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IRRITABLE BOWEL SYNDROME CHARACTERIZATION IN A POPULATION FROM BIHOR COUNTY ROMANIA

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Abstract: *Our aim was to analyse the characteristics of a large cohort of patients with IBS from Bihor County. We retrospectively studied 525 patients with IBS admitted between 2018-2023 in Bihor Emergency Clinical County Hospital. We extracted, interpreted and statistically analysed the following parameters: age, gender, environment, family history, smoking and alcohol status, Bristol scale, results of colonoscopy and treatment. The overall prevalence of IBS was 0.2%. Fifty-six % were women, 61% of patients were from urban environment, average age was 57.74 years, with a significant statistical difference between medium age in women vs men. There was a significant statistical correlation between the medium age, medium height and weight of our patients and smoking status, alcohol consumption and positive family history. Colonoscopy was done in 148 patients and conditions found in addition to IBS appeared in 7.6% of the cases. The dominant finding was tumoral (4% of IBS cases), followed by various inflammatory conditions. The mean age for patients with normal results was 55.07 years, 50.84 years for patients with inflammatory lesions and 67.81 years for tumoral lesions, with statistically significant correlations between age and the results of colonoscopy. We did not find statistical correlation between Bristol Scale and results of colonoscopy. Only 142 patients followed specific treatment, suggesting a low compliance. The epidemiological traits of our IBS patients seem to remain constant along the time as our research lines up with other studies. Among these, age, female gender and urban provenance seem to be the most significant factors, whereas habits, body mass index and family history seem not to be statistically significant. As Rome criteria accurately diagnose IBS, we have to remember that colonoscopy should be recommended to a rather small and well selected cases of patients of older age, as in such cohorts tumoral lesions were most frequent.*

Key words: *irritable bowel syndrome, epidemiology, colonoscopy, treatment*

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1. Introduction

Irritable bowel syndrome (IBS) is an association of symptoms predominated by repetitive abdominal pain along with changes in intestinal bowel movements, i.e., diarrhoea, constipation, or both. The condition is strictly functional, lacking the organic substrate. There are 4 types of IBS, namely: IBS with diarrhoea, IBS with constipation, mixed IBS (that associates in relatively equal proportions both diarrhoea and constipation) and unclassifiable/nonspecific IBS (cannot fit into none of the above categories).

IBS represents a frequent disease that, despite the lack of severe potential for evolution, creates a significant burden on the economic and health systems worldwide, through the high costs caused by absenteeism at work, extensive and sometimes unjustified investigations, repetitive medical consultations and treatments supported.

Globally, the disease is more common in women and the prevalence of IBS stands at an average value of 11% depending on the diagnostic criteria used [1]. There is though, a high variability of this percent, depending on the geographical regions and these values are situated among 1.1% and 45% [2]. In Europe, it seems that the prevalence of IBS is somewhere between 10 to 15% according to medical studies [3]. In Romania, the researches done by Dumitrașcu et al, reported a prevalence of IBS that is heading around 14% [4].

Causes of IBS are unknown and the pathogenesis of IBS is incompletely elucidated, being considered that the symptoms of IBS are caused by dysfunctions of the peripheral and/or central nervous system that lead to the deficient processing of nerve signals at the intestinal level (the so called "brain-gut interactions") [5, 6].

The clinical picture of irritable bowel syndrome is polymorphic and often misleading by sharing common elements with organic diseases. As cardinal symptoms, IBS presents the following 3 elements: change in intestinal transit, abdominal pain, abdominal flatulence. In general, in each patient we have a dominant symptomatology from the above. Sometimes these cardinal symptoms can be accompanied by varying degrees of dyspepsia, nausea, even vomiting, the elimination of mucus of non-inflammatory origin with the stools, sexual dysfunctions, heartburn, etc. It should be noted that, in general, the entire clinical picture of IBS is aggravated/triggered by psychological stressors.

The diagnosis of IBS is largely clinical, relying on a very thorough history and objective examination. Until recently it was considered a diagnosis of exclusion, but this approach has changed in recent years. Most of the time, the clinical picture, along with basic diagnostic tests, combined with careful analysis of stool diaries (using the Bristol scale which is particularly useful [7]) and standardized questionnaires are sufficient for diagnosis.

