Original Article

Inflammatory Bowel Disease Registry and Monitoring: Feasibility Study and Application (Isfahan Inflammatory Bowel Disease Surveillance Project)

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Abstract

Background: Inflammatory bowel disease (IBD) incidence has been increased in Iran as a developing country. Surveillance is a standard method for accessing valid data about disease epidemiology to make relevant decisions for disease control, prevention, and management. We designed Isfahan IBD Surveillance Project (IISP) to make a surveillance system in this area. **Methods:** The project is designed in 3 phases. At the first phase, a model of step-wise approach (core, expanded core, and optional variables) for IBD surveillance was designed and implemented among IBD patients registered at a major referral gastrointestinal diseases clinic in Isfahan. Data bank program and its software were designed with suitable and multifunctional features. A total of 352 IBD cases were registered to data bank and analyzed as a pilot study of IISP. **Results:** A total of 352 IBD patients, including 245 ulcerative colitis (UC), 80 Crohn's disease (CD), and 27 indeterminate colitis, were registered to the data bank. Bloody stool and abdominal cramp were the most common presentation symptom among UC and CD, respectively. Extensive pancolitis was the most prevalent phenotype (40%) of UC. Over two-thirds of our IBD patients were in remission states. Biologic agents had been prescribed in about 10% of patients during disease. Primary sclerosing cholangitis was detected in about 7% and 10% of CD and UC patients, respectively. **Conclusions:** Valid data from a standard surveillance system are a relevant, trustworthy tool for making decision by health policy-makers. Integrated comprehensive interventional programs for disease control and management is the second phase of IISP.

Keywords: *Colitis, Crohn's disease, inflammatory bowel diseases, Iran, registries, ulcerative*

Introduction

Inflammatory bowel diseases (IBDs), including ulcerative colitis (UC) and Crohn's disease (CD), are chronic immune mediated inflammatory conditions affecting mainly gastrointestinal system and secondary other organs.[1-3] Genetic and environmental factors introduce IBD as a multifactorial disease, but many aspects of disease are not discovered yet.[1,2]

According to epidemiologic surveys, incidence of IBD has been grown worldwide in recent decades.[4] Due to its chronic characteristics, it is reasonable that we expect increasing the prevalence of IBD in the years ahead.[5,6] Although the pattern of IBD incidence has reached a steady state in developed countries,[5] it is going to increase in developing countries due to some environmental and lifestyle factors.[6,7] This potentially leads to many conflicts in health-care systems like many other noncommunicable diseases.[6] Disease burden and economic issues in disease management and follow up, beside its complications and disabilities among patients and their families will affect patients' health-care system and the population's quality of life (QoL).

Only three studies are published and indexed on IBD epidemiology in Iran up to 2000. Twenty-nine studies were published from 2000 to 2015.[7-9] Some are retrospective and their data were collected from hospitals. However, according to the data, increasing incidence rate of disease is presumable.

Access to valid data about diseases epidemiology and its distribution among population is the essential and vital prerequisite for disease control. Disease surveillance, including registration and monitoring, is a standard solution for data collection and patients follow up among population. A surveillance system prepares valid and reliable data for making decision

How to cite this article: Baghaei A, Emami MH, Adibi P, Tavakkoli H, Daghaghzadeh H, Tamizifar B, *et al*. Inflammatory bowel disease registry and monitoring: Feasibility study and application (Isfahan Inflammatory Bowel Disease Surveillance Project). Int J Prev Med 2018;9:190.

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DOI:
10.4103/ijpvm.IJPVM_316_17

Quick Response Code:

by health policy-makers in disease control and health budget allocation.[10]

Given the multifactorial nature of IBD, local data about disease epidemiology are needed to provide information to produce native clinical practice guidelines for disease screening, detection, treatment, and follow up.

Active monitoring system improves disease control among patients and makes a context for designing studies (clinical trials, cohorts, etc.) for clarifying hidden angles of IBD.

We designed Isfahan IBD Surveillance Project (IISP) for drafting and implementing IBD surveillance system among the Iranian population. Feasibility and application study is performed for providing data and solutions to institutionalize registration in health-care system in the next phase.

Methods

This is an integrated action research plan conducted for registration, monitoring, and interventional activities for control, management, and rehabilitation of IBDs among the Iranian patients.

The IISP was planned in three phases.

First phase: Designing a surveillance system

In this phase, we made our steering committee comprising of gastroenterologists, pathologist, epidemiologist, and internists due to multidisciplinary approach needed for conducting projects. All known variables related with any aspects of IBD (i.e., epidemiology, risk factors, diagnosis, life style, prognosis, complications, treatments, and survival) were listed.

According to our step-wise approach for data register and monitoring, after integration of experts' ideas, we categorized our variables in three levels [Figure 1].

