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Exploration of personality in the patients with the inflammatory bowel disease

Istraživanje osobina ličnosti obolelih od hroničnih zapaljenskih bolesti creva

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Abstract

Background/Aim. Inflammatory bowel diseases (IBD), which include the ulcerative colitis (UC) and the Crohn's disease (CD), are chronic diseases, the course of which is under the influence of numerous psychosocial factors. The aim of this study was the exploration of the personality traits of patients with IBD. **Methods.** This cross-sectional study has been conducted at the University Clinical Hospital Centre Zvezdara, Belgrade, Serbia. The study involved 150 patients suffering from IBD of both genders, out of which 50.7% and 49.3% of the patients suffering from UC and CD, respectively. The main inclusion criteria were: age 18 to 65 years and confirmed the diagnosis of UC or CD in remission. The sociodemographic and disease related data were collected from the hospital medical records. The personality traits related data were collected using the self-report forms of The Revised NEO Personality Inventory (NEO PI–R) and the inventory for the Assessment of Dysregulation (DELTA 10). **Results.** At the domain-level, the significant differences between IBD sample and normative sample were found in the Neuroticism ($p < 0.01$) and the Disintegration ($p < 0.01$). At the facet-level, the IBD sample scored significantly higher than the normative sample on Anxiety ($p < 0.01$), Assertiveness ($p < 0.01$), Tender-Mindedness ($p < 0.01$) and Dutifulness ($p < 0.01$), and the significantly lower scores on Warmth ($p < 0.01$), Excitement Seeking ($p < 0.01$), Positive Emotion ($p < 0.01$), Actions ($p < 0.01$), and on the all facets of Disintegration except Depression, Somatoform Dysregulation and Social Anhedonia ($p < 0.01$). The differences between UC and CD were found only at the facet-level. The facets that adds the most predictive power to the discriminative function is the General Executive Impairment, followed by Warmth, Self-Discipline, Depression and Mania. **Conclusion.** The IBD patients showed to differ from the general population in terms of basic personality structure at the domain-level, and at the facet-level. The differences between the UC and CD patients can be found only at the facet-level. Screening of the personality traits and early detection of the IBD patients who are at a greater risk of mental disorders and bad psychosocial functioning can enable their adequate prevention and improve the course of the disease.

Key words:
inflammatory bowel diseases; colitis ulcerative; crohn disease; personality; surveys and questionnaires.

Apstrakt

Uvod/Cilj. Zapaljenske bolesti creva (ZBC) koje uključuju ulcerozni kolitis (UK) i Kronovu bolest (KB) su hronične bolesti čiji je tok pod uticajem brojnih psihosocijalnih faktora. Cilj našeg istraživanja je bio ispitivanje crta ličnosti obolelih od ZBC. **Metode.** Ova opservaciona studija preseka je sprovedena u Univerzitetskom kliničkom bolničkom centru „Zvezdara", Beograd, Srbija. U studiju je bilo uključeno 150 osoba obolelih od ZBC, oba pola, sa dijagnozama UK (50,7%) i KB (49,3%). Glavni kriterijumi za uključivanje su bili: starost od 18 do 65 godina i dijagnostikovani UK ili KB u fazi remisije. Za sve ispitanike su iz bolničke medicinske dokumentacije prikupljeni sociodemografski i podaci o bolesti. Procenjivanje crta ličnosti obavljeno je primenom upitnika za samoprocenu *the Revised NEO Personality Inventory* (NEO PI – R- Revised) i Upitnika za procenu dezintegracije (DELTA 10). **Rezultati.** Na nivou domena, značajne razlike između obolelih od ZBC i normativnog uzorka nađene su na Neuroticizmu ($p < 0,01$) i Dezintegraciji ($p < 0,01$). Na nivou faceta, u poređenju sa normativnim uzorkom, oboleli od ZBC su imali značajno više skorove na facetima Anksioznost ($p < 0,01$), Asertivnost ($p < 0,01$), Blaga narav ($p < 0,01$) i Dužnost ($p < 0,01$) i značajno niže skorove na facetima Toplina ($p < 0,01$), Potraga za uzbuđenjem ($p < 0,01$), Pozitivne emocije

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($p < 0,01$), Akcija ($p < 0,01$), kao i na svim facetima Dezintegracije osim Depresije, Somatoformne disregulacije i Socijalne anhedonije ($p < 0,01$). Razlike između UK i KB nađene su samo na nivou faceta. Faceti koji najviše doprinose prediktivnoj snazi diskriminativne funkcije su Opšta egzekutivna disfunkcija, za kojom slede Toplina, Samodisciplina, Depresija i Manija. **Zaključak.** Oboleli od ZBC se po strukturi ličnosti razlikuju od opšte populacije na nivou domena i na nivou faceta. Razlike između UK i KB su nađene samo na nivou faceta. Rutinska provera crta ličnosti i rana detekcija onih ZBC bolesnika koji su u većem riziku za razvoj mentalnih poremećaja i lošeg psihosocijalnog funkcionisanja može omogućiti njihovu adekvatnu prevenciju i poboljšanje toka bolesti.