Currently, for the diagnosis of IBS, we have at our disposal the ROMA IV criteria developed in 2016, by the Roma Foundation, an organization dedicated to the study of functional digestive diseases, from the United States of America and have been adopted worldwide, including in our country [8].

Treating IBS is often difficult and represents a challenge for clinicians. The approach is complex, sometimes multidisciplinary and unfortunately in some cases with suboptimal results, hence

deriving the idea of new targets and therapeutic variants. The treatment is usually individualized and includes, in addition to general nutritional and psycho-behavioural measures, a series of drug therapies guided by the patient's symptoms [5], [9].

2. Methods

We retrospectively studied a group of 525 patients with IBS that were admitted between 2018-2023 in Bihor Emergency Clinical County Hospital, Romania (BECCH). Our study was done under the auspices of the Doctoral School of University of Oradea, Oradea, Romania, with the approval of the Ethics Committee (no 43604/14.12.2023). We excluded from our study, 15 patients with the diagnosis of IBS, due to the fact that they were not from Bihor County.

The identification of the cases in the database of the Bihor County Emergency Clinical Hospital was done using ICD-10-CM (International Classification of Diseases) coding for the corresponding condition of interest, namely irritable bowel syndrome. The cases were extracted from a total number of 260543 hospitalizations that took place in the aforementioned period. **1.**

We extracted (depending on availability) the following parameters: age, gender, provenance environment, family history, smoking and alcohol status, Bristol scale, results of colonoscopy and treatment. All data were interpreted and statistically analysed according to the details in the Statistical Analysis chapter. Subsequently, all results and data were analysed, explained according to their epidemiological, clinical and statistical significance and discussed comparatively, in the context of current research existing in the medical literature, in order to reach personal research conclusions.

In our study, we intended to monitor trends in the occurrence of IBS in our geographical area over this time, estimate the frequency of the disease and identify associations with the disease.

3. Statistical analysis

Statistical analysis was performed using the R program. The R program is a software used in specialized statistical analysis, which can be downloaded from the page: https://www.r-project.org/. To test the statistical hypotheses, a series of tests were applied, depending on the type of analyzed variable. In the case of continuous variables, the T-test (Student) and the Anova test were applied. Categorical variables were analyzed with Pearson's chi-squared test and Fisher's test. The threshold of statistical significance accepted was 0.05 (i.e., a p value < 0.05).

4. Results

4.1. Results of the demographic and epidemiological analysis of patients with irritable bowel syndrome

In our study, we had an overall prevalence of IBS in our hospital of 0.2% and a yearly prevalence that is described in Figure 1.

