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Hospitalization, use of biologics and surgery rates in inflammatory bowel diseases: a single-centre comparative analysis between public and private healthcare systems in a tertiary unit from Latin America

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HIGHLIGHTS

- In a tertiary IBD center in Latin America:
- More than half of the patients had been submitted to one or more CD-related abdominal surgical procedure.
- Between the two healthcare systems, there was no difference in the rates of use of biological therapy in patients with CD, and in UC-related hospitalizations.
- Biologics were prescribed almost twice as often in the private system as compared to the public in patients with UC.

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ABSTRACT – Background – Inflammatory bowel diseases (IBD) have rising incidence and prevalence rates globally. In IBD, there are scarce studies comparing differences between patients according to socioeconomic status. **Objective –** Our aim was to comparatively evaluate hospitalizations, use of biologics and rates of surgery in patients with IBD between public and private healthcare systems. **Methods –** Single-center retrospective cohort study in patients with IBD from a tertiary referral unit from Latin America, between 2015 and 2021. CD and UC patients were classified into two subgroups: public and private systems. Demographic characteristics, hospitalizations, need for surgery and biologics were compared. **Results –** A total of 500 patients were included, 322 with CD and 178 with UC. CD-related hospitalizations were frequently observed in both healthcare systems (76.28% in private and 67.46% in public). More than half of the patients had been submitted to one or more CD-related abdominal surgery, with no significant difference between the subgroups. Although there was no difference in the rates of use of biological therapy in CD subgroups, infliximab was more used in the public setting (57.69% vs 43.97%). There was no difference in UC-related hospitalizations between the subgroups (public 30.69% and private 37.66%) as well as the rates of colectomy (public: 16.83%, private: 19.48%). Biologics were prescribed almost twice as often in private as compared to public (45.45 vs 22.77%). **Conclusion –** There were no differences in the rates of hospitalization and abdominal surgery between the systems. In patients with UC, there was greater use of biological therapy in the private healthcare setting.

Keywords – Inflammatory bowel disease; ulcerative colitis; Crohn's disease; health systems; socioeconomic inequality.

INTRODUCTION

Inflammatory bowel diseases (IBD), namely Crohn's disease (CD) and ulcerative colitis (UC), are characterized by chronic bowel inflammation with different phenotypes. Despite having unknown etiology, the pathophysiology of IBD is considered multifactorial, with genetic predisposition, environmental factors and changes in the intestinal microbiota involved in the etiopathogenic process[1,2].

The global distribution of IBD is not homogeneous, with a higher prevalence in Europe and North America, with more than 1.5 million and 2 million people affected, respectively[3]. In western countries, the incidence of UC and CD increased in the 20th century, but new studies have shown that the IBD incidence rates are currently stable or decreasing. It is speculated that this change may have been associated to changes in environmental factors. In newly industrialized countries, from different regions such as Eastern Europe, Asia, Africa and South America, recent studies suggest that the incidence is rapidly increasing[3].

IBD are associated with significant morbidity and mortality, with substantial associated costs for healthcare systems. This makes IBD to to be considered a public health challenge, especially in Western countries[3]. Direct costs are related to diagnosis and treatment, including medication dispensing, hospitalization, surgeries, and endoscopic or cross-sectional imaging tests. Indirect costs, also known as social costs, result from lost productivity associated with absenteeism, retirement, and mortality[4].

The effect of socioeconomic inequality on health and mortality is already well documented in the literature, with consequences on health strategies changes[5,6]. Studies suggest that greater adherence to treatment and control of chronic diseases are associated with easier access to health services and higher socioeconomic status[7,8]. In chronic diseases, the effect of social inequality showed a higher frequency of complications and worse organ functionality in patients with socioeconomic deprivation[9-12]. However, the influence of socioeconomic status on IBD has not been fully explored, and further studies are essential for a precise analysis of its direct impact on health strategies in different countries. Thus, the present study aimed to comparatively assess the demographic profile, use of biologics, need for hospitalization and surgery in patients with IBD between the public and private healthcare systems, in a large Latin American referral centre.

METHODS

A retrospective cohort study was carried out in patients with IBD treated in a tertiary referral centre from a major capital from south Brazil, between January 2015 and March 2021. This unit captures patients from the public and private healthcare systems across a region with 3 million inhabitants. All consecutive patients with at least one consultation at the IBD outpatient clinics were identified to check inclusion criteria. Patients with an established diagnosis of CD or UC according to clinical, endoscopic, radiologic, or histological features were included. We excluded patients with undetermined IBD (non-specific colitis) and those with lack of data in electronic medical charts.

