

Anthropological, Demographic and Socioeconomic Characteristics of Irritable Bowel Syndrome

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ABSTRACT

Irritable bowel syndrome (IBS) is one of the most frequent functional gastrointestinal disorders (FGIDs) with a prevalence in 10 to 20%, of cases in some developed countries. The Rome Foundation has drawn up Rome III criteria, diagnostic questionnaires and scoring algorithm for FGIDs, applicable in clinical practice and population studies. The aim of this research is to determine the presence of IBS in Osječko-baranjska County and the effect of anthropometric, demographic and socioeconomic factors. 703 subjects selected in the systematic sample filled in the Rome III diagnostic questionnaire for IBS. Prevalence of IBS was recorded in 29.16%, in men in 21.39%, and in women in 36.69% of cases, anxiety and depression in 26.34% and 25.85%. Persons suffering from IBS were on average shorter, weighed less and had a lower BMI than persons not showing signs of IBS. Women have 2.101 times greater chance of risk of IBS, and with an increase in the number of members in the household the risk of IBS increases 1.139 times. Rome III survey questionnaire is an acceptable method for diagnosing IBS and identifying persons showing signs of structural changes in order to provide further treatment.

Key words: irritable bowel syndrome, prevalence, risk factors, guidelines for early detection

Introduction

Irritable bowel syndrome (IBS) belongs in the group of functional gastrointestinal disorders (FGIDs) which represent a wide group of different disorders of relatively high incidence and prevalence in (general) population of developed countries. These disorders first came to light about three decades ago with the shifting of the paradigm away from the concept of the disease based on a 3 centuries old reductionist model, where all efforts were focused on one basic biological etiology, toward an integrated, biopsychological model of falling ill and disease. Attribution of equal importance to psychosocial factors have become an imperative in the improvement of disease control. A new biopsychosocial model supports the integration of biological, psychological and social factors in the assessment, prevention and treatment of diseases¹. The other change happened two decades ago in connection with significant progress in research methods

which provided proof of FGIDs as a clinical product of interaction between psychosocial factors and disturbed physiology of the bowel. FGID is now recognized as a clinical entity.

The basic characteristic of FGIDs is the presence of characteristic symptoms with the absence of structural or biochemical abnormalities which could explain them, and which include the most frequent FGIDs; irritable bowel syndrome, dyspepsia and constipation. Irritable bowel syndrome is characterized by pain or discomfort in the medium or lower abdominal segment, connected with a disturbance in the emptying of the bowel and changes in the consistency of the stool. The patients with IBS quite commonly complain of the symptoms related to upper gastrointestinal tract, such as heartburn and chest pain of noncardiac genesis. This suggests that the

IBS might be associated with considerably more extensive smooth muscle or innervation changes than presumed before².

According to some research every fourth person in modern western societies exhibits the symptoms of functional gastrointestinal disorders³. It is estimated that this group represents half of the visits to gastrointestinal clinics. Even though there are significant differences in localization and symptoms they have a lot of common elements, e.g. in relation to motor and sensory physiology, relation to CNS and approach to treatment^{4,5}.

The symptoms of functional gastrointestinal disorders appear and are grouped in recognizable syndromes, and since the initiative started by prof. Aldo Torsoli at the International Gastroenterology Congress in 1988, the process of developing the sorting criteria has been rigorous. Since the initial consensuses of using the Delphi method, for more than 20 years now the Rome Working Committee, (known as the Rome Foundation since 2003) have worked in making their diagnostic criteria for identification and classification. According to anatomical regions they are classified in six subcategories: esophageal disorders (A), gastroduodenal disorders (B), bowel (C), functional abdominal pain (D), biliary (E) and anorectal (F), and diagnostic criteria and questionnaires have been defined for each of these entities^{6–8}.

The Rome I and Rome II criteria and diagnostic questionnaires have been made according to the evidence-based approach, and based on the experiences of their application in practice, new, Rome III criteria, diagnostic questionnaires and scoring algorithm have been made^{9,10}.