Ključne reči:
creva, zapaljenske bolesti; kolitis, ulcerativni; kronova bolest; ličnost; ankete i upitnici.

Introduction

The chronic inflammatory bowel diseases (IBD), which include the Crohn's disease (CD) and the ulcerative colitis (UC), are chronic diseases of the gastrointestinal tract, of the unknown etiology and not enough clarified pathogenesis which usually begins in early adulthood. The course of IBD is unpredictable and characterized by episodes of relapse and remissions. Incidence and prevalence of IBD have increased in all regions of the world [1], including the Eastern Europe [2], thus becoming a significant health issue. Based on the current knowledge, IBD is the result of interaction between the genetic predisposition and the environmental factors [3, 4]. The holistic biopsychosocial model of the disease [5] observes the impact of the psychosocial factors on the occurrence and the course of the disease. According to the latest European Crohn's Colitis Organization (ECCO) guidelines, there are no reliable data on the correlation between the psychosocial factors and the IBD etiology, but they could affect the course of the disease [6]. Although the results of the recent studies are controversial, a large number of them shows that stress, anxiety and depression are risk factors for the disease relapse [7], low health-related quality of life [8] and low adherence [9].

The personality is a significant predictor of psychosocial functioning and physical health. The personality traits, being the basic units of the personality structure, can be defined as the biologically determined predispositions of an individual for relatively permanent thinking patterns, feelings and behaviour in similar life situations. They can be evaluated through the personality inventory in which they are structured into domains [10]. The Five Factor Model (FFM) of personality is nowadays a predominant paradigm in the personality psychology. The model assumes the existence of five basic personality dimensions (Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness), seen as five biological dispositions [10, 11]. Also, the major effects of individual traits may be modified through their mutual interaction [12]. However, the FFM does not include the adaptively important phenomena of behavior, which would suggest the existence of a special regulatory mechanism, outside the premises of the FFM, but which lies in the basis of integration/disintegration of the psychic processes. For the purpose of a more detailed exploration of the basic personality structure, FFM was supplemented with the Disintegration as the sixth, basic dimension of personality, which refers to the psychosis proneness [13]. Thus, within this model, the basic personality structure was defined by the Five Factor Model [11] and Disintegration [13, 14].

A number of studies within the health psychology suggested that the personality traits significantly correlate with the various health aspects and reactions to the disease including the somatic complaints, reaction to stress, anxiety, depression and coping strategies [15]. Numerous studies of the personality traits of those suffering from IBD, and their relation to the psychological factors which affect the course of the disease give controversial results [16–18]. According to the available knowledge about the relations between the personality traits and the psychosocial functioning of the patients on the one hand and the effect of the psychosocial factors on the course of IBD on the other, further research of the personality traits are necessary among those suffering from IBD.

The aim of our study was to investigate the personality traits of patients with IBD in remission.

Methods

Study design / Setting / Participants

The study was designed as an observation cross-sectional and was conducted at the Clinical Hospital Centre "Zvezdara" in Belgrade, Serbia. The sample consisted of 150 patients with IBD and it was divided into two subgroups according to the type of diagnosis: UC (N = 76) and CD (N = 74). The inclusion criteria were: age from 18 to 65 years, diagnosed with UC or CD in the remission confirmed by a gastroenterologists (based on the recommended clinical, radiological, endoscopic and histological criteria [3, 4, 19–21], the absence of other chronic diseases, the absence of current or previous psychiatric morbidity and treatment, the ability to fill in the questionnaire and accept participation in the research. The exclusion criteria were: CD or UC in relapse confirmed by a gastroenterologist [19–21], the presence of other chronic somatic illnesses, inability to fill in the questionnaire (illiteracy, blindness, significant mental handicap), and rejection of participation in the study. The patients who met the inclusion criteria were invited to participate in the study and received verbal and written information about the study. All patients are provided the written informed consent before enrolling in the study.

