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Epidemiological research, burden, and clinical advances of inflammatory bowel disease in China

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Inflammatory bowel disease (IBD), which includes Crohn's disease (CD) and ulcerative colitis (UC), is a chronic, progressive illness that fluctuates in severity and involves recurring periods of relapse and remission. It has emerged as a global public health challenge. Traditionally, IBD has been predominantly found in Western countries, with North America and Europe exhibiting the highest rates of prevalence and incidence. Specifically, the prevalence and incidence rates for UC were 505/100,000 and 249/100,000, respectively, while for CD they were 322/100,000 and 319/100,000, respectively.[1] However, there has been a recent stabilization of IBD incidence in countries with high prevalence rates, whereas newly industrialized countries in Asia and South America have experienced an increase in both incidence and prevalence.[2]

Since 1956, the prevalence of IBD in China has increased significantly, transforming it from a rare to a common disease. Various studies conducted in local regions of China have revealed a rising occurrence of IBD. Additionally, research indicates that the severity of IBD in Asia, including China, is comparable or even surpasses that of Western countries.[3] It is crucial to understand the epidemiological changes and the impact of this disease to aid healthcare professionals and decision-makers in addressing the present and future social and economic challenges. This review aims to provide an up-to-date analysis of the burden of IBD in China, incorporating evidence from epidemiological studies, clinical characteristics, hospital burden, and advanced approaches for diagnosing and treating IBD patients.

In China, there is a limited amount of population-based epidemiological research data on IBD. According to published studies, case numbers are estimated to have increased 3.08 times from 1981 to 2000. In 2011, the first population-based epidemiological research was conducted in Daqing, Zhongshan, and Wuhan, which represent the northern, southern, and middle regions of China, respectively.[4–6] The incidence rates were 1.77/100,000 for IBD, 1.64/100,000 for UC, and 0.13/100,000 for CD in Daqing, 3.14/100,000 for IBD, 2.05/100,000 for UC, and 1.09/100,000 for CD in Zhongshan, and 1.96/100,000 for IBD, 1.45/100,000 for UC, and 0.51/100,000 for CD in Wuhan. During the same period, the reported incidence rates of IBD, UC, and CD in Hong Kong (China) were 2.62/100,000, 1.25/100,000, and 1.30/100,000, respectively. Based on these small-scale studies, it was observed that IBD was a rare disease in China during that period. There was a geographic gradient in IBD prevalence, with CD being more prevalent in the southern region and UC being more prevalent in the northern region. Furthermore, the number of CD cases was significantly lower compared to UC cases.

In recent years, there has been a notable increase in the number of patients with IBD, both in hospitals and outpatient settings. According to the most recent data from the National Urban Employee Basic Medical Insurance (NUEBMI) database in 23 provinces, the prevalence of CD and UC has been steadily rising. From 2013 to 2016, the annual percentage change in CD prevalence was 21.0%, with rates increasing from 1.59 per 100,000 to 3.39 per 100,000. In the same time period, UC prevalence increased by 24.2%, rising from 8.72 per 100,000 to 17.24 per 100,000. The UC/CD ratio in 2016 was 5.09.[7] The incidence rates for CD ranged from 0.82 per 100,000 to 0.97 per 100,000, while for UC, the rates were 4.54 per 100,000 and 4.85 per 100,000 between 2013 and 2016, respectively. This study also revealed variations in prevalence between different regions in China. In 2016, the age-standardized prevalence rate of CD was highest in the eastern region, at 5.30 per 100,000, followed by the central region at 1.45 per 100,000, and the western region at 0.25 per 100,000. The western region, however, showed the highest annual percentage change in the age-standardized prevalence of CD at 40.70% per year. The age-standardized prevalence rate of UC was highest in the eastern region, at 30.65 per 100,000,

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followed by the central region at 2.32 per 100,000, and the western region at 1.26 per 100,000. Moreover, the study found that the higher incidence of both UC and CD was observed in male patients. The peak age for UC and CD in both men and women was between 50 and 59 years, while for CD, the peak age varied, with the majority of cases occurring in individuals aged 20 to 29 years.

Based on its current development trend, IBD is increasingly prevalent in China. Regional variations in IBD incidence may reflect the influence of economic factors, with the eastern region of China having the highest gross domestic product and experiencing rapid economic growth.[8] This has led to accelerated urbanization and a greater burden of IBD. This rise in IBD cases is believed to be linked to the process of industrialization and urbanization in China, as well as the adoption of a western lifestyle.

Overall, the epidemiological trends in China align with the processes of globalization. According to the four stages of IBD, the second stage is characterized by a significant increase in incidence. These findings emphasize the need for prioritizing prevention efforts. Moreover, eastern China has the highest incidence and prevalence of IBD. It is crucial to allocate more healthcare resources to improve diagnostic methods and treatment options in this region. However, intervention strategies are also required in the western region due to notable changes in the prevalence and incidence of CD, which stands at 29.40% and 3.80%, respectively. Given that IBD is a relatively new and rapidly emerging disease in China, it is vital to prioritize understanding its clinical characteristics, diagnosis, and treatment strategies. This comprehensive understanding of the disease burden will facilitate the development of effective future plans.

With the growing prevalence and incidence rate of IBD in China, the hospitalization of patients poses a significant challenge to the healthcare system. In China, it has been reported that the hospitalization rates for patients with CD and UC increased from 2.20 to 3.62 per 100,000 (10.68% annual percentage change [APC]) and from 6.24 to 8.29 per 100,000 (5.73% APC), respectively, from 2013 to 2018.[9]

Based on nationwide data, it was found that 166,000 hospitalized IBD patients incurred a total expenditure of $426.37 million ($149.91 million for CD patients and $276.46 million for UC patients) in 2018. The average annual hospitalization charges were $1600–$1900 per CD patient and $1200–$1500 per UC patient. The costs of hospitalization in 2018 were covered by the national insurance program, amounting to $231 million. Hospitalization data indicates that IBD significantly affects the quality of life in young individuals, resulting in the loss of work capabilities and imposing further challenges to the healthcare system in China.