The group of functional bowel disorders of category C includes: irritable bowel syndrome (C1), functional bloating (C2), functional constipation (C3), functional diarrhoea (C4) and non-specific functional disorders (C5).

Rome III diagnostic questionnaires include alarm symptoms for possible structural changes which require further treatment and a psychosocial module for psychosocial difficulties which may warn of the need for further psychiatric consultation^{11–15}.

Rome III diagnostic questionnaires for functional gastrointestinal disorders have proved to be valid (sensitive and specific) and reliable instruments for diagnosing FGIDs. Sensitivity of 70% and specificity of 87% has been proven for IBS¹⁶.

The Rome Foundation and Rome Questionnaire Committee find that the questionnaires are suitable for application in clinical practice, research and population studies, however, it should be pointed out that a questionnaire cannot substitute clinical judgement regarding the need for further diagnostic tests in order to determine a final diagnosis.

It is considered that about 10 to 20% of adults have symptoms of IBS, the disease includes all races, and it is somewhat more prevalent in women than in men^{17,18}. It most frequently occurs in younger age groups, between 25 and 50 years of age^{19–22}.

Since it is well known that IBS significantly diminishes the working ability of those suffering from it, with high material costs of diagnosis and treatment, it is important that its prevalence in Osječko-baranjska County be determined, as well as its characteristics and the factors which influence its incidence.

Aim of the Research

It is a cross-sectional and case-control study aiming to estimate the presence of the irritable bowel syndrome in the region of Osječko-baranjska County and to determine the effect of anthropometric, demographic and socioeconomic factors on its incidence, its characteristics in urban and rural regions in age groups between 20 and 70 years of age.

The effect of the following anthropometric and demographic factors will be analyzed: gender, age, (height, body weight, BMI), education, profession, marital status, place of birth, place of residence and the effect of socioeconomic factors: material status and size of the household.

The results will be used to determine the specific characteristics and the demographic and socioeconomic effects on the incidence and the characteristics of the irritable bowel syndrome.

Subjects and Methods

Subjects

The research population comprises the insured persons of the Regional Office of the Croatian Institute for Health Insurance for Osječko-baranjska County, between 20 and 70 years of age, entered in the records of family physicians.

The sample (900 of them, even though a sample of 600 would be enough to make valid conclusions) was selected by applying the systematic sample in 12 selected family medicine clinics in urban regions and 6 clinics in rural regions of Osječko-baranjska County. The first subject was randomly selected, and he/she was followed by every tenth person in the records in alphabetic order. All subjects showing signs of irritable bowel represent the cases-group, and those not showing any such signs were selected for the control group, making sure that they match the “cases” group in terms of gender, age, place of residence (in a town or village) and similar education level.

Methods

Every subject was sent an invitation letter and a Rome III diagnostic questionnaire for irritable bowel syndrome to their home address, asking to return the filled in questionnaire in the enclosed, addressed envelope.

Rome III diagnostic questionnaire for irritable bowel syndrome contains 30 questions. In the first part of the questionnaire (17 questions) there are questions aiming

at anthropometric and socioeconomic information: gender, age, height, weight, (for BMI), marital status, education, profession, place of birth (Slavonia or elsewhere), place of residence, material status, household, chronic diseases and level of satisfaction with the health condition.

In the second part of the questionnaire (10 questions) there are questions about the symptoms specific for IBS: in the last 3 months, how often have you felt discomfort or pain in any part of the abdomen: for women: did such discomfort or pain appear only during the menstrual bleeding, and not at other times; have you experienced this discomfort or pain during 6 months or longer; how often did this discomfort or pain diminish or disappear after the emptying of the bowel; when this discomfort or pain began, was there more frequent emptying of the bowel; when this discomfort or pain began, was there less frequent emptying of the bowel; when this discomfort or pain began, did your stool become looser; when this discomfort or pain began, did your stool become harder; in the last 3 months, how often did you have hard or lumpy stool; during last 3 months, how often did you have loose or watery stool; followed by 6 questions for possible structural disorder of the digestive system, and in the third part of the questionnaire 7 questions about psychosocial factors (anxiety, depression, suicidal thoughts, intensity of pain and abuse).