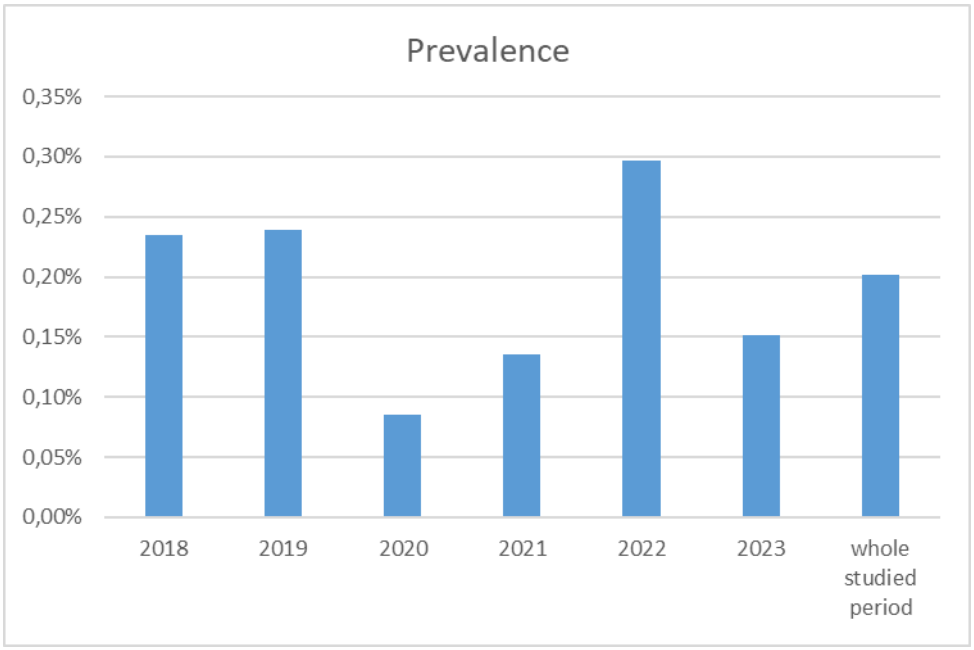

Fig. 1. *Prevalence of IBS in BECCH*

From the total number of patients with IBS (525 cases), 294 were women (56%) and 231 were men, meaning 44%. From the point of view of the environment of origin, the majority of patients were from the urban environment (319 patients, 61%) vs the rural environment (206 patients, 39%) as illustrated in Figure 2. In terms of age, the studied IBS patients presented an average age of 57.74, with extremes located at 16 years and 92 years, respectively. We noticed a significant statistical difference between the medium age in women vs men ($p<0.05$) as seen in Table 1. At the same time there was no statistical relevance in terms of age and environment provenance ($p>0.05$) as seen in Table 2. From the point of view of the distribution by age decades, we noticed that in our geographical area, we have a peak incidence of IBS in the decade of 61-70 years, followed by the decade 71-80 years and the decade 51-60 years (Figure 3).

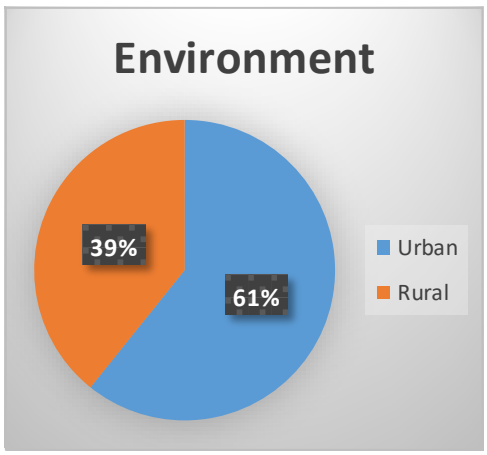

Fig. 2. *Distribution of the patients regarding environment provenance*

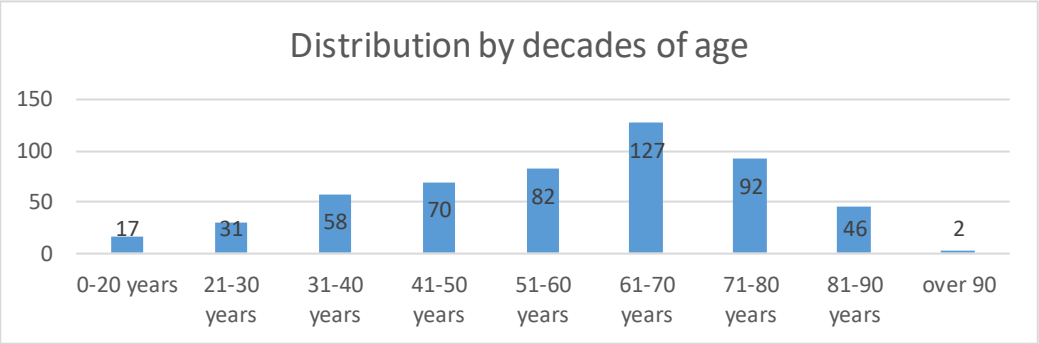

Fig. 3. *Distribution by decades of age in the group of patients with IBS*

Table 1

Statistical analysis of age characterization

Age	All the group	Women	Men
Minimum	16	16	17
Maximum	92	92	89
Medium	57.74	59.25	55.82
Standard deviation	17.35	17.66	16.76
T -test		$p < 0.05$	

Table 2

Statistical analysis of age characterization in relation with environment provenance

Age	Rural	Urban
Minimum	23	16
Maximum	92	91
Medium	58.91	57.03
Standard deviation	16.87	17.62
T -test	$p > 0.05$	

From the point of view of the distribution of IBS cases by years, respectively of the temporal trend, we noticed, that the period of the COVID-19 pandemic, determined besides a lower overall presentation of patients to medical services a lower presentation of IBS patients also and this trend did not become upward again with the end of the pandemic.