Data sources / Instruments

Sociodemographic data (gender, age, education level, employment status, marital status, children, place of residence) and disease-related data (type of diagnosis, age at diagnosis, duration of the disease, the total number of relapses

since the onset of disease), were obtained from the hospital medical records. The personality traits related data were collected using the self-report forms of the instruments:

The Revised NEO Personality Inventory (NEO PI - R)

The questionnaire was designed to operationalize the Five Factor Model (FFM) of personality [11, 22]. NEO PI-R measure the five broad basic dimensions (domains) each of which is represented and measured by the six lower-level traits (facets): Neuroticism (N) – anxiety, hostility, depression, self-consciousness, impulsiveness, vulnerability, Extraversion (E) – warmth, gregariousness, assertiveness, activity, excitement seeking, positive emotion, Openness (O) – fantasy, aesthetics, feelings, action, ideas, values, Agreeableness (A) – trust, straightforwardness, altruism, compliance, modesty, tender-mindedness and Conscientiousness (C) – competence, order, dutifulness, achievement striving, self-discipline, deliberation [10]. The instrument consisted of 240 five-point Likert-type items, with 48 items measuring each of five broad dimensions (8 per facet). The instrument was translated into Serbian and empirically tested on a normative sample in Serbia [23].

DELTA 10

DELTA 10 is the inventory for the assessment of general proneness to psychosis named Disintegration [13, 14]. The instrument measures ten facets: General Executive Impairment (GEI), Perceptual Distortions (PD), Paranoia (P), Depression (D), Flattened Affect (FA), Mania (M), Somatoform Dysregulation (SOD), Enhanced Awareness (EA), Social Anhedonia (SA), and Magical Thinking (MT). The instrument consists of 120 five-point Likert-type items. DELTA 10 showed to be a sound measure of Disintegration [14].

Statistical analysis

Descriptive statistical measures were calculated and presented for all relevant sociodemographic and disease-related characteristics, as well as each personality domain and facet. The data were presented as the arithmetic mean ± standard deviation for continues variables and as the absolute number and percentages for discrete variables. In all analyses, the two-tailed tests were used. The *P* values estimated by the independent sample *t*-test for equality of means and by the χ^2-test to compare proportions. A normality of distribution was tested using the Kolmogorov-Smirnov test. The α – Cronbach alpha was used to measure the reliability of the instruments. The stepwise discriminant canonical analysis was used in order to examine personality-based differences between UC and CD. In order to make a comparison between personality traits of the IBD patients and the general population a series of *t*-tests were calculated for each personality domain and facet, along with the Cohen's effect size measure. For the purpose of this analysis we used data obtained from the IBD patients within this study as well as the normative sample data [23, 14]. Following the mean differences calculation for each domain and facet, due to the multiple comparisons made, the Bonferroni correction was used. The data were analyzed using the IBM SPSS 21 statistical package.

Ethical consideration

The study was approved by the local Research Ethics Committee of the University Clinical Hospital Center Zvezdara, and by the Ethics Committee of the Faculty of Medicine, the University of Belgrade, Serbia (No. 29/II-18). The written informed consents were obtained from all participants in this study. The study was conducted in accordance with the Helsinki Declaration.

Results

The study involved 150 IBD patients of both genders (49.3% females). The sample consisted of two subgroups of participants according to the type of diagnosis: UC (50.7%) and CD (49.3%). The sociodemographic characteristics of the whole sample and two subsamples are provided in Table 1. The majority of the whole sample consisted of the secondary school graduated (52%), and the university educated individuals (36.7%), while a smaller part of the sample reported finishing only elementary school (4%), or higher school (7.3%). Sixty-seven percent of participants were employed, 28.7% were unemployed, while 4.7% of participants were retired. The majority of participants are married/cohabiting (44%), 38.7% reported as not married, while 15.3% of them were divorced/separated and 2% were widower. The majority of participants were living in urban area (96.0%). As shown in Table 1, there were no significant differences between UC and CD subsamples with respect to the sociodemographic characteristics ($p > 0.05$).

The disease-related characteristics of the whole sample and two subsamples are provided in Table 2. There were no significant differences between UC and CD subsamples with respect to the age of onset of disease, disease duration and the total number of relapses from onset of disease.

The descriptive characteristics of NEO PI-R and Disintegration domains and their respective facets for the whole sample (IBD) and subsamples (UC and CD) are summarized in Table 3. The Cronbach's alpha was used to measure reliability of the instruments.

The differences in NEO PI-R and Disintegration scores between whole sample (IBD) and the normative sample of Serbia [14, 23] are provided in Table 4. At the domain level, the statistically significant differences were observed only in Neuroticism ($p < 0.01$) and Disintegration ($p < 0.01$). The differences between the IBD sample and the normative sample in relation to other domains were not statistically significant. The patients with IBD were characterized by the higher scores on Neuroticism and lower scores on Disintegration than the normative sample. At the Neuroticism domain, the Anxiety facet made the largest contribution to the discrepancy between the IBD sample and the normative sample. Compared to the normative sample, the IBD patients scored significantly higher on the Assertiveness facet of Extraversion ($p < 0.01$), while at the same time achieved the significantly lower scores on Warmth, Excitement Seeking and Positive Emotionality facets within the Extraversion domain ($p < 0.01$).