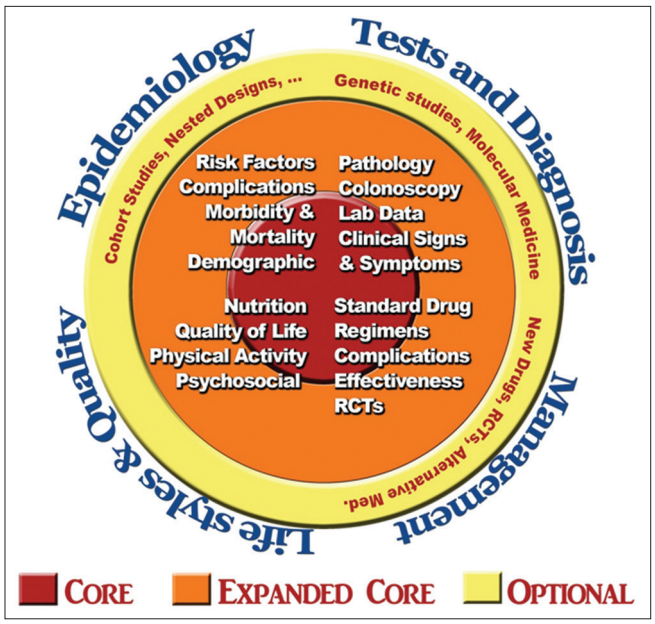

Figure 1: Stepwise approach model for IBD Surveillance: IISP

Core variables are defined as absolute minimum vital required data for IBD patient to be registered. Expanded core variables are good, but not mandatory, data to be collected. Optional variables are data which may be useful for research proposals (The IISP website: http://www.ihsorg.ir).

In accordance with the variables list, we designed a data registry form and proprietary software for IBD surveillance. The Software features and capacities are demonstrated in IISP website (www.ihsorg.ir/ibd_clinic) [Video 1]. Data were assorted in 10 fields (The IISP website: http://www.ihsorg.ir).

Data collection process and filling out registry forms were prepared as a manual booklet in Persian for all users.

Data collection tools reviewing and confirmation, cases' eligibility confirmation for registration, data analysis auditing and designing and steerage of interventional activities for IBD control, education and treatment are our steering committee's duties in IISP. Patients were selected as IBD by diagnostic documents (i.e., biopsy, endoscopy, clinical symptoms and signs, and laboratory data). The data were reviewed by audit team and data were processed afterward.

Second phase: Surveillance system implementation

In a pilot study, designed surveillance system was setting up in a private gastrointestinal clinic in Isfahan with an acceptable IBD referred patients (Poursina Hakim Gastrointestinal Clinic and Research Center). All 352 IBD patients in this clinic were registered to data bank. Process evaluation was carried out for highlighting any conflicts and problems in the way of data collection and analysis.

Collected data in software were extracted and exported to SPSS version 22 (Long produced by SPSS Inc., it was acquired by IBM in 2009, America, New York, Armonk) for more analysis. After that, we implemented the system in other offices, clinics, and hospitals which admit such patients in Isfahan province.

Patients' follow up in a cohort study makes it possible to have a context for studies about any aspects of IBD.

Third phase: Comprehensive integrated interventional activities

After patients' recruitment by the surveillance system and accessibility to them, We will implement the comprehensive integrated programs for education, control, and rehabilitation of patients to improve their QoL.

Legislation is another necessary activity for promoting health-care facilities for IBD patients that will be followed by this project. This includes policies about treatment accessibility and facilities for rehabilitation through more qualitative life style.

Program evaluation

Program evaluation has been designed at two levels. Process evaluation is a method of assessing how this program is being implemented. Process evaluation focuses on the program's operations, implementation, and service delivery. Outcome evaluation focuses on the effectiveness of the program and its outcomes (data analysis and the effectiveness of interventional activities in the third phase).

Results

Three hundred and fifty-two IBD patients were registered as a pilot, in IISP. All patients were diagnosed as IBD (CDs, UC and indeterminate colitis) according to the diagnostic criteria of the study (clinical, pathological, and colonoscopy findings) in Poursina Hakim Clinic.

UC and CD frequency among patients were 70% and 23%, respectively [Table 1]. Sex distribution was the same in both groups [Table 1]. Mean age of both groups (UC and CD) was the same (53 ± 13 years).

The most prevalent first presentation symptom was bloody stool in UC group [Table 2]. CD patients stated abdominal pain and cramp as the most common symptom in the beginning of their disease [Table 2].

The third decade of life included the highest rates of disease startup in both groups (UC and CD) [Table 3]. About one-third of the patients passed between 5 and 10 years of diagnosis [Table 3].

Based on colonoscopy and Montreal classification, about 40% of UC patients had extensive colitis [Figure 2]. Colonic pattern was the most common type of intestinal involvement in CD patients according to Montreal classification (61%).