Criteria for confirmation of IBS diagnosis:*

- Symptoms of recurrent abdominal pain or discomfort for at least 3 days/month during last 3 months
- Followed by two or more symptoms stated below:
 1. Feeling of relief after defecation
 2. Changes in the frequency of emptying of the bowel
 3. Changes in the form of stool (hard or watery)

A special scoring algorithm according to the criteria of prevalence of symptoms is used to confirm or exclude the diagnosis.

The statistic data processing included the use of the χ^2 -test, t-test, log-linear analysis and logistic regression, and the software packages SPSS Statistics 17.0 and Statistica 8.0. The confirmed level of significance of $p < 0.05$ is considered statistically significant.

Results

Of 900 delivered survey questionnaires 703 or 78% of them were returned for further processing, of equal distribution in terms of gender. Average age of the subjects was 42.23 years of age. According to median, one half of the subjects were 44 years old or younger, whereas the other half was 44 years old or older (Table 1).

For the requirements of the analysis the subjects were divided in three age groups (Table 2).

Average age of male and female subjects was only slightly different. The median value calculated for male

TABLE 1
DISTRIBUTION OF SUBJECTS BY GENDER

Gender	Number of subjects	Percentage
Male	346	49.22
Female	357	50.78
Total	703	100.00

TABLE 2
DISTRIBUTION OF SUBJECTS BY AGE GROUPS

Age group (full age reached)	Number of subjects	Percentage
20–34	243	34.57
35–49	211	30.01
50–69	249	35.42
Total	703	100.00

TABLE 3
STATISTICAL INDICATORS PERTAINING TO THE AGE OF THE SUBJECTS IN CONNECTION WITH GENDER

Statistical indicator	Gender	
	male	female
Number of information	346	357
Arithmetic mean	43.47	42.99
Median	44.00	43.00
Standard deviation	14.16	14.62
Variation coefficient	32.57	34.01

subjects was only 1 year higher than for the female subjects. Also, the youngest and the oldest male and female subject were of same age. The calculated values of standard deviation and variation coefficient show a somewhat greater dispersion of data in the distribution of female subjects by age (Table 3).

Male and female subjects were approximately equally represented in all three age groups (Table 4).

Based on the criteria for irritable bowel and the scoring algorithm for irritable bowel syndrome, 205 of 703 subjects or 29.16% showed signs of irritable bowel (Table 5).

Based on the results reached, one can conclude that irritable bowel syndrome is more prevalent in women. Namely, by applying the chi-square test one can accept the hypothesis on the existence of correlation between gender and prevalence of irritable bowel syndrome ($\chi^2 = 19.931$, $p = 0.000$). Correlation of the analyzed characteristics has also been confirmed by using the Yates's correction ($\chi^2 = 19.196$, $p = 0.000$) (Table 6).

The research did not confirm the hypothesis of the existence of correlation between age groups and prevalence

* the symptoms must be present for at least 3 months with the beginning of symptoms at least 6 months prior to the diagnosis.

TABLE 4
DISTRIBUTION OF SUBJECTS BY AGE GROUPS AND GENDER

Age group	Gender		Total
	male	female	
20–34	120	123	243
column percentage	34.68%	34.45%	
row percentage	49.38%	50.62%	
35–49	102	109	211
column percentage	29.48%	30.53%	
row percentage	48.34%	51.66%	
50–69	124	125	249
column percentage	35.84%	35.01%	
row percentage	49.80%	50.20%	
Total	346	357	703

TABLE 5
DISTRIBUTION OF SUBJECTS IN TERMS OF PREVALENCE OF SIGNS OF IRRITABLE BOWEL SYNDROME

IBS	Number of subjects	Percentage
no	498	70.84
yes	205	29.16
Total	703	100.00

of irritable bowel syndrome ($\chi^2 = 1.143$, $p = 0.565$), nor the hypothesis of the existence of correlation between age groups and prevalence of IBS in men ($\chi^2 = 2.294$, $p = 0.318$), nor a possible hypothesis of existence of correlation between age groups and prevalence of IBS in women ($\chi^2 = 2.201$, $p = 0.333$).