Table 1

Sociodemographic characteristics of the inflammatory bowel disease (IBD) sample and the subsamples (ulcerative colitis – UC and Chron's disease – CD)

Variable	Whole sample (n = 150)	UC subsample (n = 76)	CD subsample (n = 74)	*p*-value
Current age (years)				
mean ± SD	37.16 ± 11.48	36.79 ± 12.84	37.54 ± 9.97	
range	19–63	19–63	20–63	
Gender, n (%)				
male	76 (50.7)	40 (52.6)	36 (48.6)	0.626
female	74 (49.3)	36 (47.4)	38 (51.4)	
Education (years), n (%)				
elementary (1–8)	6 (4.0)	4 (5.3)	2 (2.7)	
secondary (9–12)	78 (52.0)	39 (51.3)	39 (52.7)	0.862
higher school (13–16)	11 (7.3%)	6 (7.9)	5 (6.8)	
university (≥ 16)	55 (36.7)	27 (35.5)	28 (37.8)	
Employment status, n (%)				
unemployed	43 (28.7)	28 (36.8)	15 (20.3)	
employed	100 (66.7)	44 (57.9)	56 (75.7)	0.064
retiree	7 (4.6)	4 (5.3)	3 (4.0)	
Marital status, n (%)				
single (never married)	58 (38.7)	31 (40.8)	27 (36.5)	
married/cohabiting	66 (44.0)	35 (46.1)	31 (41.9)	0.398
divorced/separated	23 (15.3)	8 (10.5)	15 (20.3)	
widowed	3 (2)	2 (2.6)	1 (1.3)	
Children, n (%)				
having children	73 (48.7)	40 (52.6)	33 (44.6)	0.325
not having children	77 (51.3)	36 (47.4)	41 (55.4)	
Place of residence, n (%)				
rural area	6 (4.0)	4 (5.3)	2 (2.7)	0.424
urban area	144 (96.0)	72 (94.7)	72 (97.3)	

SD – standard deviation; *p* – values estimated by the independent sample *t*-test for equality of means and by the χ^2 test to compare proportions.

Table 2

Disease-related characteristics of the inflammatory bowel disease (IBD) sample and the subsamples (ulcerative colitis – UC and Chron's disease – CD)

Variable	Whole sample (n =150)	UC subsample (n = 76)	CD subsample (n = 74)	*p*-value
Age at the onset of disease (years)				
mean ± SD	29.25 ± 10.49	29.30 ± 11.75	29.19 ± 9.08	0.947
range	14–60	14–60	14–58	
Duration of disease (months)				
mean ± SD	96.50 ± 92.73	92.47 ± 101.14	100.64 ± 83.72	0.592
range	2–420	2–420	2–335	
Total number of relapses				
mean ± SD	3.98 ± 2.77	3.86 ± 2.78	4.11 ± 2.79	0.579
range	1–15	1–15	1–15	

SD – standard deviation; *p* – values estimated by the independent sample *t*-test.

Table 3
Descriptive characteristics of NEO PI-R + Disintegration domains and their respective facets for the whole sample (IBD) and subsamples (UC and CD)