Surgery and the development of colitis-related carcinogenesis contribute to the burden of hospitalization in China. The average surgery rate in CD patients was estimated at 56.4%, with a majority of patients undergoing emergency operations (42.1% on average).[10] However, surgery does not mark the end of progression. Research studies have shown that 28.9–37.0% of non-penetrating, non-stricturing (B1) patients progress to stricturing (B2), 22.2–55.0% of B1 patients progress to penetrating (B3), and 28.9% of B1 patients progress to B2 + B3 after the initial surgery, indicating the need for careful consideration of postoperative medical therapy and management.

It is estimated that approximately 16.4% of patients with UC in China undergo surgical intervention at some point in their lives. The main reasons for surgery are the failure of medical treatment, perforation, significant bleeding, and toxic megacolon. Therefore, it is imperative that we make efforts to reduce the need for surgery by addressing surgical risk factors and implementing effective medical treatment.

Carcinogenesis is a serious complication of IBD, predominantly involving gastrointestinal malignancies and followed by extraintestinal cancers.[11] These conditions have a poor prognosis. In China, the standardized incidence ratio (SIR) for total cancer occurrence in IBD patients is estimated to be 1.77. For UC specifically, there is a higher incidence of digestive cancers (SIR: 3.75), thyroid cancer (SIR: 10.34), and hematological malignancies (SIR: 6.25). However, the risk of cancer in CD patients does not surpass that of the general population. Comparatively, elderly individuals with IBD exhibit a higher overall cancer incidence than those with adult-onset IBD (26.9 *vs.* 9.51 per 1000 person-years, respectively). We have also observed that the risk of colonic and rectal carcinoma among IBD patients is higher in China compared to Western countries, with a combined SIR of 2.39.[12] These disparities between Eastern and Western countries underscore the importance of tailoring prevention and monitoring strategies to the specific clinical characteristics of Chinese IBD patients. Consequently, active tumor surveillance should be given priority in the long-term management of Chinese IBD patients.

The present epidemiological study of IBD in China is not yet comprehensive, and there is still significant room for improvement in its diagnosis and treatment. Consequently, many IBD centers throughout China have proactively established multidisciplinary team (MDT) to enhance IBD diagnosis and treatment. The initial IBD MDT in China, formed in the 1970s at the Peking Union Medical College Hospital (PUMCH), revolved around the Department of Gastroenterology and included the collaboration of the Department of Basic Surgery, Pathology, Infection, and Radiology. However, during that period, IBD was not prevalent in China, and the demand for MDT was not substantial. Since 2012, several hospitals have gradually established MDT consultation systems and specialized outpatient clinics for IBD. Additionally, in 2018, the Chinese Society of Inflammatory Bowel Disease established systems for evaluating the quality of IBD diagnosis and treatment in China, thereby promoting standardized diagnosis and treatment in specialized centers that focus on confirming the diagnosis and managing treatment quality.[13] In 2021, Liang *et al*[14] formulated the consensus opinion on the MDT diagnosis and treatment model of IBD, providing detailed insights into IBD-MDT hardware and software construction, core team and extended team members, tasks assigned to relevant departments, guidance for doctor-patient decision-making, standardized MDT discussion processes, and management.

Since the first report of IBD in China in 1956, several consensuses on IBD diagnosis and treatment have been published

to guide clinical practice.[15,16] This development of IBD consensuses has progressed through the stages of exploration, understanding, and evidence-based scheme creation. Each consensus represents a deeper understanding aimed at facilitating updates and improvements to overcome clinical challenges. The Delphi method was introduced in the development of the IBD diagnosis and treatment consensus in 2012 and 2018. The 2018 consensus on IBD diagnosis and treatment introduced the notion of long-term patient management and shared decision-making with patients.

The progress in the treatment of IBD in recent years has been truly remarkable. Prior to 2006, the treatment options were limited to conventional therapies such as glucocorticoids, 5-aminosalicylic acid (5-ASA), and immunosuppressants. However, with the introduction of infliximab in 2006, the use of biologics in IBD treatment gradually became more prevalent. Over the years, a growing number of biologics, including adalimumab, ustekinumab, vedolizumab, and upadacitinib, have been approved for use in China. Thanks to the inclusion of biologics in the National Reimbursement Drug List (NRDL), we now see a significant increase in the use of biologics in the treatment of IBD in China. Currently, around 59% of IBD patients in China are being treated with biologics. This, combined with the application of biological agents, is not only improving patient prognosis but also strengthening the management of IBD and providing evidence-based education for patients.

In conclusion, IBD is an emerging and rapidly growing disease in China, and it poses a significant burden on both patients and the national health system. The prevalence of IBD is still increasing at a fast rate, which will result in a substantial rise in the number of patients in the future. Additionally, many regions and medical centers lack the capacity to effectively diagnose and treat IBD patients, due to a mismatch between regional healthcare and resource allocation. Furthermore, there are notable differences in the clinical characteristics of IBD between patients residing in the east and the west, yet there is a lack of nationwide clinical studies in China focusing on this aspect. Another challenge is the absence of precise screening markers or specific strategies for IBD prevention. However, it is worth noting that the surgery rate and mortality rate among IBD patients have significantly decreased thanks to the extensive efforts made in China. Although we still face considerable challenges, we remain optimistic that substantial progress will be made in the future to further improve patient prognosis.

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Conflicts of interest

None.

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