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Neurotic symptoms profile in a day hospital patients with an anamnesis of head injury in the past

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Summary

Aim. The aim of the study was to assess the relationship between the occurrence of brain damage and symptoms of neurotic disorders, reported by patients of the psychotherapeutic day hospital for neurotic and personality disorders before starting treatment.

Material and method. Analysis of the co-occurrence of neurotic symptoms with previous head or brain tissue damage. The trauma was reported in a structured interview (*Life Questionnaire*) completed before treatment in the day hospital for neurotic disorders. Illustrated with OR coefficients (odds ratios), the performed regression analyses showed statistically significant correlations between brain damage (caused by brain trauma, stroke, etc.) and symptoms listed in the symptom checklist KO "0".

Results. In a group of 2,582 women and 1,347 men, some of respondents reported (in the self-completed *Life Questionnaire*) a previous head or brain injury. Men reported a history of trauma much more often than women (20.2% vs. 12.2%; $p < 0.0005$). Patients who had a history of head trauma obtained a significantly higher value of the global severity of neurotic symptoms (OWK) in the symptom checklist KO "0" than patients without head trauma. This applied to both the male and female groups. Regression analyses showed a significant relationship between head injuries and the group of anxiety and somatoform symptoms. In both groups (men and women), 'paraneurological', dissociative, derealization, and anxiety symptoms occurred more frequently. Men more often reported difficulties in controlling the expression of emotions, muscle cramps and tension, obsessive-compulsive symptoms, skin and allergic symptoms, and symptoms of depressive disorders. Women more often reported vomiting when feeling nervous.

Conclusions. Patients with a history of head injuries have a higher global severity of neurotic disorders symptoms than people without such history. Men experience head injuries more often than women, and the risk of developing symptoms of neurotic disorders is higher in men. It seems that patients with head injuries are a special group when it comes to reporting some psychopathological symptoms, especially in the group of men.

Keywords: head and brain trauma, anamnesis, symptoms of neurotic disorders

Introduction

The basis for the diagnosis of neurotic disorders is the presence of symptoms or groups of symptoms related to experiencing emotions, behavior or the occurrence of symptoms in a somatic form (psychogenic, without a confirmed somatic basis). Characterization of the symptoms of neurotic disorders may be difficult, both in an individual patient (due to the variability of the experienced symptoms) and in the entire population (significant changes in the nature of the reported symptoms due to various, variable pathogenic socio-cultural influences in a given population) [1]. The most common symptoms, occurring in all neurotic disorders, are anxiety and depression symptoms [1, 2]. In addition, patients with neurotic disorders also report symptoms of somatization and hypochondriac disorders, neurasthenia, psychogenic sexual dysfunctions, sleep disorders, emotional lability, disruptions in social relationships, and manifestations of personality disorders other than so-called "specific" [3, 4].

The conclusions from the research on neurological patients indicate that this group is particularly prone to depressive and anxiety symptoms, somatization disorders and phobias [5, 6]. The neurological diseases in which anxiety and depressive symptoms are most common are dementia, traumatic brain injury (TBI), stroke, epilepsy, multiple sclerosis, migraine, and parkinsonism [5, 7].

Even the mildest head injuries can have long-term consequences, significantly adversely affecting the long-term quality of the patient's life. Klonoff et al. [8] studied the long-term effects of mild head injuries from childhood to adulthood. They determined that 23 years after the initial data collection phase (from trauma), 31% of study participants experienced subjective effects of a head injury from the past. The authors divided the ailments into three groups – physical, intellectual and mental. Physical symptoms included, among others, a range of neurological complaints, visual or hearing impairment, and skin problems. Intellectual symptoms were associated with various neuropsychological disorders. Psychopathological symptoms concerned symptoms of depressive and anxiety disorders. The anxiety disorders that may appear after TBI include: post-traumatic stress, generalized anxiety, obsessive-compulsive disorder, panic disorder, phobias, and social anxiety. The development of anxiety disorders after traumatic brain injury is a strong predictor of further increasing difficulties in social life, interpersonal relations and professional life [9].