Patients from the public system were referred to the unit through distribution of monthly quotes from family physicians, regulated by a central appointment regulation facility, in addition to referrals from the hospital (inpatient service). Private patients could be referred by demand or schedule appointments with our staff members directly. Patients could have a primary diagnosis of IBD performed in the unit, or be referred by other internal medicine, gastroenterology or colorectal surgery units and private physicians. Patients were allocated into two groups, according to the primary diagnosis: CD or UC. Subsequently, they were classified into two subgroups: public and private healthcare systems. The same staff members were in charge of patient care, independently of the healthcare system. Data were compiled by an electronic medical charts retrospective review after identification. The follow-up period comprised time between first visit (system entry) and last registration of consult, admission or procedure during the study period.

Demographic variables such as age at diagnosis, sex and smoking status were evaluated. The phenotypes of both CD and UC were checked according to the Montreal classification. The use of specific

medication at any time during treatment (steroids, azathioprine, mesalamine, methotrexate, biologics or small molecules) was checked. Other important variables evaluated included the need for IBD-related hospitalization, major abdominal surgery (in CD and UC) and perianal surgery (in CD), at any time after the first visit to our unit. We also analyzed if patients had a primary diagnosis of IBD in our unit due to suggestive symptoms or were referred with an already established IBD diagnosis from other hospitals. Demographic variables were compared between the subgroups in each disease to check homogeneity. The main variables of interest (hospitalizations, medication and surgery) were compared between subgroups.

Data were compiled and stored in a Microsoft Excel spreadsheet. The mean and standard deviation (SD) were presented by quantitative variables with normal distribution, and Student's *t* test was used to compare two independent samples. Categorical data were shown as percentages and Pearson's chi-square test or Fisher's Exact test were used to compare two proportions of independent samples. Statistical significance was considered for $P<0.05$. Statistical analyses were performed using IBM SPSS v. 22.0 (UNICOM Global, Mission Hills, United States).

This study was approved by the Research Ethics Committee of the Catholic University of Paraná (PUCPR) with reference report number CAAE 08547219.0.0000.0020, via the Ministry of Health's website *Plataforma Brasil*.

RESULTS

Initially, 520 patients were identified for the study. After excluding five patients with undetermined colitis and 15 patients without available clinical information in electronic medical records, data of 500 patients with IBD were analyzed (FIGURE 1). From those, 322 had a diagnosis of CD and 178 of UC.

Crohn's disease

Clinical and demographic characteristics of patients with CD are summarized in TABLE 1. As observed, both subgroups in the different healthcare systems were homogeneous in relation to age at diagnosis, sex, smoking status and perianal disease. Regarding the Montreal classification, there was a predominance of diagnosis of CD between 17 and 40 years (A2), ileocolonic disease (L3) and inflammatory phenotype (B1) in both groups. There was a significant predominance of stricturing behavior in the private and penetrating disease in the public systems, respectively.

There was a significant difference between the subgroups regarding the use of steroids (83.73% in private and 65.38% in public systems, $P<0.001$). In both healthcare systems, azathioprine was used by most patients, and methotrexate was less frequently used. The mean follow-up time ranged between 5.5 and 6 years, with no difference between the two subgroups.

Most included patients with CD were exposed to some type of biological therapy during any phase of their treatment, with no significant differences between the subgroups (public 78.84% and private 75.90%, $P=0.529$). Among the biological agents, infliximab (IFX) was significantly more used in the public system (57.69% vs 43.97%, $P=0.014$) and despite not statistically significant, the use of ustekinumab (UST) tended to be more frequent in the private healthcare system, as observed in FIGURE 2.

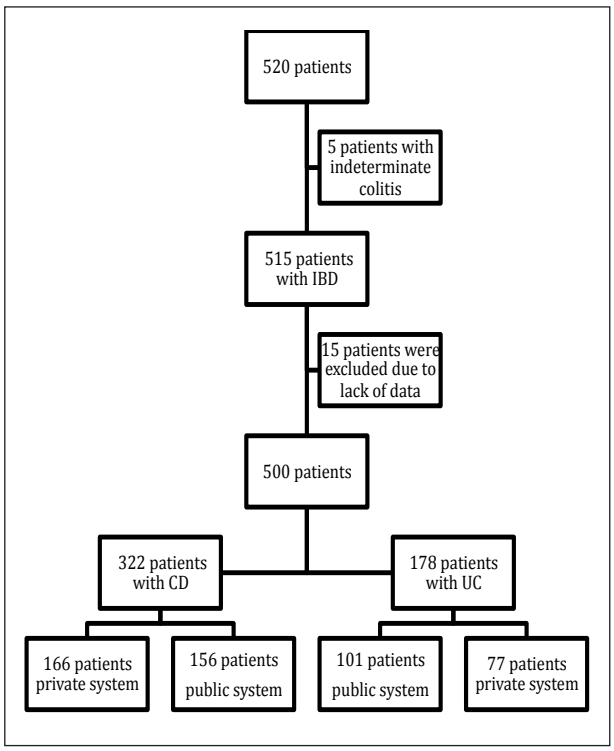

FIGURE 1. Study flowchart.