At the time of registration, three-fourth of CD patients was in remission state based on Harvey-Bradshaw Index (HBI) score [Table 4]. About 80% of UC patients had mild score (<5) of severity based on clinical scoring system for the Simple Clinical Colitis Activity Index (SCCAI) [Table 4]. All these patients were under treatment in Poursina Hakim Clinic.

5ASA compounds were the most common drugs used in all types of IBDs (over 90%). Azathioprim was the second choice of drug administered for IBD in the patients (about 40%). About 6% of the patients were under treatment with biologic agents at the time of registration. Meanwhile, about 10% of patients in the course of their disease had a history of biologic drug prescription.

By monitoring patients during the 1st year of study (2016–2017), about 182 patients were visited routinely in IBD clinic. According to our surveillance questionnaire and follow-up protocol among IBD patients, we reviewed these follow-up indices among eligible ones and asked them to complete their files. Only 15 patients of 87 eligible cases

Table 1: Sex distribution of IBD patients among registered cases (IISP)

	Male	Female	Total
Ulcerative Colitis	126	119	245
Crohn's Disease	37	43	80
Indeterminate Colitis	10	17	27
Total	173	179	352

IISP=Isfahan, IBD=Surveillance Project

Table 2: IBD Presentation Symptoms among Registered Cases (IISP)

Symptom	Percent	
	Crohn's Disease	Ulcerative Colitis
Diarrhea/Mucous Feces	28	71
Constipation	12	7
Painful Defecation	16	18
Bloody Stool	44	73
Bowel Movement Urgency	6	56
Tenesmus	18	46
Abdominal Cramp and Pain	68	61
Nausea and Vomiting	7	2
Loss of Appetite	6	4
Weight Loss	21	8

IISP=Isfahan, IBD=Surveillance Project

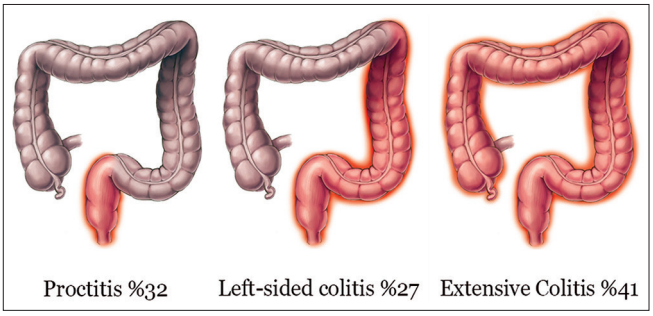

Figure 2: Ulcerative colitis phenotypes by Montreal Classification in Isfahan IBD Surveillance Project (215 patients)

for bone mineral density (BMD) test had done it before the surveillance program. This improved to 53 cases after surveillance program set up (17%–60%). Pap smear was another item that improved during the surveillance from 17% to 56% among the eligible cases (88 cases). Surveillance colonoscopy was increased from 70% to 87% of eligible cases (102 cases).

Primary sclerosing cholangitis was seen in 11% of UC patients. This was about 7% among CD patients. Musculoskeletal manifestation was reported in 5% of all patients.

Discussion

IISP was designed for registration and monitoring IBD patients in Isfahan province, Iran. A group of gastroenterologists along with pathologist, epidemiologist, and computer programming supervised the project phases.

Table 3: Age of Onset and Diseases Duration in Registered cases (IISP)

	Age of Onset (year): N (*P*)						Disease Duration (year): N (*P*)			
	≤ 20	21-30	31-40	41-50	51-60	>60	<5	5-10	11-15	>15
Crohn's Diseases (80)	11 (14)	27 (34)	22 (28)	10 (12)	7 (8)	3 (4)	34 (43)	26 (32)	16 (20)	4 (5)
Ulcerative Colitis (245)	44 (18)	76 (31)	63 (26)	32 (13)	20 (8)	10 (4)	79 (32)	86 (35)	43 (17)	37 (15)
Total (325)	55 (17)	103 (32)	85 (26)	42 (13)	27 (8)	13 (4)	113 (35)	112 (34)	59 (18)	41 (13)

N=Number, P=Percent, IISP=Isfahan IBD Surveillance Project

Table 4: Crohn's Disease Severity HBI (57 patients) and UC severity based on SCCAI (152 patients)

Diseases Severity	Frequency	Percent
Crohn's Disease (HBI Score)		
Remission	35	62
Mild Disease	13	23
Moderate Disease	6	10
Severe Disease	3	5
Ulcerative Colitis (SCCAI Score)		
<5	107	70
6-10	39	26
>10	6	4

HBI=Harvey-Bradshaw Index, SCCAI=Simple Clinical Colitis Activity Index

In comparison with other registry systems designed in Iran, IISP has more detailed data and is designed in stepwise approach for data collection.[7-9] Data process and quality control by audit committee are a valuable aspect of this project.