Similar results were obtained by Silver et al. [10], who investigated the relationship between the history of a head injury with accompanying loss of consciousness or disorientation, and the diagnosis of mental disorders throughout the respondents' lives. Such head injuries were associated with an increased likelihood of depression, dysthymia, panic disorder, obsessive-compulsive disorder, phobias, and substance use disorder. Moreover, the risk of attempting suicide in people who have experienced a head injury was significantly higher compared to people without such a burden [10].

The group of symptoms that can occur after a head injury is called post-concussion syndrome (PCS). The duration of symptoms can vary from several days to many years. Most often though, they disappear up to a year after the injury; however, according to the study by Hiploylee et al. [11], the post-concussion syndrome, which persisted

in patients for at least three years, did not disappear for the next several years. Symptoms that persist after an injury or concussion of the brain are commonly grouped into three categories: (1) somatic (e.g., headache and dizziness), (2) cognitive (e.g., impaired attention and autobiographical memory), and (3) psychopathological (e.g., irritability, mood swings, sadness, depression, apathy, anxiety, agitation, aggression, sleep disturbances) [10, 12, 13]. Disturbances in the personality of patients (organic personality disorder), which are associated with changes in constant patterns of premorbid behavior, may also appear. This is especially related to abnormalities in the expression of emotions, needs and drives, and may also include cognitive and thinking disorders, and altered sexual needs [14]. In the long term, TBI may be associated with an increased risk of dementia [15].

Another type of traumatic injury to the nervous tissue of the brain is diffuse axonal injury, which most often occurs in traffic accidents. It is characterized by damage to the nerve tissue (axons) in the brain's pathways, the corpus callosum and the brainstem, even with minor head injuries. Symptoms accompanying a diffuse axonal injury may include, among others, amnestic syndrome, cognitive impairment and changes in the patient's personality [16]. The above data support the idea that even minor head injuries can have psychopathological consequences.

The severity and type of psychopathological symptoms, as well as focal neuropathological changes, are largely related to the location of the damage [17, 18]. For example, an increased risk of depressive syndrome is associated with a stroke located in the frontal part of the brain (frontal lobes) and deep structures (basal ganglia) [19]. Post-stroke depression (PSD) is widely described in the literature and its incidence is 20%-80% [20]. Other mental disorders occurring after stroke include anxiety disorders, apathy, fatigue, and PTSD [5].

In the literature, there are many studies on the long-term effects of head injuries in neurological patients. There are certainly fewer publications in which the studied group consists of psychiatric patients. Therefore, this study analyzes the data of patients from the day hospital for neurotic and personality disorders who reported a history of head or brain tissue injury during qualification for treatment. The analysis was aimed at an in-depth description of psychopathological symptoms, which could be a specific profile for this selected subgroup of patients qualified for psychotherapy in the day hospital.

Aim

The aim of this study was to analyze the profile of neurotic symptoms in patients of the day hospital for the treatment of neurotic disorders with a history of head injuries.

Material and method

The incidence of head injuries in the life-long history of 3,929 patients (2,582 women and 1,347 men) was assessed with the use of data from the *Life Questionnaire*. This is a retrospective questionnaire in which patients, as part of their admission to the day hospital, provide detailed information about themselves, relevant to

the treatment process. The data concerns interpersonal relations, sexual development, traumatic events, socioeconomic situation, medical history, and previous hospitalizations. The tool consists of 138 questions (with answer variants to choose from) [21]. In the study, the following variables were taken into account: diseases and injuries of the head and brain (e.g., concussion) and demographic variables (Table 1).

Neurotic symptoms were examined with the use of the symptom checklist KO "0", which enables obtaining data on the presence and severity of 135 neurotic symptoms in the past seven days prior to the assessment [22]. This checklist is one of the few original Polish tools created on the basis of a criterion approach [23] using colloquial language. It enables patients to report the most common ailments [24], and is characterized by satisfactory psychometric properties [4, 22].