TABLE 1. Baseline characteristics of patients with CD.

Characteristic	Public (n=156)	Private (n=166)	*P* value
Age at diagnosis (years ± SD)	32.20±14.06	29.80±14.86	0.75
Sex, n (%)			
female	87 (55.80)	83 (50)	0.3
male	69 (44.20)	83 (50)	0.3
Smoking, n (%)	27 (17.30)	21 (12.65)	0.24
Montreal – age at diagnosis, n (%)			
A1 (<17 years)	15 (9.61)	24 (14.45)	0.22
A2 (17-40 years old)	100 (64.10)	109 (65.66)	
A3 (>40 years)	41 (26.28)	33 (19.87)	
Montreal – location of the disease, n (%)			
L1	50 (05.32)	57 (34.33)	0.75
L2	36 (07.23)	38 (22.89)	
L3	70 (44.87)	70 (42.16)	
L4	0	1 (0.60)	
Montreal – phenotype, n (%)			
B1	90 (57.69)	84 (50.6)	**0.006**
B2	24 (15.38)	50 (30.12)	
B3	42 (26.92)	32 (19.27)	
Perianal disease, n (%)	64 (41.02)	64 (38.55)	0.65
Hospitalization, n (%)	119 (76.28)	112 (67.46)	0.07
CD surgery, n (%)			
Major abdominal surgery, n (%)	84 (53.84)	84 (50.60)	0.56
Perianal surgery, n (%)	61 (39.10)	52 (31.32)	0.13
Stoma, n (%)	32 (20.51)	20 (12.04)	**0.039**
Steroids, n (%)	102 (65.38)	139 (83.73)	**<0.001**
Azathioprine, n (%)	145 (92.94)	144 (86.74)	0.067
Methotrexate, n (%)	20 (12.82)	16 (9.63)	0.365
Mesalamine, n (%)	64 (41.02)	76 (45.78)	0.389
Biological therapy, n (%)	123 (78.84)	126 (75.90)	0.529
Follow-up time in months, mean (SD)	67.31±38.1	71.06±38.7	0.382

CD: Crohn's disease; SD: standard deviation.

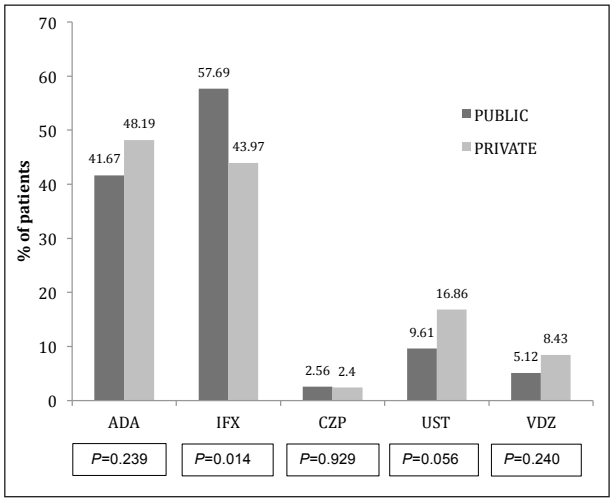

FIGURE 2. Proportion of patients (%) with CD that used biological therapy in public and private services.
ADA: adalimumab, IFX: infliximab, CZP: certolizumab pegol, UST: ustekinumab, VDZ: vedolizumab.

CD-related hospitalizations were frequently observed in both healthcare systems (76.28% in private and 67.46% in public subgroups; *P*=0.07). More than half of the patients had been submitted to one or more CD-related abdominal surgery, with no significant difference between the subgroups. From these patients, 68 were submitted to urgent surgical procedures at some point. However, there were more elective surgeries in the private than in the public setting (92.85 vs 75%; *P*=0.001). The mean number of major abdominal procedures performed in patients with CD treated at the private system was 1.80 (±1.02), and 1.65 (±1.37) in the public setting. No differences in perianal procedures were noted. Most patients submitted to surgical interventions had previously used biological therapy, in public (81%) and private (86.9%) services. The rate of intestinal stomas in CD was higher in the public as compared to the private system (20.51% vs 12.04%; *P*=0.039).

Lastly, most included patients had a previous diagnosis of CD in the first consultation in both healthcare systems. The proportion of new diagnoses (performed at our unit, based in symptoms), however, was higher in the public as compared to the private sector (32.69 vs 22.8%; *P*=0.049).

