

Personality traits through psychological dimensions in adolescents with headache: an investigation on how social isolation during the pandemic influenced mental health – a pilot study

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Abstract

Introduction: We wanted to evaluate how the COVID-19 pandemic and consequent isolation have influenced some psychological characteristics according to the model of the Big Five theory in a group of adolescents suffering from chronic diseases such as headache.

Material and methods: Before and after the lockdown for the COVID-19 pandemic, we administered the Big Five Inventory (BFI) to a group of adolescents suffering from headache. We took into account the presence of protective factors and risk factors, such as psychiatric comorbidity, friendships, relation with parents, perception of school difficulties and bullying, through a structured interview. We used the Wilcoxon signed-rank test to evaluate the differences for factors of the Big Five model between the two periods.

Results: Fifteen patients (12 females and 3 males), with a mean age of 16 years (max. 18 years, min. 13 years), agreed to repeat the evaluation after one year; of these, 7 suffered from tension-type headache, 5 from migraines with aura and 3 females from somatization headache. There was a significant increase in the levels of conscientiousness after the lockdown.

Conclusions: Our study demonstrated an unexpected improvement in a personality trait considered positive, during a period of high traumatic value. We hypothesize that adolescents suffering from chronic headaches may have peculiar personal characteristics, and that these may be susceptible to some environmental and relational factors.

Key words: headache, the Big Five, COVID-19, migraine.

Introduction

The period related to lockdown has profoundly influenced our way of life, increasing feelings of anxiety, depressive experiences and loneliness (Giallonardo *et al.* 2020). This could have had a psychological impact on adolescents, especially on those who have an underlying medical condition.

The five-factor model, also known as the Big Five, is a well-known psychological theory that allows one to identify individual differences in the construction of personality. It uses 5 personality macro-categories which describe different personality profiles (Costa *et al.* 2012). Categories are: *extraversion* (for sociability, as-

sertiveness, level of activity, dynamism); *agreeableness* (for altruism, caring, cooperativeness); *conscientiousness* (for capacity for self-regulation, accuracy, scrupulousness, perseverance); *neuroticism* or *emotional lability* (for inability to control emotional reactions, mood instability, presence of negative affectivity and irritation); and *openness* (for openness to novelty, broad cultural interests, creativity). The Big Five profiles can be considered risk factors or protective factors for mental disorders such as anxiety.

Population studies on headache have identified high levels of neuroticism as a risk factor, while high levels of extroversion, agreeableness and conscientiousness appear to be protective for the development of headache (Magyar *et al.* 2017).

The aim of our study was to characterize the psychological profile of an adolescent group with headache, using the Big Five dimension, before the outbreak of the COVID-19 pandemic and how these traits underwent changes after the social isolation imposed during 2020. We took into consideration protective factors, such as the presence of a coping strategy, friendships, relation with parents, and risk factors related to coexisting psychopathologies, school difficulties and bullying.

Material and methods

Population

The sample is composed of adolescent neurological outpatients who came to our clinic reporting headache and who voluntarily adhered to the psychological evaluation carried out between March and April 2019 and repeated in June 2020.

Evaluation

In March-April 2019, before the COVID-19 outbreak, we collected personal information about 40 patients complaining of headaches, regarding: age, sex, headache, Big Five levels, psychiatric comorbidity, presence of coping strategies such as sports and reading. Headache was classified according to the third International Classification of Headache Disorders and divided into three macro-categories (migraine, tensive and somatoform). The assessments included the Big Five Inventory (BFI) for psychological dimensions: this is a self-report questionnaire using a 5-point Likert scale to obtain a final score; higher scores indicate higher levels of a given personality trait; the Italian version of the scale, for this population, was also validated (Fosati *et al.* 2011). Psychiatric comorbidities were evaluated using the Child Behavior Checklist by Achenbach (CBCL6/18), a self-report questionnaire from which it is possible to determine the overall functioning of the child through the “Internalization” scale, which includes anxiety, depression and somatic grievances, and the “Externalization” scale that measures aggressive behavior and rule breaking.