Domains and facets	Whole sample (IBD) (n = 150)	α	UC subsample (n = 76)	α	CD subsample (n = 74)	α
	mean ± SD		mean ± SD		mean ± SD	
Neuroticism (N)	95.48 ± 21.75	0.897	96.14 ± 21.85	0.892	94.80 ± 21.77	0.904
anxiety	19.05 ± 5.57	0.764	19.34 ± 5.55	0.756	18.74 ± 5.62	0.776
hostility	15.06 ± 5.00	0.696	14.96 ± 5.43	0.740	15.16 ± 4.56	0.636
depression	15.06 ± 5.74	0.759	14.86 ± 5.52	0.707	15.27 ± 5.99	0.807
self-consciousness	16.27 ± 3.83	0.351	16.79 ± 3.86	0.368	15.73 ± 3.75	0.334
impulsiveness	17.31 ± 3.82	0.462	17.16 ± 3.90	0.421	17.46 ± 3.76	0.514
vulnerability	12.74 ± 4.78	0.760	13.04 ± 5.08	0.770	12.43 ± 4.46	0.747
Extraversion (E)	101.13 ± 17.46	0.818	101.54 ± 15.67	0.754	100.70 ± 19.22	0.864
warmth	19.19 ± 3.42	0.396	19.51 ± 3.10	0.168	18.85 ± 3.70	0.559
gregariousness	16.59 ± 5.31	0.747	16.57 ± 5.26	0.708	16.62 ± 5.39	0.788
assertiveness	15.63 ± 4.24	0.546	15.57 ± 4.16	0.488	15.69 ± 4.35	0.602
activity	18.73 ± 4.62	0.607	18.39 ± 5.10	0.646	19.07 ± 4.07	0.542
excitement seeking	14.09 ± 5.46	0.629	14.36 ± 5.18	0.539	13.82 ± 5.76	0.711
positive emotion	16.90 ± 5.16	0.693	17.14 ± 4.85	0.644	16.65 ± 5.48	0.734
Openness (O)	106.61 ± 18.48	0.852	106.39 ± 18.88	0.851	106.84 ± 18.9	0.855
fantasy	16.53 ± 5.01	0.724	16.57 ± 5.10	0.730	16.50 ± 4.95	0.724
aesthetics	18.54 ± 5.70	0.743	18.39 ± 5.53	0.693	18.69 ± 5.91	0.793
feelings	21.38 ± 4.04	0.600	21.26 ± 4.36	0.632	21.50 ± 3.71	0.558
actions	12.61 ± 3.93	0.499	12.47 ± 3.78	0.421	12.76 ± 4.11	0.570
ideas	18.42 ± 6.02	0.789	18.55 ± 6.62	0.831	18.28 ± 5.38	0.727
values	19.13 ± 3.18	0.206	19.14 ± 3.46	0.333	19.11 ± 2.89	0.042
Agreeableness (A)	119.66 ± 18.05	0.866	118.57 ± 19.86	0.882	120.78 ± 16.05	0.841
trust	19.35 ± 4.61	0.718	18.86 ± 5.17	0.763	19.86 ± 3.91	0.638
straightforwardness	21.35 ± 4.65	0.671	21.16 ± 4.45	0.594	21.55 ± 4.87	0.739
altruism	23.18 ± 4.12	0.711	23.01 ± 4.07	0.659	23.35 ± 4.19	0.765
compliance	17.06 ± 5.20	0.706	16.62 ± 4.92	0.654	17.51 ± 5.47	0.751
modesty	16.92 ± 4.24	0.586	17.21 ± 4.96	0.679	16.62 ± 3.34	0.379
tender-mindedness	21.79 ± 3.61	0.497	21.71 ± 4.00	0.571	21.88 ± 3.19	0.381
Conscientiousness (C)	129.26 ± 20.39	0.903	128.28 ± 22.18	0.913	130.27 ± 18.47	0.889
competence	21.89 ± 3.95	0.613	21.33 ± 4.15	0.625	22.47 ± 3.68	0.582
order	20.03 ± 3.58	0.329	19.97 ± 3.82	0.327	20.08 ± 3.34	0.347
dutifulness	25.55 ± 3.96	0.696	25.11 ± 4.42	0.742	26.01 ± 3.40	0.611
achievement striving	21.00 ± 4.99	0.714	21.03 ± 5.44	0.755	20.97 ± 4.51	0.655
self-discipline	20.95 ± 5.26	0.793	21.26 ± 5.28	0.786	20.62 ± 5.25	0.804
deliberation	19.84 ± 4.90	0.762	19.58 ± 4.81	0.726	20.11 ± 5.01	0.797
Disintegration	2.22 ± 0.46	0.962	2.24 ± 0.46	0.960	2.20 ± 0.46	0.966
GEI	2.22 ± 0.65	0.863	2.35 ± 0.65	0.845	2.09 ± 0.64	0.871
PD	1.72 ± 0.57	0.835	1.73 ± 0.56	0.816	1.70 ± 0.57	0.858
P	2.06 ± 0.61	0.855	2.11 ± 0.64	0.856	2.01 ± 0.57	0.857
D	2.13 ± 0.64	0.823	2.12 ± 0.64	0.814	2.15 ± 0.64	0.839
FA	2.28 ± 0.53	0.702	2.30 ± 0.58	0.731	2.25 ± 0.49	0.666
SOD	2.05 ± 0.56	0.786	2.05 ± 0.56	0.775	2.04 ± 0.56	0.801
MT	2.27 ± 0.67	0.797	2.27 ± 0.71	0.811	2.27 ± 0.63	0.783
EA	2.45 ± 0.72	0.804	2.50 ± 0.74	0.808	2.39 ± 0.69	0.802
M	2.83 ± 0.73	0.842	2.81 ± 0.69	0.806	2.86 ± 0.77	0.873
SA	2.18 ± 0.61	0.789	2.13 ± 0.61	0.778	2.22 ± 0.61	0.805

NEO PI-R – Revised NEO Personality Inventory; IBD – inflammatory bowel disease; UC – ulcerative colitis; CD – Chron's disease; GEI – General Executive Impairment; PD – Perceptual Distortions; P – Paranoia, D – Depression; FA – Flattened Affect; SOD – Somatoform Dysregulation; MT – Magical Thinking; EA – Enhanced Awareness; M – Mania; SA – Social Anhedonia; VC – ulcerative colitis; SD – standard deviation; α – Cronbach alpha.