The year 2022 represented the peak prevalence of IBS and at the opposite pole, was the year 2020 (38 patients with IBS) as can be seen in Figure 4.

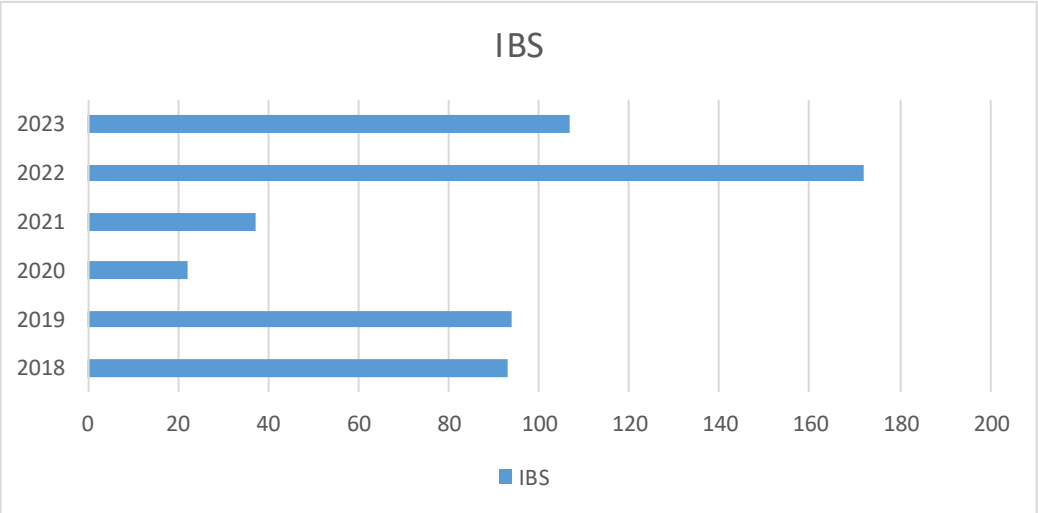

Fig. 4. *Temporal trend of irritable bowel syndrome in the period 2018-2023*

4.2. The results of analyzing the anamnestic, clinical and paraclinical data of the patients with IBS

Regarding family history, we observed in the patients with irritable bowel syndrome that 64.9% of the patients presented a negative family history of digestive tract diseases, the rest of the patients having among their close relatives, diseases such as IBS, tumors of digestive tract, ulcer disease, hemorrhoidal disease, etc.

Regarding smoking status, IBS patients presented, an approximately equal distribution between smokers and non-smokers/ex-smokers, thus 52% of IBS patients were either non-smokers or ex-smokers and 48 % were smokers. However, we cannot specify whether the cessation of smoking took place after the diagnosis of the disease, before its diagnosis, and if the cessation of smoking took place before the onset of the disease, how many years before it was done. Regarding alcohol consumption, 20% of our patients drank alcohol, but the exact amount and type was not clearly depicted (Figure 5). Our patients had a medium weight of 73.79 kg, a medium height of 171.35 cm, with a mean body mass index of 25.07. Regarding Bristol Scale most of our patients had a Bristol scale of 5 (39.24%), followed by 6 (36.38%) and on the third place there was Bristol 7 with 16.95%.

The average age of the patient with irritable bowel syndrome is statistically significantly lower if the patient is a smoker, consumes alcohol or has a family history of the disease (Table 3).

A higher average weight, with a statistically significant difference, is observed in patients with irritable bowel syndrome who smoke and consume alcohol and without a statistically significant difference in those who have a family history of the disease (Table 3).

A higher average height is observed in patients with irritable bowel syndrome who smoke, consume alcohol or have a family history of the disease, the

differences being statistically significant (Table 3).

Regarding BMI, there is no statistically significant difference between the average value of BMI for people who smoke versus those who do not smoke, for people who consume alcohol versus those who do not, and respectively for people with a family history of the disease versus those without (Table 3).