In the present study, we used data from questionnaires which were filled out by patients before starting their first treatment in the day hospital for neurotic disorders in the years 1980-2002.

The obtained data concern patients diagnosed with neurotic, behavioral and personality disorders (categories F4, F5, F6 of the ICD-10 classification). These diagnoses were assigned to some of the patients (hospitalized before the introduction of the ICD-10 classification) based on the analysis of the equivalence of the described symptom syndromes and, in some cases, based on the archival history of the disease, which made it possible to formulate only less detailed diagnoses (e.g., code F42) or even their combined groups (e.g., F40 or F41). In each case, qualification for treatment included at least two psychiatric examinations, an interview and a psychological examination, and a battery of questionnaires, which made it possible to exclude other disorders (including affective disorders, schizophrenic psychoses, exogenous or pseudoneurotic disorders and severe somatic illnesses) that cannot be treated by psychotherapy in the day psychiatric ward [25]. Most of the respondents were diagnosed with one of the neurotic disorders or a personality disorder with a secondary neurotic disorder (Table 2).

Information obtained from routine diagnostic examination was used with the consent of the patients, and all data were stored and processed in an anonymous form. The analyses were carried out with the consent of the Bioethics Committee no. 122.6120.80.2015.

The logistic regression method was used to estimate the risk coefficients (ORs) for the coexistence of the values of two nominal variables – (1) reporting the occurrence of brain damage (head or brain injury, stroke) and (2) other life circumstances or reporting a symptom in the week prior to the study during the qualification period. The non-parametric Mann-Whitney *U* test was used to compare the distributions. The significance of the difference between the percentages was estimated using the test for two structure indices (percentages). The licensed statistical package STATISTICA PL was employed.

Table 1. **Sociodemographic characteristics of the respondents**

Variable	Women (n = 2,582)	Men (n = 1,347)
Age in years mean ± SD (median)	33 ± 9 (median 33)	32 ± 9 (median 28)
Education		
None/primary	9%	12%
Secondary (including students)	57%	56%
Higher	34%	32%
Employment		
Employed	59%	70%
Unemployed	41%	30%
Including pension	10%	7%
Students	23%	24%

Table 2. **Severity of symptoms and type of disorder according to ICD-10**

Variable	Women (n = 2,582)	Men (n = 1,347)
Global Symptom Level score (OWK): mean ± SD (median)	394 ± 152 (median 387)	349 ± 151 (median 336)
ICD-10 diagnosis (primary)		
F44/45 Dissociative and somatoform disorders	29%	25%
F60 Personality disorders	23%	29%
F40/F41 Anxiety disorders	17%	16%
F48 Neurasthenia	7%	14%
F34 Dysthymia	7%	5%
F50 Eating disorders	5%	0%
F42 Obsessive-compulsive disorder	2%	2%
F43 Reaction to severe stress, and adjustment dis.	1%	2%
Other, e.g., no data enabling full coding according to ICD-10	9%	8%

Results

Table 3. **Occurrence of brain injuries (head injuries, strokes, etc.) in the groups of women and men and the average values of the Global Symptom Level of neurotic symptoms (OWK)**

Variable	Women		Men	
	Injury	No injuries	Injury	No injuries
Percentage	***12.2%	87.8%	***20.2%	79.8%
Global Symptom Level (OWK) Mean ± SD	**418.3±159.9	386.3±151.2	***394.6±162.5	333.3±146.9

The statistical significance of the difference in percentages: *** $p < 0.0005$; the statistical significance of the difference in distribution: ** $p < 0.005$; *** $p < 0.0005$.

The data in Table 3 show that in the group of men, injuries were significantly more frequent than among women, and that both in the group of women and men, they were associated with a significantly higher global symptom level (OWK) assessed using the symptom checklist KO "0".