Table 4

Differences between whole sample (IBD) and the normative sample

Domains and facets	*t*	Cohen's *d*
Neuroticism (N)	**3.527****	**0.323**
anxiety	**5.771****	**0.543**
hostility	-0.172	0.016
depression	2.343*	0.220
self-consciousness	2.151*	0.190
impulsiveness	2.791**	0.251
vulnerability	2.859**	0.264
Extraversion (E)	-1.080	0.098
warmth	**-4.794****	**0.420**
gregariousness	-0.519	0.048
assertiveness	**6.896****	0.643
activity	2.103*	0.195
excitement seeking	**-3.530****	**0.332**
positive emotion	**-3.739****	**0.354**
Openness (O)	-1.402	0.128
fantasy	-0.582	0.053
aesthetics	-2.550**	0.241
feelings	1.475	0.135
actions	**-5.099****	**0.467**
ideas	1.018	0.096
values	-0.222	0.020
Agreeableness (A)	-0.079	0.008
trust	0.206	0.019
straightforwardness	1.744	0.166
altruism	-0.601	0.057
compliance	-1.218	0.117
modesty	-3.158**	0.290
tender-mindedness	**3.293****	**0.310**
Conscientiousness (C)	1.991*	0.184
competence	0.848	0.078
order	2.346*	0.209
dutifulness	**3.389****	**0.312**
achievement striving	1.663	0.157
self-discipline	0.162	0.015
deliberation	1.224	0.113
Disintegration	**-6.276****	**0.568**
GEI	**-3.939****	**0.365**
PD	**-7.627****	**0.627**
P	**-4.297****	**0.374**
D	0.358	0.031
FA	**-6.171****	**0.522**
SOD	-3.015**	0.254
MT	**-6.779****	**0.584**
EA	**-8.162****	0.733
M	**-4.163****	**0.392**
SA	-1.696	0.151

IBD – Inflammatory bowel disease; GEI – General Executive Impairment, PD – Perceptual Distortions, P – Paranoia, D – Depression, FA – Flattened Affect, SOD – Somatoform Dysregulation, MT – Magical Thinking, EA – Enhanced Awareness, M – Mania, SA – Social Anhedonia; NEO PI-R normative sample n = 474 [68], DELTA 10 normative sample n = 1001 [72]; *t* – *t*-test, Cohen's *d* – effect size, *$p < 0.05$, **$p < 0.01$; Values of the *t*-test that exceed alpha level (0.05/46 comparisons = 0 .0011) after the Bonferroni correction are marked bold.

Among the Openness facets, the only significant difference emerged for the Action facet ($p < 0.01$). The IBD sample scored significantly higher on the Tender-Mindedness facet of Agreeableness domain ($p < 0.01$). Among the Conscientiousness facets, the IBD patients can be the most strikingly distinguished from the general population by means of their significantly higher scores of Dutifulness ($p < 0.01$). Regarding Disintegration, the significant differences between the IBD group and the normative sample were found in all facets except Depression, Somatoform Dysregulation and Social Anhedonia ($p < 0.01$). More specifically, compared to the normative sample, the patients with IBD had the significantly lower scores on General Executive Impairment, Perceptual Distortions, Paranoia, Flattened Affect, Magical Thinking, Enhanced Awareness and Mania facets of Disintegration.

Table 5
The statistical significance of canonical correlation

r	W-L	χ^2	df	*p*
0.451	0.797	33.073	5	0.001

r – canonical correlation; W-L – Wilks' Lambda; χ^2 – Chi-square test; df – degrees of freedom.

In order to examine which traits discriminated the best between two subgroups of the patients, the stepwise discriminant analysis was conducted, with the facets of NEO PI-R and DELTA10 taken as the predictors of the diagnostic group. Since the Box's M test indicated the equality of population covariance matrices [Box's M = 13.611, F (15,88054.71) = 0.875, p = 0.593], the analysis was carried out using the within-groups covariance matrices. The results indicated a significant canonical correlation (Table 5).