Ulcerative colitis

The clinical and demographic characteristics of the 178 patients with ulcerative colitis (101 from the public and 77 from the private setting) are summa-

rized in TABLE 2. There was a predominance of females in both groups. The mean age at diagnosis was 34.15 (±13.11) in the public sector and 26.86 (±9.97) in the private sector. Regarding to the Montreal classification there were significantly more cases of proctitis (E1) in the public system compared to the private system, 28.71% vs 12.98%, respectively (*P*=0.012). Pancolitis (E3) was more prevalent, in the private system (*P*=0.010). Corticosteroids were frequently used, with a larger proportion in the private system (89.61 vs 70.29%; *P*=0.002). Azathioprine and methotrexate were less used in both groups, without disparities. Almost all UC patients received mesalamine at some point, with no difference between the healthcare units. The mean follow-up time varied significantly between the private and public systems, being longer in the public system (5.8 vs 4.4 years).

The proportion of patients who used any type of biological therapy in UC was lower than in CD, with less than half of the patients having been exposed to these agents. Biologics were prescribed almost twice as often in the private setting as compared to the public system, (45.45 vs 22.77%; *P*=0.001). In both groups, the most used biological agent was IFX, followed by vedolizumab (VDZ) and adalimumab (ADA). It is noteworthy that the use of these biologicals was significantly higher in the private system compared to the public system, as shown in FIGURE 3.

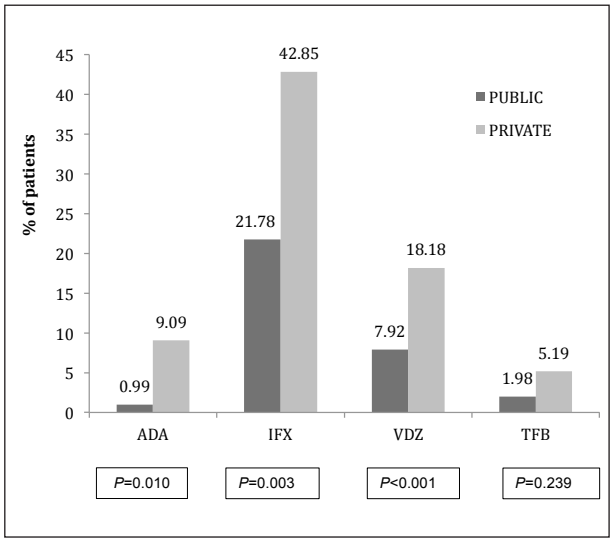

FIGURE 3. Proportion of patients (%) with UC that used biological therapy or small molecules in public and private services.
ADA: adalimumab, IFX: infliximab, VDZ: vedolizumab, TFB: tofacitinib.

TABLE 2. Baseline characteristics of patients with UC.

Characteristic	Public (n=101)	Private (n=77)	*P* value
Age at diagnosis in years (Mean ± SD)	34.15±13.11	26.8±9.97	0.087
Gender, n (%)			
Feminine	62 (61.38)	45 (58.44)	0.691
Male	39 (38.61)	32 (41.55)	0.691
Smoking, n (%)	7 (6.93)	8 (10.38)	0.41
Montreal – extent of disease, n (%)			
E1 (proctitis)	29 (28.71)	10 (12.98)	**0.012**
E2 (left colitis)	39 (38.61)	27 (35.06)	0.627
E3 (pancolitis)	33 (32.67)	40 (51.94)	**0.01**
Hospitalization, n (%)	31 (30.69)	29 (27.66)	0.33
Abdominal surgery, n (%)	17 (16.83)	15 (19.48)	0.65
Stoma, n (%)	13 (12.87)	10 (12.98)	0.98
Corticosteroid, n (%)	71 (70.29)	69 (89.61)	0.002
Azathioprine, n (%)	47 (46.53)	46 (59.74)	0.081
Methotrexate, n (%)	2 (1.98)	6 (7.79)	0.064
Mesalamine, n (%)	98 (97.02)	77 (100)	0.127
Biological therapy, n (%)	23 (22.77)	35 (45.45)	0.001
Follow-up time in months, mean (SD)	69.74±38.38	52.36±27.72	0.001

UC: ulcerative colitis; SD: standard deviation.

Approximately 1 in 5 patients with UC needed colectomy, a rate similarly observed between both subgroups (public: 16.83%, private: 19.48%; *P*=0.648). Among the surgical patients, there was no difference regarding the type of surgical procedure, urgent or elective. The mean number of UC-related abdominal surgical procedures performed in these patients was 2.06 (±1.02) in the public and 2.07 (±1.28) in the private setting.

As for hospitalization, approximately one in three patients required an UC-related hospitalization, with no differences between the subgroups (public 30.69% and private 37.66%; *P*=0.33). Approximately 2/3 of included patients already had a previous diagnosis of UC in the first consultation in both healthcare systems. The rate of new diagnoses, however, was higher in the public sector (35.6%) as compared to the private system (20.8%), with significant difference (*P*=0.031).

DISCUSSION

This retrospective cohort study was the first to comparatively assess possible differences in patients' profile, hospitalizations, use of biologics and surgery rates in patients with IBD between the public and private healthcare systems in Brazil and Latin America. IBD are known to be linked to significant morbidity and mortality, as well as substantial costs to different health systems[3]. Among chronic diseases, IBD are considered the costliest disorders in Europe[13].