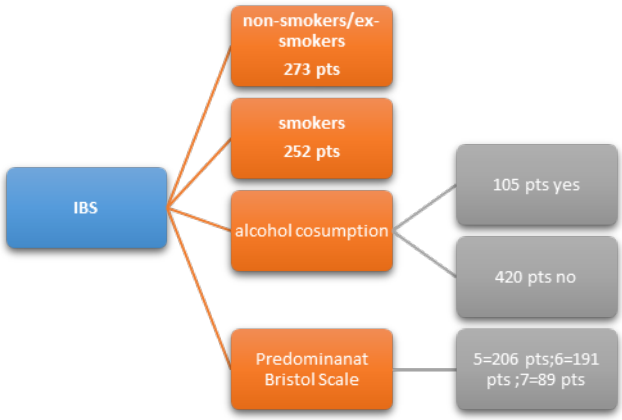

Fig. 5. *Smoker/non-smoker and alcohol consumption status in patients with IBS*

Table 3

Statistical analysis of the clinical and epidemiological data in IBS patients

Medium age for:	**Smokers 0 no/1 yes**	**Alcohol 0 no/1 yes**	**Family history 0 no/1 yes**
0	66.52	59.43	65.15
1	49.63	50.96	44.00
T-test	p < 0.00001	p < 0.00001	p < 0.00001
Medium weight for:	**Smokers 0 no/1 yes**	**Alcohol 0 no/1 yes**	**Family history 0 no/1 yes**
0	70.32	72.38	73.37
1	77.00	79.46	74.58
Testul T	p < 0.00001	p < 0.00001	p = 0.4
Medium height for:	**Smokers 0 no/1 yes**	**Alcohol 0 no/1 yes**	**Family history 0 no/1 yes**
0	167.59	170.14	170.09
1	174.82	176.18	173.67
Testul T	p < 0.00001	p < 0.00001	p < 0.00001
Medium BMI for:	**Smokers 0 no/1 yes**	**Alcohol 0 no/1 yes**	**Family history 0 no/1 yes**
0	25.05	24.94	25.31
1	25.08	25.58	24.62
Testul T	p = 0.9	p = 0.1	p = 0.06

LGIE- lower gastro-intestinal endoscopy; BMI- body mass index

Of the 525 patients with irritable bowel syndrome, 148 people underwent lower digestive endoscopy (full colonoscopy) (Figure 6). As indications for colonoscopy,

we had the following: the appearance of alarm symptoms (rectal bleeding, anemia) in 7.7% of IBS cases (27% of colonoscopies performed), occlusive/sub-occlusive syndromes (4.9% of IBS cases, 26% of colonoscopies performed), worsening of the diarrhea (2.8% of IBS patients, 10% of colonoscopies performed), on demand (10% of IBS cases, 37% of colonoscopies performed). Regarding patients without colonoscopy, we have no data if they ever had a colonoscopy in the past or not.

Conditions found in addition to IBS during colonoscopy were present in 40 cases (7.6%). Thus, unfortunately, the dominant associated finding was tumoral (21 cases, 4% of all IBS cases), followed by various inflammatory conditions (IBD, proctitis, radicular proctitis, colitis and non-specific ileitis - 3.6% of cases of IBS), detailed in Figure 7 below.