The research did not confirm the hypothesis of the correlation between Osječko-baranjska County as region of birth and prevalence of IBS ($\chi^2 = 1.647$, $p = 0.199$), which pertains to both male subjects ($\chi^2 = 0.049$, $p = 0.824$) and female subjects included in the research. ($\chi^2 = 3.43$, $p = 0.064$). Lack of correlation of the analyzed characteristics was confirmed by using the Yates’s correction ($\chi^2 = 19.196$, $p = 0.194$).

There is a somewhat greater share of subjects showing signs of IBS among those who live in rural regions compared to those who live in towns. The chi-squared test shows that one cannot accept the hypothesis of the existence of correlation between the current place of residence and prevalence of irritable bowel syndrome ($\chi^2 = 0.035$, $p = 0.852$). Independence of the analyzed characteristics was confirmed by using the Yates’s correction ($\chi^2 = 0.01$, $p = 0.922$), which pertains both to men and women included in the research.

Even though the greatest percentage of subjects showing signs of irritable bowel syndrome was found in the group who had finished primary school education (possible answers: not finished primary school education, primary school education, secondary school education, higher education, university education) and the least percentage in the group who had not finished their primary school education, the chi-square test shows that the hypothesis of existence of correlation between the level of education and prevalence of IBS cannot be accepted ($\chi^2 = 5.576$, $p = 0.233$), which pertains to both male and female subjects.

The greatest share of subjects showing signs of irritable bowel is in the group of persons who live together out

TABLE 6
DISTRIBUTION OF SUBJECTS BY GENDER AND PREVALENCE OF SIGNS OF IRRITABLE BOWEL

Gender	IBS		Total
	no	yes	
male	272	74	346
column percentage	54.62%	36.10%	
row percentage	78.61%	21.39%	
female	226	131	357
column percentage	45.38%	63.90%	
row percentage	63.31%	36.69%	
Total	498	205	703

TABLE 7
BASIC INDICATORS OF DESCRIPTIVE STATISTICS WITH T-TEST RESULTS

Variable	IBS				t-test	
	No		Yes		t	p
	Mean	Standard deviation	Mean	Standard deviation		
Age	43.821	14.379	41.780	14.337	1.712	0.087
Number of years of living in the current place of residence	31.879	16.859	31.371	16.732	0.359	0.720
Height (cm)	174.267	9.697	171.790	10.416	3.011	0.003
Weight (kg)	79.627	15.554	75.551	16.726	3.088	0.002
BMI (kg/m ²)	26.831	3.882	25.059	4.343	5.706	0.000
Number of members in the household	3.003	1.691	3.118	1.738	-0.887	0.375
Estimate of material status of the household [*]	3.136	0.739	3.056	0.713	1.457	0.145
Estimate of the health condition ^{**}	3.682	0.953	3.672	0.852	0.144	0.886

*3=average; ** 3=neither satisfied nor unsatisfied, and 4=pretty satisfied

of wedlock, (possible answers: single, married, living together out of wedlock, divorced, widower/widow) and the smallest is in the group of divorced persons. Chi-square test also show that the hypothesis of existence of correlation between marital status and prevalence of irritable bowel syndrome cannot be accepted ($\chi^2=3.745$, $p=0.442$), which pertains to both male and female subjects.

As part of the analysis t-test was used to test the hypothesis of equal average age, number of years of living in the current place of residence (village, town), height, weight, BMI (kg/m²<18.5 malnutrition, 25–29.9 normal body weight, 30 or more obesity), number of members in the household, (up to 18 years of age, between 19 and 64, and 65 and older), estimate of the material status (much worse than average, somewhat worse than average, average, somewhat better than average, much better than average) and estimate of the health condition (very unsatisfied, pretty unsatisfied, neither unsatisfied nor satisfied, pretty satisfied, very satisfied) in persons with IBS and persons not showing signs of IBS.