However, this project has been designed for IBD patients admitted to health-care systems and not for population survey. Our cases are selected from offices, clinics, and hospitals, so may have defect to estimate the overall incidence and prevalence of disease in our community. With cooperation of IBD society and gastroenterologists in Isfahan province, we can make a valuable estimation of minimum incidence and prevalence of disease. Of course, other goals of surveillance system are reached as well (i.e., patients' follow-up, investigations about risk factors, drug regimens, complications, interventional activities, etc.,).

Due to data security and validity issues, the designed software is an intranet program (not web-based) that cannot be used open access via the internet. This makes some difficulties for online merging data and reduces the speed of data collection. The collected data in offices other than data center (Poursina Hakim Research Center) would be transferred to data center by defining an IP address and as a local network. The authors are going to develop their data collecting system partly on the web for registration of cases direct from community. This is more user-friendly and more feasible for growing our data mass. Furthermore, we should plan a protocol for preservation of data validity which will be collected from the web-based registry.

Abdominal pain and cramps were the most common complaint of CD patients as the disease presentation symptom among the patients. Bloody stools and diarrhea were the most among UC patients. These findings confirmed previous findings among Iranian patients.[7-9]

Third decade of life was the time period which most of our IBD patients had been diagnosed in it. This was the same as reports from Asian countries such as India and Japan. Unlike disease patterns in developed countries, we did not have a second peak of IBD in age over 60-year-old. This is consistent with other studies carried out on Iran.[7,8] The sex distribution among our patients was equal and similar to findings in many studies in Iran and other countries.[7,8,11] However, a few reports from south East Asia have shown male predominance among IBD patients.[12,13]

The extension of UC among our patients had different feature from most previous reports in Iran. Extensive UC was seen in about 41% of our patients. Few studies have shown a prevalence of 35-40% pancolitis among UC patients,[14] but most report left-sided colitis and proctitis as the most common phenotype of UC.[1,15-18] In a recent report of IBD epidemiology, extensive colitis is reported maximally about 30%.[1,15] This unsettled finding in our survey is may be due to selection bias of this pilot study and because of the referral nature of patients who were admitted to Poursina Hakim Clinic. However, about 28% of patients with proctitis and left-sided colitis would progress to extensive colitis after 10th year of disease course.[1,17] At least, 30% of our patients had suffered from UC since 10 years ago. This can explain the majority of extensive pattern of UC in our study group.

5ASA was the most common type of drug prescription for IBD registered to IISP. Biologic drugs included remicade and adalimumab were used in about 10% of patients during their disease course. 5ASA is the most common type of drugs administered in UC and CD patients all around the world.[19,20] Immunosuppressive agents were added to 5ASA in about 55% of CD patients by the year 2015.[19] The use of immunosuppression agents has increased in last decade from 15% to 60% of CD patients.[19] This was confirmed in our patients. Corticosteroid therapy has dropped, in management of IBDs in past 5 years ago, from 50% to 30% of all IBD cases.[19,20] In our patients, corticosteroids were prescribed in about 55% in CD and 25% in UC patients. The recommendation for more rapid start of immunosuppression drugs may lead to decreased dose and frequency of corticosteroids in patients.[19,20]

Biologic agents were prescribed in our patients less than recent reports in developed countries.[19-21] Only 10% of our patients had a history of biologic drugs administration, this is about 14% for UC and 30% for CD patients in developed countries.[1,2,19] Some surveys report less frequency of biologic agent's use.[22] However, it seems that we should make a more liberality strategy for prescription of biologic drugs among IBD patients.

One of the valuable outcome of surveillance system, is to monitor necessary follow-up procedures, preventive measures and treatments in chronic diseases.[23] In the 1st year of surveillance, we could improve follow-up indicators in IBD patients. Surveillance colonoscopy, BMD, and Pap smear tests have been increased 1.2 to more than 3 times in the eligible cases in a period of 12 months.

PSC frequency was seen in the IBD cases more than previous reports around the world.[1,24] Somewhat, this may be due to the characteristics of patients who referred to our clinic, but it seems that some genetic and ethnicity factors have role in high frequency of PSC among Iranian IBDs.[25,26]

Conclusions

By developing the surveillance program and more IBD patients' registration, the researchers could have a more valid estimation about the epidemiology of IBD in their community. By that information, it is possible to make effective and precise activities for disease control and improved the QoL.

Financial support and sponsorship

Some part of this project has been funded by Isfahan University of Medical Sciences and Health Services as a medical thesis (No. 96534).

Conflicts of interest

There are no conflicts of interest.

Received: 06 Aug 17 **Accepted:** 14 Aug 17
Published: 17 Oct 19

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