The profile of CD patients in our study, in both subgroups, was of young adults (between 17 and 40 years old) and with ileocecal disease, similarly to international studies[14,15]. Although the inflammatory phenotype exceeded half of included cases in both subgroups, the stenotic behavior was the second most frequent in patients from the private subgroup, with almost twice as many cases compared to the public system (*P*=0.006). There was a greater predominance of the penetrating phenotype in patients with CD in the public as compared to the private system. It is known that this phenotype is associated with uncontrolled disease, or with a delayed diagnosis. A possible reason for this specific finding can be the greater difficulty in accessing public IBD tertiary referral centres, with delays in precise diagnoses and effective therapy causing bowel damage and complications, as a consequence of an unchanged natural course of CD.

In a French prospective multicentric study, Nahon et al. identified significantly higher hospitalization rates in CD patients with socioeconomic deprivation as compared with patients without this deprivation[16]. In this study, there was a tendency for CD-related hospitalization rates to be higher in the public as compared to the private system, despite absence of a significant difference (*P*=0.07). Eventually, with a larger sample of patients, this could be statistically proved. It is important to emphasize the high rates of hospitalization in both healthcare systems in CD (above 60%). In UC, there was also no difference between the healthcare systems, and hospitalization rates were lower as compared to CD (approximately 30%). The transmural and more aggressive characteristic of CD as compared to UC may be one of the factors for this difference between the diseases. It should also be noted that the number of patients with CD patients who were included was higher than that of UC (322 vs 178). In addition, considering that the our referral unit is a colorectal surgery unit, the odds for hospitalizations in CD increases, as Crohn's is more associated with a need for surgical treatment than UC, according to the surgical rates identified in our study.

Nguyen et al., in a study of patients with IBD hospitalized between 1999 and 2005, showed that individuals without health insurance were less electively admitted to hospitals, as compared to patients with insurance[17]. Nonetheless, the overall hospitalization rates increased 3 times faster in uninsured as compared to insured patients, suggesting that this finding could be a consequence of the lack of access to adequate outpatient medical care. Cohen-Mekelburg et al. when analyzing readmissions to hospitals different from those of the first hospitalization, identified that readmissions were more prevalent in young people, beneficiaries of public funding and uninsured[18]. In addition, readmissions are associated with a higher probability of in-hospital death, higher inpatient colonoscopy rates, and longer hospital stay. A qualitative American study evaluated the underlying causes of the increase in hospital readmissions among Medicaid beneficiaries, a health

plan funded by the federal and state governments for people eligible by specific criteria. This study identified difficulties in accessing care, lack of primary provider and non-adherence to medication as contributors to readmissions among this vulnerable population[19]. Thus, despite there were no differences in hospitalizations between public and private patients in our single-centre cohort study, it is possible that in a population-based, national level observational study, this difference could be identified, what warrants further research.

Regarding the rates of abdominal surgery in CD, the mean number of procedures performed in each patient was similar between the public and private systems, 1.65 (±1.37) and 1.80 (±1.02), respectively. From the 322 patients with CD in the present study, about half underwent some abdominal major procedure, with no differences between the healthcare systems. The literature corroborates these findings, describing that half of the patients will need surgery within 10 years of diagnosis, and one third will possibly undergo multiple surgical procedures[14,20]. Elective surgeries were more often performed in the private than in the public system (92.85 vs 75%; P=0.001), with no differences in patients with UC. This difference in CD could be related to the greater ease of access and inter-hospital referrals for procedures in the private health system. Nahon et al., similarly, described higher rates of surgery in patients without socioeconomic deprivation, but did not differentiate between urgent and elective procedures[16]. In our study, most CD patients submitted to surgical interventions had previously used biological therapy (more than 80%), suggesting that the group was possibly comprised of patients with more severe and refractory disease, typical characteristics of patients from tertiary referral centres.

An Italian study showed that there was a drop in the rate of permanent stomas from the pre-biological to biological era, 60.8% to 19.2%, respectively (P<0.001)[21]. However, there is still debate whether biological therapy can reduce the rate of stomas[22]. The current study showed that there was a significantly greater need for stomas in the public as compared to the private system in CD, 20.51% and 12.04%, respectively (P=0.039). Such data could be justified by the disease profile, with more penetrating behavior (Montreal B3) in the public patients as compared to private, 26.96% and 19.27%, respectively. Patients with more severe disease and greater intestinal damage may need more stomas within the surgical strategy, possibly due not only to more extensive procedures, but also to other consequences as malnutrition and infection.