The results of the t-test showed statistically significant differences between average height, weight and BMI of persons showing signs of IBS and those not showing signs of IBS. Persons showing signs of IBS were, on average, shorter and had lower body weight and BMI than persons not showing signs of IBS (Table 7).

The logistic regression model was used in this paper with the purpose to predict the risk of irritable bowel, that is, to identify the variables which have a significant effect on its occurrence. The variable defined as risk of irritable bowel represented a dependent (criterion) variable in the logistic regression model. As independent (predictor) variables the following variables were defined: gender; age; region of birth; current place of residence; height; weight; BMI; level of education; marital status; number of members in the household; estimate of material status; estimate of health condition.

In this research the logistic regression model was made without the selection procedure, i.e. all predictor variables were introduced in the model at the same time (Table 8).

Table 9 contains indicators which pertain to the constant and all variables included in the model.

B represents the estimated coefficient in the logistic regression model, and with it there is the related standard error. Wald statistics are used to determine the importance of the contribution of each variable or constant. Exp(B) greater than 1 increases the risk of irritable bowel, and lower than 1 decreases the risk.

Based on the results reached one can conclude that three variables are statistically significant: gender, number of members in the household and estimate of the health condition.

According to the results reached, with other conditions unchanged, women have 2.101 times greater chance of risk than men. Apart from that, it is more likely that a person living in a household with more members will belong in the risk group. Namely, with the increase of the number of members of the household by one person the chance of risk of irritable bowel increases 1.139 times. Also, if the estimate of the health condition increases by one level (from very unsatisfied to very satisfied), the chances of risk will increase 0.537 times.

The calculated approximation of determination coefficients in our case, according to Cox & Snell amounted to R² 0.105, and according to Nagelkerke R² 0.15, which shows a weak correlation between the dependent and the independent variables.

The model correctly classified 464 subjects without risk of irritable bowel and 41 subjects with risk of irritable bowel, whereas 34 subjects without risk of irritable bowel and 164 subjects with risk of irritable bowel were not classified correctly. Since 71.8% of persons were in

TABLE 8
PARAMETERS OF THE LOGISTIC REGRESSION MODEL

Constant and variables	B	Standard error	Exp(B)	Wald	Degree of freedom	p
Constant	13.104	10.106	490868.891	1.681	1	0.195
Gender (1)	0.742	0.267	2.101	7.741	1	0.005
Age	-0.012	0.009	0.988	1.747	1	0.186
Region of birth (1)	-0.175	0.235	0.839	0.559	1	0.455
Current place of residence (1)	0.068	0.204	1.070	0.111	1	0.739
Height	-0.075	0.059	0.928	1.640	1	0.200
Weight	0.083	0.063	1.086	1.746	1	0.186
BMI	-0.269	0.186	0.764	2.086	1	0.149
Level of education				5.039	4	0.283
Level of education (1)	1.480	0.848	4.392	3.045	1	0.081
Level of education (2)	1.081	0.834	2.946	1.677	1	0.195
Level of education (3)	1.184	0.870	3.267	1.851	1	0.174
Level of education (4)	0.861	0.868	2.365	0.983	1	0.321
Marital status				4.358	4	0.360
Marital status (1)	-0.252	0.268	0.777	0.885	1	0.347
Marital status (2)	0.701	0.556	2.016	1.590	1	0.207
Marital status (3)	0.008	0.524	1.008	0.000	1	0.988
Marital status (4)	0.140	0.479	1.151	0.086	1	0.769
Number of members of household	0.131	0.056	1.139	5.403	1	0.020
Estimate of material status	0.145	0.139	1.157	1.091	1	0.296
Estimate of health condition	-0.622	0.105	0.537	34.867	1	0.000

TABLE 9
BASIC INDICATORS OF DESCRIPTIVE STATISTICS WITH T-TEST RESULTS

Variable	IBS				t-test	
	No		Yes		t	p
	Mean	Standard deviation	Mean	Standard deviation		
Presence of blood in stool	1.048	0.224	1.122	0.370	-2.660	0.008
Black stools	1.070	0.256	1.220	0.460	-4.377	0.000
Vomiting blood	1.004	0.063	1.024	0.288	-1.004	0.316
Difficulty in swallowing	1.070	0.286	1.229	0.455	-4.641	0.000

fact classified correctly, the model can be considered partly satisfactory (Figure 1).