The variables that showed to add predictive power to the discriminant function are presented in Table 6. The facets that added the most to the discriminative power were General Executive Impairment facet, followed by Warmth, Self-Discipline, Depression, and Mania. The UC group, in contrast to the CD group was characterized by the elevated levels of General Executive Difficulties, accompanied by the higher levels of Warmth and Self-Discipline and lower levels of Depression and Mania.

Centroids for the UC and CD groups were 0.495 and -0.509, respectively. In all, results indicated that two groups could be distinguished based on their personality traits.

The proportion of successful classification of cases into the diagnostic groups using the discriminant function was overall at the satisfying level – 70.7% (Table 7).

Table 7
Classification results

Subsamples	Predicted group membership		Total
	UC	CD	
UC	55 (72.4%)	21 (27.6%)	76
CD	23 (31.1%)	51 (68.9%)	74

UC – ulcerative colitis; CD – Chron's disease.

Discussion

In this study, we investigated the personality traits of the IBD patients in remission, whereby applying the Five factor + Disintegration personality model. The study was carried out both for the entire sample of the IBD patients as well as for two subsamples separately (UC and CD). The personality traits were examined both at the domain-level and at the facet-level. Although the interest for the characteristics of persons suffering from IBD has been present since the first half of the 20th century, the findings are contradictory, which might relate to the methodological and conceptual limitations. The previous studies used various methodological approaches (mixed sample both of UC and CD, children and adults, patients in remission and in relapse), various theoretical personality models and various instruments for measuring the personality traits. Also, in previous studies, the personality traits were analyzed solely at the domain-level, whereas in some studies, only selected personality traits were observed (most often the extraversion and neuroticism). All of the aforementioned makes the comparison of results more difficult. To the best of our knowledge, the present study is the first to use the full FFM and Disintegration trait to investigate the patients with IBD. However, there are a large number of studies which confirm the connection between the personality traits and those psychosocial factors which were proven to influence the course of the chronic diseases in general, and therefore IBD as well.

The findings of our study suggest that the IBD patients differ from the normative sample in Serbia, in regard to the personality structure. The IBD patients have higher scores in the domain of Neuroticism, especially on Anxiety facet.

Table 6
Discrimination between ulcerative colitis (UC) and Chron's disease (CD): standardized canonical discriminant function coefficients and structure matrix

Parameters	Standardized canonical discriminant function coefficients	Structure matrix
Depression	-0.716	-0.058
Warmth	0.437	0.193
Self-Discipline	0.517	0.121
General Executive Impairment	1.854	0.411
Mania	-0.707	-0.068

Such findings are in compliance with those which other researchers obtained, which implies that the high scores of Neuroticism were observed in 70% of patients with UC, and in 62% of patients with CD [16]. Neuroticism, defined as the tendency to experience negative emotions (such as fear, sadness, anger, guilt) is related with vulnerability to stress and specific disposition to depression [24, 25], anxiety [26] and other mental disorders [27]. High Neuroticism is also associated with less adequate emotion regulation and ineffective coping [27, 28]. Earlier researches showed that the IBD patients were at a risk of high frequency of mental disorders [29], especially anxiety and depression [7, 29, 30]. Among the IBD patients, depression and anxiety are associated with frequent relapses, hospitalizations, operations and low quality of life [31], due to which many authors suggest the routine screening to anxiety and depression, aimed at early initiation of their treatment [32]. We can assume that among the IBD patients who have the high scores on Neuroticism, there is a high risk of developing anxiety and depression. Therefore, it might be that early detection of this risky group of patients, prior to the occurrence of symptoms of anxiety and depression, enabled adequate prevention of mental disorders and improvement of the course of the disease [33].

At the level of other NEO PI-R domains we found no significant difference between the IBD patients and the general population. We did find out that the IBD patients had the lower scores at Extraversion and Openness domains as well, but they were not statistically significant. However, these findings can be of practical significance, since some studies showed that among personality traits, neuroticism and extraversion had the highest effects on well-being [34, 35]. Although other researchers discovered a significant difference between the IBD patients and the normal group for other domains (e.g., lower extraversion and openness), we cannot compare these findings with ours since various tests for the assessment of personality were used.

At the level of facets, we found out that, in comparison to the general population, the IBD patients had the lower scores at the following facets: Warmth, Excitement Seeking, Positive Emotion and Actions, and the higher scores for Anxiety, Assertiveness, Tender-Mindedness and Dutifulness. Among the IBD patients, we also discovered the high scores for Impulsiveness and Vulnerability, but the differences in comparison to the general population were not significant. Low Warmth was connected to difficulties in establishing emotional connections and poor friendly compassion towards other people and can be a predictor of low social support and a bad doctor-patient relationship. Low Excitement Seeking is related to the decreased desire for excitement and stimulation and can be connected to the old age and behavior related to a life burdened by a chronic condition. Low Positive Emotion is in relation to a low tendency to experience positive emotions (e.g., happiness, love) and is also associated with an increased risk of developing chronic conditions [36]. Low Actions, which refers to preference of familiar patterns and routine and dislike of changes, is often seen among people who suffer from chronic diseases for a longer period of time. Also, those who scored lower on Positive Emotion and Actions had more chronic diseases [36]. High Assertiveness is connected to the strength and social domination whereas Tender-Mindedness is connected to sympathy and care for other people. High Dutifulness is in relation to scrupulosity and abiding by rules and moral obligations, which in favorable combination with other facets can result in better adherence.

