should be carried out to elucidate the incidence, prevalence, epidemiology and environmental risk factors of IBD in our region. We hope this study will provide valuable IBD epidemiological data in the state of Johor that can be built on, to benefit the IBD community as a whole.

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