Figure 1 shows the ROC curve. ROC curve presents the discriminatory power of the analyzed model. The area under the ROC curve is 0.703, which also shows a medium level of prediction power of the model.

Symptoms indicating structural changes (blood in stool, black stool, vomiting blood, difficulty in swallowing) and IBS were valued by the subjects with ratings 1 to 5 (1 – never or rarely, 2 – sometimes, 3 – often, 4 – most of the time, 5 – always) (Table 9).

The average values which subjects with signs of irritable bowel used to estimate the presence of individual symptoms which indicate structural changes, and which

require prompt further diagnostic treatment, are greater than the average values used by the subjects without any signs of irritable bowel to estimate the presence of such symptoms. According to the t-test results there is a statistically significant difference between average estimates of presence of blood in stool during last 3 months, black stool during last 3 months and difficulty in swallowing during last 3 months in persons showing signs of irritable bowel and persons not showing any signs of irritable bowel. Persons with signs of IBS had on average higher values of symptoms indicating changes in comparison with the subjects in the control group.

There is a great share of subjects showing signs of irritable bowel among those who have been diagnosed with

anaemia. Testing the hypothesis that the two characteristics are mutually independent shows that a possible hypothesis of existence of correlation between the two can be accepted ($\chi^2=10.924$, $p=0.001$). Correlation between the analyzed characteristics was also confirmed by using the Yates's correction ($\chi^2=9.971$, $p=0.002$).

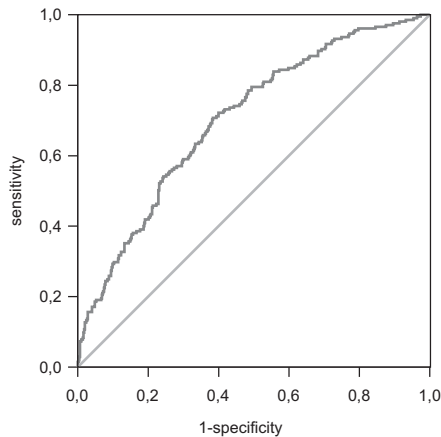


Fig. 1. ROC curve

In our research, in a total of 205 subjects showing signs of IBS the correlation between the feeling of anxiety and depression, and the suicidal wish during the week which preceded the survey was recorded in 54.53 and 27 subjects or in 26.34%, 25.85% and 13.17% of cases. In addition, 30 or 14.63% of them had been psychologically, physically or sexually abused in the past. In subjects with signs of irritable bowel who experienced pains (20 or 9.76% of them) there is greater number of those who had the sensation that it will never get better (67 or 32.68% of them).

Discussion

The research included 703 subjects, of which 346 male (49.22%) and 357 (50.78%) female. Average age of the subjects was 42.23 years of age. Average ages of male and female subjects were only slightly different. The prevalence of the irritable bowel syndrome was recorded in 29.16% of the subjects, in men in 21.39% and in women in 36.69% of cases. There is greater prevalence of IBS in women, ($\chi^2=19.931$, $p=0.000$), which was also confirmed by applying the Yates's correction.

According to the t-test results, statistically significant differences were found between average height, weight and BMI of persons showing signs of IBS and those not showing signs of IBS. Persons with signs of IBS were on average shorter, weighed less and had a lower BMI than those not showing signs of IBS.

By applying the linear regression model one can conclude that, when it comes to the risk of IBS, three variables have statistical significance: gender, number of members in the household and estimate of health condition. Women have 2.101 times greater risk of IBS than

men, by increasing the number of members in the household the risk of irritable bowel increases 1.139 times, and with a higher self-estimated level of the health condition the risk decreases (for each higher level of health condition there is an increase of 0.537 times).