In the present study, there was a higher proportion in the use of corticosteroids, with higher rates prevailing in the private as compared to the public unit, 83.73% and 65.38%, respectively (P<0.001). This finding could suggest a greater demand for indiscriminate use of steroids (self-medication) by patients without socioeconomic deprivation. There is scarcity of data which can be compared to our results relation to this topic.

Concerning the use of biologicals, there was no significant difference between the public and private systems in CD. However, among medications, there was a significantly higher use of IFX in the public sector and a trend towards greater use of UST in the private patients. There is significant difficulty in accessing treatment with UST in the public network, as it is not reimbursed by the Brazilian Public Health System. Therefore, public patients who needed UST underwent litigation. This difficulty does not occur in the private system. Nahon et al., similarly to our study, described no disparities between patients with or without social deprivation regarding the use of immunosuppressants and biological therapy[16]. However, the authors analyzed the use of IFX, not allowing comparisons with other drugs to be evaluated.

Differently than what is described in the literature, in the present study there was a higher prevalence of females in UC in both subgroups[23]. Magro et al., performed a review of the demographic profile of patients with UC and identified that, at diagnosis, 30 to 60% of patients had proctitis, 16 to 45% had left colitis, and 14 to 35% had pancolitis[24]. In addition, authors observed that the disease could progress proximally in 10 to 19% of patients after 5 years, and in more than 28% of cases within 10 years. Our study, on the other hand, was limited to retrospective data collection, without detailing the progression of the disease over time. In the private system, pancolitis was the most common manifestation, with more cases as compared to the public

network, 51.94% and 32.67%, respectively (P=0.01). Proctitis was more prevalent in the public as compared to the private system, 28.71% and 12.98%, respectively (P=0.012).

Hospitalization rates in patients with UC are variable. According to a Canadian cohort, one in eight adults with UC are hospitalized per year[25]. In an American study, Nguyen et al. showed a difference in the hospitalization rate in patients with UC over 6 years regarding the presence or absence of a health plan, with admissions being less prevalent among insured patients[17]. In our study, we identified no differences in UC-related hospitalizations between the health systems with hospitalization rates ranging from 27.66 to 30.69%.

In accordance to international studies, the proportion of UC-related abdominal surgery in patients with UC was low in the present study, less than 20%[24]. There was no difference between the subgroups, but the sample was possibly too small and not powered to detect a statistical difference. In a recent review, the risk of colectomy for UC was 4.9% in the first year, 11.6% at 5 years, and 15.6% at 10 years of illness[20]. Several studies have shown a decrease in colectomy rates in the last two decades, suggesting a relationship with the introduction of biological therapy[26].

In our cohort, there was a significant difference regarding the use of corticosteroids in UC, prevailing in the private sector as compared to the public health system, 89.61% and 70.29%, respectively (P=0.002). This finding could be due to the predominance of more extensive and severe disease in the private network.

In the present study, the use of biological therapy was significantly higher in UC patients from the private than in patients from the public system, 45.45% and 22.77%, respectively (P=0.001). IFX was the most used agent in both subgroups, with a predominance in the private sector (P=0.003). Although with small numbers, VDZ was significantly more prescribed in the private network (P<0.001). This difference between the health systems in Brazil was completely expected, as the access to biologics in the public system was limited to litigation until 2019, when the use of biologicas in UC was finally started to be reimbursed by the ministry of health. In an American cohort, there was a significant difference in the use of biological therapy among IBD patients in terms of race. As there is a difference in access to health care between races in the United States, researchers hypothesized that health deprivation was the basis for differences in the use of medical therapies[27]. However, in another American study, based on an outpatient database, authors found no difference in drug access in IBD patients[28]. In multivariate analysis, there was no association in patients with UC between anti-TNF therapy and socioeconomic status.

CONCLUSION

The present study is associated with some limitations, which must be considered in the analysis of the results. First, this was a retrospective study that, despite having an adequate sample, included patients from a tertiary IBD referral centre, with more severe and refractory disease. For this reason, the study's results may not be applicable to all Latin American units. In addition, the study was performed in a colorectal surgery IBD unit, what could overestimate surgical rates, due to referral bias. Lastly, our observational study was not performed with a specific methodology aiming a cause-effect relationship (we could only demonstrate association). Despite these limitations, the strengths of the study include a solid number of patients, the fact that it is the first Latin American study on this topic and the uniform patient care between systems, as the same staff were in charge of patients in both subgroups.

In summary, the demographic profile of patients was similar between the two healthcare systems in terms of age, sex, and overall disease characteristics. In CD, there was a greater predominance of the penetrating phenotype and the need for stomas in the public system. In UC, there was a greater predominance of distal proctitis in the public system and extensive colitis in the private system. In both diseases, there was greater use of corticosteroids in the private healthcare system.

There were no differences in the rates of hospitalization, major abdominal surgery and frequency of use of biological therapy in patients with CD between the public and private systems. Among patients with

UC, there were also no differences in the rates of hospitalization and abdominal surgeries between the two health systems. However, there was greater use of biological therapy in the private network. Our study servers as a gateway to further research on possible differences between health systems in IBD patients globally.