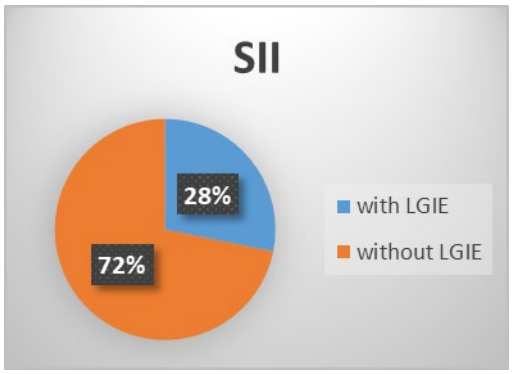

Fig. 6. *Distribution of patients with IBS and lower gastrointestinal endoscopy*

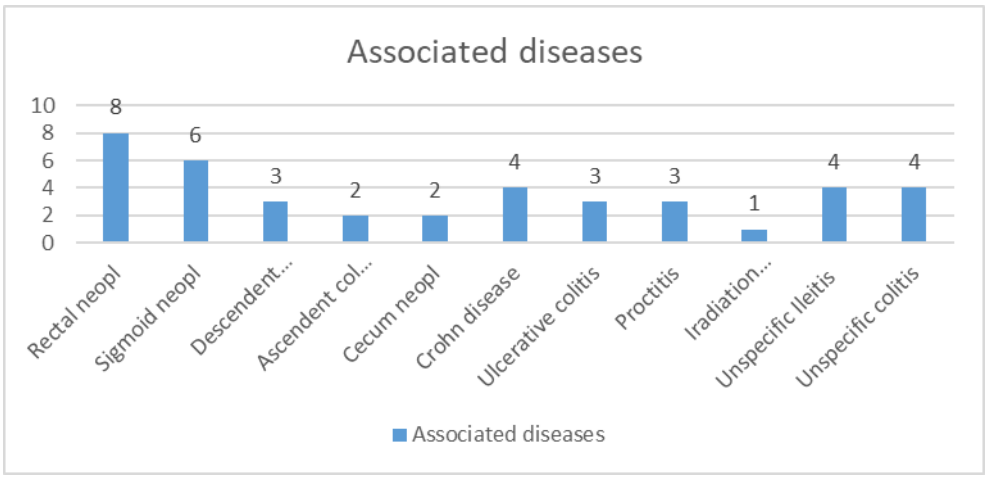

Fig. 7. *Lesions detected at colonoscopy*

When we analyzed the relationship between age and the results of the colonoscopy, we found out that the mean age for patients with normal results was 55.07 years. The mean age for patients with inflammatory lesions was 50.84 years and for those with tumoral lesions the mean age was 67.81. So, we found out that between age and the results of the colonoscopy, there were statistically significant correlations, meaning that the age of the patients who had a neoplastic/tumoral disease was statistically higher than of those with inflammatory diseases or normal colonoscopies (Anova test $p<0.01$; Tukey HDS test $p=0.004$) as seen in Table 4 and 5. There were no statistically relevant

results when we analyzed the relationship between the results of the colonoscopy and gender of the patient, provenance, weight, height or body mass index, nor regarding the family history and consumption of toxics (cigarettes or alcohol) (p>0.05) as seen in Table 3.

Medium age and LGIE results Table 4

LGIE results	Normal	Inflammatory	Tumoral	**Anova test**
Medium age	55.07	50.84	67.81	**P<0.01**

Table 5

Statistical comparison between mean age and categories of results of LGIE

Categories of results	**P value Tukey HSD test**
Normal-inflammatory	0.5567
Tumoral-inflammatory	0.004
Tumoral- normal	0.0041

Regarding Bristol scale we did not find any significant statistical correlation between the type of stool and the results of the colonoscopy (p=0.7) as seen in the Table 6.

Bristol Scale and results of LGIE Table 6

Bristol Scale	3	4	5	6	7
LGIE results					
Inflammatory	0	1	8	6	4
Normal	2	2	39	40	26
Tumoral	0	1	10	8	2
% total	2	4	57	54	32
results of LGIE					
Inflammatory	0.00%	25.00%	14.04%	11.11%	12.50%
Normal	100.00%	50.00%	68.42%	74.07%	81.25%
Tumoral	0.00%	25.00%	17.54%	14.81%	6.25%

Fisher test applied -> p = 0.7

Regarding therapies followed by the group of patients with IBS, only 142 of them followed specific treatment, the remaining 318 patients did not have in the therapeutic scheme, medication suitable for the diagnosis. A number of 14 patients had associated psychiatric medication consisting of: zolpidem, alprazolam and lorazepam. The specific treatment was dominated by intestinal motility regulators, antidiarrheal medications, gas absorbing drugs, prokinetics, probiotics, detailed in Figure 8.