According to the results of the t-test there is a statistically significant difference between average ratings of presence of blood in the stool during last 3 months, black stool during last 3 months and difficulty in swallowing during last 3 months between persons showing signs of irritable bowel and those not showing signs of irritable bowel. Persons showing signs of IBS had on average higher values of symptoms indicating structural changes in comparison with the subjects in the control group.

Apart from our research, two studies on the prevalence of irritable bowel syndrome and its characteristics have been conducted so far in Croatia, in Zagreb and in Bjelovarsko-bilogorska County. Questions in connection with anthropometric, demographic and socioeconomic characteristics were not harmonized in our studies, ROME III questionnaires were applied in the research in Osječko-baranjska County and Bjelovarsko-bilogorska County, and ROME II questionnaire in Zagreb.

Research in the area of Zagreb with 500 subjects, conducted by M. Baretić in 2002, showed a high prevalence of IBS (28%), of which 10% in men and 18% in women. Age, education and life in an urban or rural region had no effect on the prevalence of the irritable bowel syndrome. Logistic regression showed the effect of gender, age and body mass index on increased risk of developing irritable bowel syndrome, relative risk of developing IBS in women is 165% greater than in men, and the increase of BMI by 5 kg/m² increased the risk of IBS by 36%. BMI was tagged as a possible new factor in the prevalence of IBS²³.

In the other study, which was conducted in Bjelovarsko-bilogorska County in 2008, on the effect of environmental factors on the occurrence of irritable bowel syndrome, in 264 subjects tested by Rome III questionnaire there was a prevalence of 26.52%, (22.33% in men and 29.19% in women). It was determined that the disorder is more frequent in women, especially in the age group of 50–63 years of age. Irritable bowel syndrome was more frequently recorded in persons with a lower level of education, those living in rural regions, those unemployed due to illness, in younger population living in the town, in married persons with a higher level of education²⁴.

Analysis by means of t-test showed that the subjects with IBS are shorter than the IBS-negative subjects. A greater risk of developing IBS was recorded in female subjects belonging to the age group of 50–64 years of age, persons with excessive body weight (BMI>25), lower level of education and those living in a rural region.

Our research recorded a higher prevalence of IBS in comparison with the research conducted in Zagreb and Bjelovarsko-bilogorska County, which is especially expressed in women (36.69%), whereas in Bjelovarsko-bilo-

gorska County prevalence in women was recorded in 29.19% of cases, and in Zagreb it was 18%^{23,24}.

Even though the connection between anthropometric, demographic and socioeconomic characteristics in the research areas cannot be fully compared due to lack of harmonization of questions, some common factors relevant for the development of IBS were determined, such as gender and lower level of education, and they, together with the other determined risk factors, determine the risks of developing IBS in the research areas.

The recorded prevalence of IBS in Osječko-baranjska County is significantly higher in comparison with the research conducted elsewhere in the world, where it was recorded in about 10% to 20% of adult population; however, the ratio of prevalence in women in comparison with men in persons with IBS is similar. Most IBS studies found greater prevalence in women than in men, in a 2:1 ratio, which was also confirmed in our research. Women have 2.101 times greater chance of developing IBS than men^{17,18}. It most frequently occurs in younger age groups, between 25 and 50 years of age^{19–22}.

So, for example, in Italy the prevalence of irritable bowel was recorded in 12%, in Great Britain in 6.2%^{17,18}, in the United States the prevalence of irritable bowel syndrome was recorded in 12 to 15%^{25,26}, in Canada 12.1%²⁷, Korea 5.6%²⁸, Turkey in 10.2%²⁹, Japan (Tokyo) in 9.8%³⁰, China (Beijing) 6.44%³¹, Singapore in 8.6%³², Israel in 2.9%³³, Columbia 19.9%³⁴.

Even though the levels of prevalence mentioned above are significantly lower than the prevalence of IBS in our research, the recorded differences in prevalence in the conducted studies are partly conditioned by the lack of harmonization of the definition of IBS, lack of harmonization of criteria and questionnaires (Rome II, Rome III, Manning), and the data collection method.