Orcid

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Authors' contribution

Zacharias P and Kotze PG contributed to study conception and design; Zacharias P, Kotze PG and Perussolo M contributed to data collection. Magro DO contributed to data analysis. Zacharias P, Barauna SB and Kotze PG contributed to writing, editing and reviewing.

Zacharias P, Magro DO, Perussolo M, Baraúna FSB, Kotze PG. Taxas de hospitalização, uso de biológicos e cirurgias em doenças inflamatórias intestinais: uma análise comparativa entre os sistemas público e privado de saúde em centro de referência da América Latina. Arq gastroenterol. 2024;61:e23140.

RESUMO – Contexto – As doenças inflamatórias intestinais (DII) têm taxas crescentes de incidência e prevalência em todo o mundo. Na DII, são escassos os estudos comparando as diferenças entre os pacientes de acordo com o nível socioeconômico. **Objetivo** – Nosso objetivo foi avaliar comparativamente as hospitalizações, o uso de biológicos e as taxas de cirurgia em pacientes com DII entre os sistemas público e privado de saúde. **Métodos –** Estudo de coorte retrospectivo unicêntrico em pacientes com DII de uma unidade terciária de referência da América Latina, entre 2015 e 2021. Os pacientes com DC (doença de Crohn) e retocolite ulcerativa foram classificados em dois subgrupos: sistema público e privado. Características demográficas, hospitalizações, necessidade de cirurgia e biológicos foram comparadas. **Resultados –** Foram inclusos 500 pacientes, sendo 322 com DC e 178 com retocolite ulcerativa. Internações por DC foram frequentes em ambos os sistemas de saúde (76,28% na rede privada e 67,46% na rede pública). Mais da metade dos pacientes havia sido submetida a uma ou mais cirurgias abdominais relacionadas à DC, sem diferença significativa entre os subgrupos. Embora não tenha havido diferença nas taxas de uso de terapia biológica nos subgrupos de DC, o infliximabe foi mais utilizado no ambiente público (57,69% vs 43,97%). Não houve diferença nas internações relacionadas a retocolite ulcerativa entre os subgrupos (público 30,69% e privado 37,66%) e nas taxas de colectomia (público: 16,83%, privado: 19,48%). Os biológicos foram prescritos quase duas vezes mais no privado do que no público (45,45 vs 22,77%). **Conclusão** – Não houve diferença nas taxas de internação hospitalar e de cirurgia abdominal entre os sistemas. Nos pacientes com retocolite ulcerativa, houve maior utilização da terapia biológica no setor privado de saúde.

Palavras-chave – Doença inflamatória intestinal; retocolite ulcerativa; doença de Crohn; sistemas de saúde; desigualdade socioeconômica.

REFERENCES

1. Baumgart DC, Carding SR. Inflammatory bowel disease: cause and immunobiology. Lancet 2007;369:1627-40.
2. Kaser A, Zeissig S, Blumberg RS. Inflammatory bowel disease. Annu Rev Immunol. 2010;28:573-621.
3. Ng SC, Shi HY, Hamidi N, Underwood FE, Tang W, et al. Worldwide incidence and prevalence of inflammatory bowel disease in the 21st century: a systematic review of population-based studies. Lancet. 2017;390:2769-78.
4. De Sá Brito Fróes R, Carvalho ATP, De Vascocellos Carneiro AJ, De Barros Moreira AMH, Moreira JPL, et al. The socio-economic impact of work disability due to inflammatory bowel disease in Brazil. Eur J Health Econ. 2018;19:463-70.
5. Mackenbach JP, Kunst AE, Cavelaars AE, Groenhof F, Geurts JJ. Socioeconomic inequalities in morbidity and mortality in western Europe. The EU Working Group on Socioeconomic Inequalities in Health. Lancet. 1997;349:1655-9.
6. Mackenbach JP, Stirbu I, Roskam AJ, Schaap MM, Menvielle G, et al. Inequalities in Health. Socioeconomic inequalities in health in 22 European countries. N Engl J Med. 2008;358:2468-81.
7. Malta Carvalho D, Berna RTI, Guimarães Lima M, Caribé de Araújo S, Alves da Silva MM, et al. Doenças crônicas não transmissíveis e a utilização de serviços de saúde: análise da Pesquisa Nacional de Saúde no Brasil. Rev Saúde Pública 2017;51:(Supl 1):4.
8. Girotto E, De Andrade SM, Cabrera MA, Matsuo T. Adherence to pharmacological and non pharmacological treatment for arterial hypertension and associated factors in primary care. Cien Saude Colet. 2013;18:1763-72.
9. McEntegart A, Morrison E, Capell HA, Duncan MR, Porter D, et al. Effect of social deprivation on disease severity and outcome in patients with rheumatoid arthritis. Ann Rheum Dis. 1997;56:410-3.
10. Bihan H, Laurent S, Sass C, Nguyen G, Huot C, Moulin JJ, et al. Association among individual deprivation, glycemic control, and diabetes complications: the EPICES score. Diabetes Care 2005;28:2680-5.