About a year after the assessment, in the period between June and August 2020, the BFI was repeated.

Finally, through structured interviews, before and after lockdown we investigated presence of other environmental factors: use of social networks, friendships, relation with parents, perception of school difficulties and bullying.

Conscious consent

Participation in the study was voluntary and no financial compensation was given to the recruited participants; all the participants expressed their informed consent to obtain the data. The study respects the bioethical criteria for scientific research.

Statistical analysis

Data regarding continuous variables such as the factors of the Big Five model were reported as median and interquartile range (IQR).

The Wilcoxon signed-rank test was used to evaluate the differences for factors of the Big Five model between the two periods.

Results

The final sample, from the initial group of 40 patients, included 15 patients (12 females and 3 males), with a mean age of 16 years (max. 18 years, min. 13 years) who agreed to repeat the evaluation after one year; of these, 7 suffered from tension-type headache (including 6 females and 1 male), 5 from migraines with aura (3 females and 2 males) and 3 females from somatization headache.

From CBCL6/18 analysis we found that 6 patients were clinical for internalizing problems, 1 was clinical for internalizing and externalizing problems and 4 girls had a borderline score for psychological problems. In our sample 4 patients were without clinical scores (Table 1).

As regards BFI scores, we analyzed the mean score changes in our sample from the pre-COVID to post-COVID period and we obtained the following results: extraversion scores changed from a mean of 25 in the pre-COVID (IQR 19-30) to a mean of 24 in the post-COVID period (IQR 21-29), agreeableness changed from 34 (IQR 27-36) to 33 (IQR 30-38), conscientiousness from 30 (IQR 22-25) to 31 (IQR 25-38); neuroticism from 28 (IQR 21-32) to 29 (IQR 22-31) and openness from 36 (IQR 24-41) to 35 (IQR 29-43). Conscientiousness had a significant improvement (p -value = 0.0269). The other categories of the Big Five theory had no statistically significant mean differences between the two periods (Table 2). The difference in conscientiousness values before and during the lockdown remains significant when considering only the female subgroup (p -value = 0.02).

Finally, it appears that in the environmental factors only perception of school difficulties

Table 1. Results of study

Patient N°	Age	Sex	Type of headache	Psychiatric comorbidities (Child Behavior Check List 6/18)		Protective factor		Adverse factors			
				Sport	Lecture	Time on social network after lockdown	Parents' pre- vs. post-lockdown relationship	Pre- vs. post-lockdown friendship	Pre- vs. post-lockdown scholastic problems	Pre- vs. post-lockdown bullying	
1	17	F	Tensive	No comorbidities	+	+	Same	Unchanged	Improved	↓	↓
2	17	F	Somatoform	Internalizing problems	+	-	↓	Unchanged	Unchanged	↓	↓
3	18	F	Tensive	Borderline for internalizing	-	-	↓	Improved	Unchanged	↓	↓
4	17	M	Migraine	Internalizing problems	-	-	↓	Unchanged	Worsened	↓	No bullying
5	16	F	Somatoform	No comorbidities	-	+	↑	Improved	Unchanged	↓	↓
6	14	M	Migraine	Internalizing problems	+	-	↑	Improved	Worsened	↓	No bullying
7	18	F	Tensive	Borderline for externalizing	-	-	↑	Unchanged	Unchanged	No problems	No bullying
8	14	F	Tensive	Internalizing problems	-	+	↑	Unchanged	Worsened	↓	↓
9	17	F	Tensive	No comorbidities	+	-	Same	Worsened	Unchanged	↓	No bullying
10	13	F	Migraine	Internalizing problems	+	+	↑	Worsened	Worsened	↓	↓
11	18	F	Migraine	No comorbidities	-	-	↓	Unchanged	Unchanged	School interrupted	↓
12	16	F	Migraine	Borderline internalizing and externalizing	+	+	↑	Unchanged	Improved	No problems	↓
13	15	M	Tensive	Internalizing and externalizing problems	+	-	↑	Improved	Unchanged	↓	↓
14	17	F	Tensive	Internalizing problems	-	+	↑	Unchanged	Unchanged	↓	↓
15	14	F	Somatoform	Borderline for internalizing	-	+	↑	Worsened	Improved	No problems	↓