Research has shown that IBS appears more frequently in persons with a generally bad health condition, lower socioeconomic status and education, irregular eating habits, insufficient physical activity and increased body weight, and the patients suffering from IBS show a diminishing of work ability and the quality of life in general^{35–39}. Our research also shows a greater risk of developing IBS in persons with a poorer health condition, bigger number of members in the household, but it is not connected with the level of education.

The evaluation and treatment of acute abdominal pain patients referred acutely by GPs account significantly the workload of the acute surgical service. The symptoms alone does not allow a correct diagnosis, and a prerequisite for management of this problem is a screening procedure. Rome III diagnostic questionnaires for

functional gastrointestinal disorders could be valid for improvement that problem⁴⁰.

Exposure to psychological, physical and sexual abuse in the past, and the intensity and duration of the abuse are closely connected with the occurrence and intensity of the symptoms^{41–42}.

Patients show signs of anxiety and depression more frequently than the persons without any signs of IBS, the symptoms of depression in persons with IBS have been recorded in 17% of cases, and a general anxiety is 4.7 times more frequent than in persons who do not suffer from IBS^{41–50}.

In our research the connection between the feeling of anxiety and depression in subjects showing signs of IBS was determined in 26.34% and 25.85% of cases, and exposure to psychological, physical and sexual abuse in the past was present in 14.63%.

Conclusion

The research of the prevalence of irritable bowel syndrome in Osječko-baranjska County shows that IBS is an important health problem, because the prevalence of IBS was recorded in 29.16% of cases, in men in 21.39% and in women in 36.69% of cases. Chi-square testing shows a greater prevalence of IBS in women.

Persons showing signs of IBS were on average shorter, weighed less and had a lower BMI than persons not showing signs of IBS.

The risk of developing IBS is greater in women, in persons living with a bigger number of members in the household and in those with a poorer health condition.

The connection of the feeling of anxiety and depression in the subjects with signs of IBS was determined in 26.34% and 25.85% and exposure to psychological, physical and sexual abuse in the past was present in 14.63% of cases.

The subjects showed a high level of motivation to participate in IBS research, since 703 out of 900 or 78% of the subjects returned a completely filled in questionnaire for further analysis.

Rome III survey questionnaire proved to be an acceptable method for diagnosing IBS and for separating persons showing signs of structural changes where further diagnostic treatment must be applied immediately. However, for population studies questionnaire should be expanded by a greater number of questions about the socioeconomic status.

Research has shown that there is a need to apply a uniform questionnaire on anthropometric, demographic and socioeconomic characteristics of IBS in Croatia.

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ANTROPOLOŠKE, DEMOGRAFSKE I SOCIOEKONOMSKE KARAKTERISTIKE SINDROMA IRITABILNOG KOLONA

SAŽETAK

Sindrom iritabilnog kolona (SIC-a) spada među najčešće funkcijske poremećaje probavnog sustava (FPPS-a) uz prevalenciju u 10 do 20%, slučajeva u nekim razvijenijim zemljama. Rome Foundation napravila je Rome III kriterije, dijagnostičke upitnike i algoritam bodovanja za FPPS, primjenjive u kliničkoj praksi i populacijskim studijama. Cilj ovog istraživanja je utvrditi proširenost SIC-a na području Osječko-baranjske županije i utjecaj antropometrijskih, demografskih i socioekonomskih čimbenika. 703 ispitanika izabranih sistematskim uzorkom ispunili su Rome III dijagnostički upitnik za SIC-a. Prevalencija SIC-zabilježena je u 29,16%, kod muškaraca u 21,39%, kod žena u 36,69%, anksioznost i depresivnost u 26,34% i 25,85%. Osobe sa SIC-a imale su prosječno manju visinu i tjelesnu težinu i niži BMI od osoba bez znakova SIC-a. Žene imaju 2,101 puta veće izgleda za rizik SIC-a, a povećanjem broja članova u domaćinstvu rizik od SIC-a raste 1,139 puta. Rim III anketni upitnik prihvatljiva je metoda za postavljanje dijagnoze SIC-a i izdvajanje za daljnju obradu osoba sa znacima strukturnih promjena.