11. Ellison-Loschmann L, Sunyer J, Plana E, Pearce N, Zock JP, Jarvis D, et al. Socioeconomic status, asthma and chronic bronchitis in a large community-based study. Eur Respir J. 2007;29:897-905.
12. Basagaña X, Sunyer J, Kogevinas M, Zock JP, Duran-Tauleria E, Jarvis D, et al. Socioeconomic status and asthma prevalence in young adults: the European Community Respiratory Health Survey. Am J Epidemiol. 2004;160:178-88.
13. Burisch J, Jess T, Martinato M, Lakatos PL. ECCO -EpiCom. The burden of inflammatory bowel disease in Europe. J Crohns Colitis. 2013;7:322-37.
14. Torres J, Mehandru S, Colombel JF, Peyrin-Biroulet L. Crohn's disease. Lancet. 2017;389:1741-55.
15. Baumgart DC, Sandborn WJ. Crohn's disease. Lancet. 2012;380:1590-605.
16. Nahon S, Lahmek P, Macaigne G, Faurel JP, Sass C, Howaizi M, et al. Socioeconomic deprivation does not influence the severity of Crohn's disease: Results of a prospective multicenter study. Inflamm Bowel Dis. 2009;15:594-8.
17. Nguyen GC, Sam J, Murthy SK, Kaplan GG, Tinmouth JM, LaVeist TA. Hospitalizations for inflammatory bowel disease: profile of the uninsured in the United States. Inflamm Bowel Dis. 2009;15:726-33.
18. Cohen-Mekelburg S, Rosenblatt R, Gold S, Shen N, Fortune B, Waljee AK, et al. Fragmented Care is Prevalent Among Inflammatory Bowel Disease Readmissions and is Associated with Worse Outcomes. Am J Gastroenterol. 2019;114:276-90.
19. Jiang HJ, Boutwell AE, Maxwell J, Bourgoin A, Regenstein M, Andres E. Understanding Patient, Provider, and System Factors Related to Medicaid Readmissions. Jt Comm J Qual Patient Saf. 2016;42:115-21.
20. Frolkis AD, Dykeman J, Negrón ME, Debruyn J, Jette N, Fiest KM, et al. Risk of surgery for inflammatory bowel diseases has decreased over time: a systematic review and meta-analysis of population-based studies. Gastroenterology. 2013;145:996-1006.
21. Coscia M, Gentilini L, Laureti S, Gionchetti P, Rizzello F, Campieri M, et al. Risk of permanent stoma in extensive Crohn's colitis: the impact of biological drugs. Colorectal Dis. 2013;15:1115-22.
22. Müller C, Bergmann M, Stift A, Argeny S, Speake D, Unger L et al. Restoration of intestinal continuity after stoma formation for Crohn's disease in the era of biological therapy: A retrospective cohort study. Wien Klin Wochenschr. 2020;132:12-8.
23. Ungaro R, Mehandru S, Allen PB, Peyrin-Biroulet L, Colombel JF. Ulcerative colitis. Lancet. 2017;389:1756-70.
24. Magro F, Rodrigues A, Vieira AI, Portela F, Cremers I, Cotter J, et al. Review of the disease course among adult ulcerative colitis population-based longitudinal cohorts. Inflamm Bowel Dis. 2012;18:573-83.
25. Benchimol EI, Manuel DG, Mojaverian N, Mack DR, Nguyen GC, To T, et al. Health Services Utilization, Specialist Care, and Time to Diagnosis with Inflammatory Bowel Disease in Immigrants to Ontario, Canada: A Population-Based Cohort Study. Inflamm Bowel Dis. 2016;22:2482-90.
26. Kuenzig ME, Benchimol EI, Lee L, Targownik LE, Singh H, Kaplan GG, et al. The Impact of Inflammatory Bowel Disease in Canada 2018: Direct Costs and Health Services Utilization. J Can Assoc Gastroenterol. 2019;2(Suppl 1):S17-S33.
27. Damas OM, Jahann DA, Reznik R, McCauley JL, Tamariz L, Deshpande AR, et al. Phenotypic manifestations of inflammatory bowel disease differ between Hispanics and non-Hispanic whites: results of a large cohort study. Am J Gastroenterol. 2013;108:231-9.
28. Lin KK, Sewell JL. The effects of race and socioeconomic status on immunomodulator and anti-tumor necrosis factor use among ambulatory patients with inflammatory bowel disease in the United States. Am J Gastroenterol. 2013;108:1824-30.