In our study, the IBD patients showed the lower scores in the domain of Disintegration in comparison to the general population. There are no published studies which investigated this personality dimension among the IBD patients. The lower scores at Disintegration imply that the IBD patients are less prone to psychotic-like experiences than the general population.

We did not find a difference between the UC and CD patients at the level of observed domains. This is in compliance with the results of previous studies which shows that these two IBD diagnostic types are not different in the personality structure [16, 37]. In one of the studies [16], a higher level of Neuroticism and Extraversion was observed in the patients with UC, whereas the patients with CD exhibited a higher level of Openness to experience and Agreeableness, but these differences were not statistically significant. However, when comparing UC and CD at the facet-level, it turned out that the differences between UC and CD exist and that they can have a practical significance. The dominant difference refers to the General Executive Impairment (GEI) facet within Disintegration: the patients with UC had more obvious executive dysfunctions than the patients with CD. The contribution of other facets in deciphering UC from CD is lower. The patients with UC had higher scores at Warmth and Self-Discipline facets, which could mean that the UC patients are more sensitive to the lack of social support and have a higher tendency to low adherence than the CD patients. We also found that the patients with UC had the lower scores at Depression and Mania facets, which suggests that the UC patients are more prone to mood swings, i.e., they are more prone to the cyclothymia than the CD patients.

So far, the studies that dealt with researching the persons suffering from chronic diseases were mostly focused on the domain level. Our findings show that certain differences can be discovered only at the facet-level and that facet-level associations can go in opposite directions and obscuring the effect at the broad domain-level. This implies the significance of analysis of personality structure at the facet-level as well, which is in compliance with the recommendations of other authors [35].

The limitations of our study refer primarily to a relatively small sample and the results that we obtained should be confirmed in some studies involving larger samples. Our sample comprised of patients from one reference tertiary centre which disables the generalization of results. Also, the patients who previously received the psychiatric treatment were not included in the study as well as persons in relapse, which mitigated the difference between our sample and the general population. The limitations of our study refer to its design as well (observational study). The future prospective studies would enable the research of impact of personality traits on the course of the disease, as well as the observation of

changes in the personality traits during the course of the disease. The research on correlations between the personality traits and psychosocial factors which are proven to affect the course of IBD (anxiety, depression, coping) are also necessary.

In case of theoretical implications of our study, they primarily refer to the necessity of researching the personality traits not only at the domain-level but also at the facet-level. Given that we found the significant differences between IBD and the general population, at the level of Disintegration, the observance of this dimension is also important for future researches. A larger number of studies in this field and the comparison of their results could enable the conceptualization of specific type of personality suffering from IBD, which would be more vulnerable and prone to the worse course of the disease. In that sense, the interdisciplinary cooperation is necessary among the gastroenterologists, psychiatrists and the psychologists.

The examination of personality of the IBD patients has the important clinical implications. The routine application of personality tests among the IBD patients, especially immediately upon setting the diagnosis, would enable early detection of those patients who are at a greater risk of anxiety, depression and inadequate coping, according to their personality traits. Thus detected patients would be the focus group for various forms of psychosocial interventions, psychotherapy and possibly pharmacotherapy. Consequently, anxiety, depression and inadequate coping would be prevented, which would also prevent their negative impact on the course of IBD.

Conclusion

Based on personality traits, we found that the IBD patients differ from the general population in the domains of Neuroticism and Disintegration. At the level of other domains, we found no difference, but the difference was found at the level of facets to which they belong. Among the patients with UC and CD, we found no difference at the domain-level, but we did discover it at the facet-level, predominantly at GEI within Disintegration. The screening of the personality traits can be used to early detection of the IBD patients who are at a greater risk for mental disorders and bad psychosocial functioning. These patients would be the focus group for early psychosocial interventions, psychotherapy or pharmacotherapy which would prevent anxiety, depression and inadequate coping. In accordance with the proven relationship between personality and psychosocial functioning of the IBD patients, an implementation of these procedures can improve the course of the disease.

Conflict of interest

The authors fully declare that there is no conflict of interest.

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