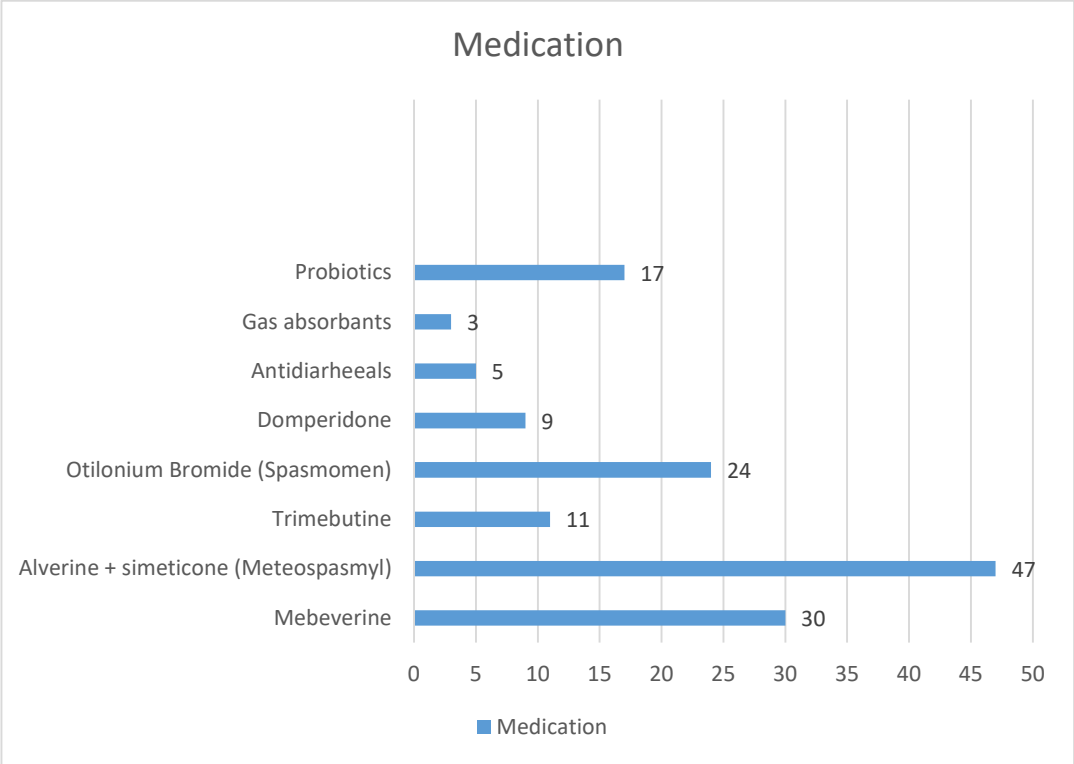

Fig. 8. *Patients who received specific medication for IBS*

5. Discussions

In our research we observed that there was an overall prevalence of IBS cases in our hospital of 0.2%. IBS is a disease that is mostly suitable for evaluation and monitoring in outpatient units. Of note, that this data was obtained studying patients hospitalized in a county hospital (Bihor Clinical County Hospital), so we can assume that the number of cases in our region is actually much higher, IBS being a disease that does not usually require hospitalization. This is usually performed for evaluation/ diagnostic reasons or when a patient with IBS presents alarm symptoms that require colonoscopy or if the patient opts for a hospital admission. In any case, we see that this value is highly different from metanalysis that show in general a prevalence of the IBS ranging from 1% to 16% [10,11], but as mentioned we assume the low prevalence in our study is due to
the outpatient characteristic of the disease. What is interesting is that even after hospitalization, it seems that outpatient visits at the gastroenterologist continue and tend to repeat rather than decrease as was concluded from the French National Health Data System [12]. Interestingly, the highest prevalence of IBS was met immediately after the Covid-19 pandemic, suggesting the psychological impact of this period upon people as well as worsening of pre-existing IBS due to gastrointestinal effects of Covid-19. Similar facts were also noted after the pandemics in other regions as the medical literature reports [13,14].

In our group, females were more affected by IBS, and urban provenance was definitely more frequent, suggesting that all the factors associated with urban life, like pollution and unhealthy food, might play a role in the development of IBS. IBS seems to affect people of a medium age of 57.74 years and a it has a peak incidence between 61 to 70 years. As described by other researchers higher incidence is usually associated with female gender and with the age group of 46-60 [15].