M – male, F – female, + hobby practiced, – hobby not practiced, ↓ decreased, ↑ increased

Table 2. Results of Big Five Inventory (BFI) score

The five-factor model (the Big Five)	All patients in the study (N = 15)			Female patients (n = 12)		
	Pre-COVID	Post-COVID	p-value (Wilcoxon signed-rank test)	Pre-COVID	Post-COVID	p-value (Wilcoxon signed-rank test)
Extraversion	25 (19-30)	25 (19-30)	0.71	25 (19-29)	24 (21-28)	0.96
Agreeableness	34 (27-36)	34 (27-36)	0.26	34 (28-37)	34 (33-38)	0.24
Conscientiousness	30 (22-35)	30 (22-35)	0.02*	32(22-35)	33(28-38)	0.02*
Neuroticism	28 (21-32)	28 (21-32)	0.15	28 (23-32)	30 (22-32)	0.41
Openness	36 (24-41)	36 (24-41)	0.30	36 (28-41)	37 (30-43)	0.5

IQR – interquartile range

and bullying had an improving trend during the COVID-19 period, while other environmental factors were equally present in the two periods: 11 patients reported improvements in academic performance (3 did not report previous school difficulties, 1 stopped school attendance); 10 patients reported a reduction in cases of bullying and 4 never experienced one. Protective factors were equally present in the two periods (see Table 1).

Discussion

Conscientiousness is considered a positive behaviour, which usually includes qualities such as scrupulousness, organizational capacities and motivation to complete an assigned task. It results in working hard and willingly, doing the best without being stressed (Barbaranelli *et al.* 1998).

Among factors could have influenced the increase of conscientiousness, it is possible to identify a trend only concerning the decrease in scholastic difficulties and bullying episodes; improvement of these factors is temporally related to the transition from traditional face-to-face teaching to remote teaching.

It is possible to compare our findings to other studies that investigated how the COVID-19 period influenced mental health of adolescents. In particular, research conducted on a population of adolescents suffering from somatoform disorders has revealed an improvement in the emotional aspects during the lockdown (De Nardi *et al.* 2021). In this study it was recorded that the reduction of stressors was linked to the teaching change. With the transition from traditional teaching to remote teaching, the school setting undergoes changes, especially for what concerns the relational component, which is inevitably reduced.

Conscientiousness is a dimension including skills such as self-regulation, precision, accuracy, scrupulousness, tenacity, and perseverance, that emerge especially in a performing environment. So, we believe that participants in our study, after being exposed to a reduction in bullying and relational conflicts, may have perceived a less competitive and more welcoming school environment, also leading to an improvement in their academic performance.

Due to the small sample size, it was not possible to establish statistically significant correlations or to infer causality relations. Nevertheless, we can hypothesize that adolescent patients suffering from headache have personality characteristics which are susceptible to emotional,

relational and performance aspects, especially expressed in school.

Conclusions

The emerging results of our study demonstrate an unexpected improvement in a personality trait considered positive, during a period of high traumatic value and which correlates with an increase in mental distress in developmental age (Jones *et al.* 2021).

The strength of our study remains the comparison between the pre-COVID period and the one immediately following the lockdown. Unfortunately, the small number of participants in our research hardly allows us to make deductions applicable to the general population. Nevertheless, we can hypothesize that adolescent patients suffering from headache have personality characteristics which are susceptible to emotional, relational and performance aspects, especially expressed in school. We hope that our study has established a basis for further research to support our findings, researching how personality traits can change in these patients due to environmental factors, comparing them to a control group.

Disclosure

The authors declare no conflict of interest.

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