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In our study, family history does not seem to exert a strong influence to the presence of IBS as almost 2 thirds of our patients had a negative pedigree. Other studies showed a 50 % positive family aggregation, but data was self-reported, and when the results were reassessed to comply with Rome criteria the percentage dropped to 19 [16].

The habits of our patients revealed that there was an approximately equal distribution between smokers and non-smokers/ex-smokers and, regarding alcohol consumption, only 20% of our patients drank alcohol. Unfortunately, lack of data, impeded us to conclude whether the cessation of smoking took place after the diagnosis of the disease, before its diagnosis, and if the cessation of smoking took place before the onset of the disease, how many years before it was done, and also what the exact amount of alcohol consumed on a regular basis by our patients, so prospective studies should be done in this field. Studies that looked into the relationship of alcohol and IBS, indicated that moderate drinking was not associated with exacerbation of digestive symptoms, and that women tended to be more prone to have symptoms after alcohol consumption [17]. A very recent study, from 2023, demonstrated that there is an additive interaction between alcohol consumption and HLA-DQ8 in the appearance of IBS, thus opening a new insight of the pathogenesis of IBS in terms of genetics and epigenetics [18].

Most of our patients seemed to have a normal nutritional state, with a mean BMI of 25.07, with no statistical difference between men and women, suggesting that most of the patients with IBS tend to have rather careful diet probably due to their fear of developing symptoms after eating, as other studies also underline [19].

In our patients only 28% had a colonoscopy, and the most frequently encountered indication for this, was the presence of alarm symptoms (rectal bleeding, anemia) followed by occlusive/sub-occlusive syndromes and worsening of the diarrhea. Luckily, most of the colonoscopies were normal (more than 90%), indicating that Rome criteria can predict IBS in an accurate way. Unfortunately, in those cases where the colonoscopy was not normal, tumoral lesions were most frequent. So, when we analyzed the results of the colonoscopies in relation with the age of the patients, we found out that there was an important statistical correlation between the age of the patients and the depiction of tumoral lesions at endoscopy, suggesting that in

well selected cases, of older individuals with IBS, colonoscopy is to be taken into account. No statistical correlations were found between the results of the colonoscopy and the gender of the patient, provenance, weight, height or body mass index, Bristol scale, nor regarding the family history and consumption of toxics. Studied showed that patients with IBS that have a negative colonoscopy have a better quality of life, by the mean of the reassurance they don't have a life threatening disease [20]. On the other hand, other studies, showed that in general the indications for colonoscopy are the same, and that non tumoral findings were more prevalent [21].

As well known, among the risk factors for colorectal cancer (modifiable and nonmodifiable), we encounter: weight (obesity respectively), smoking (which increases the risk of polyps), moderate to heavy alcohol consumption, age and male gender. We analyzed all these factors in our patients with tumoral findings and we found statistically significant correlations only with age in our studied group. Regarding risk factors it would also be of great importance as a further deepening of our study to depict and analyze other parameters like: diet (red meat), low levels of vitamin D and personal history of cholecystectomy (as recent studies show a slight increase of right-sided colorectal cancer risk after cholecystectomy through a not fully understood mechanism) or even risk factors with unclear effect on colorectal cancer like night shift work or previous treatment for certain cancers [22].

Interestingly, only 26% of our patients were on specific medication, suggesting once more that the compliance of these category of patients is rather low, conducting to poor results in terms of efficacy of treatment and overall quality of life. A search of the literature regarding this aspect shows that in general the adherence to treatment is poor, there are a lot of factors that influence this and that we need tailored interventions to obtain better outcomes [23,24].

6. Conclusions

The epidemiological traits of our IBS patients seem to remain constant along the time as our research lines up with other studies. Among these, age, female gender and urban provenance seem to be the most significant factors, whereas habits, body mass index and family history seem not to be statistically significant. Our research shows that a large number of IBS patients opt for hospitalization so there are some healthcare expenditures no necessarily justified. Although Rome criteria accurately diagnose IBS, we have to keep in mind that colonoscopy should be mandatory in cases of patients of older age as in such cohorts tumoral lesions were most frequent.

Acknowledgements

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