Table 4. **Symptoms significantly more frequently reported by patients with a history of brain injury (head injuries, strokes, etc.)**

Symptoms specified by coefficients OR > 1.5	Women	Men
Percentage of injuries	12.16%	20.19%
"PARANEUROLOGICAL", DISSOCIATIVE, DEREALIZATION, etc.		
Dizziness	***1.70 (1.28; 2.26)	***1.85 (1.39; 2.46)
including extreme severity	*1.44 (1.1; 1.9)	***2.15 (1.5; 3.07)
Headaches	*1.44 (1.1; 1.89)	***2.03 (1.52; 2.7)
including extreme severity	***1.72 (1.32; 2.25)	*1.62 (1.11; 2.35)
Hypersensitivity to light, sounds, touch	*1.37 (1.08; 1.74)	***2.13 (1.62; 2.79)
including extreme severity	*1.39 (1.01; 1.89)	***2.44 (1.60; 3.72)
Sensation of a rush of blood to the head	**1.42 (1.11; 1.81)	***1.74 (1.32; 2.3)
Destroying things when angry or upset	*1.43 (1.09; 1.87)	***1.82 (1.36; 2.43)
including extreme severity		**2.22 (1.28; 3.84)
Inability to control the expression of emotions		**1.59 (1.21; 2.08)
including extreme severity		**1.81 (1.23; 2.66)
Disorders of balance	**1.41 (1.11; 1.8)	***1.76 (1.34; 2.3)
including extreme severity		**1.96 (1.25; 3.08)
Syncope	**1.51 (1.13; 2)	**1.70 (1.19; 2.42)

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Pre-syncope	***1.67 (1.31; 2.13)	***1.71 (1.27; 2.3)
Periodic blindness or deafness	**1.45 (1.14; 1.84)	***1.68 (1.27; 2.23)
Déjà vécu	***1.67 (1.32; 2.13)	***1.96 (1.5; 2.57)
including extreme severity		*1.94 (1.17; 3.21)
Pressure (floods) of thoughts		**1.75 (1.24; 2.47)
including extreme severity		**1.65 (1.24; 2.2)
Feeling that the world is unreal	*1.39 (1.1; 1.77)	***1.64 (1.25; 2.15)
Déjà vu	*1.33 (1.04; 1.7)	***2.00 (1.52; 2.62)
including extreme severity		**2.11 (1.25; 3.56)
Outbursts of anger		***1.78 (1.33; 2.39)
including extreme severity		**1.62 (1.15; 2.27)
Difficulty in concentration		*1.70 (1.09; 2.63)
including extreme severity		*1.48 (1.11; 1.97)
Feelings of fatigue and weakness in the morning that disappear during the day		**1.83 (1.2; 2.77)
including extreme severity		*1.41 (1.05; 1.87)
Distractedness		*1.61 (1.14; 2.28)
including extreme severity		*1.59 (1.13; 2.24)
OTHER NEUROTIC DISTURBANCES OF EXPERIENCING EMOTIONS AND BEHAVIORS		
Persistent obsessive counting, e.g., street lights, cars, etc.		***2.18 (1.63; 2.9)
including extreme severity		***3.84 (2.34; 6.32)
Muscle cramps during certain activities (e.g., writing)	*1.38 (1.09; 1.75)	***1.66 (1.27; 2.18)
including extreme severity		***2.38 (1.50; 3.75)
Vomiting in stressful situations	***1.69 (1.32; 2.18)	
including extreme severity	**1.80 (1.24; 2.61)	
Suicidal thoughts		***1.71 (1.3; 2.24)
including extreme severity		***2.39 (1.48; 3.86)
Fear of losing control, catastrophic fears	*1.35 (1.07; 1.72)	***1.73 (1.33; 2.27)
including extreme severity		***2.43 (1.64; 3.58)
Allergic symptoms	**1.43 (1.12; 1.83)	***2.04 (1.54; 2.7)
including extreme severity		**2.03 (1.24; 3.32)
Compulsion of unnecessary repetition of activities		***1.88 (1.43; 2.46)
Intrusive thoughts with aggressive content		**1.58 (1.2; 2.08)

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including extreme severity		*1,72 (1.06; 2.78)
Pessimism		**1.63 (1.17; 2.27)
including extreme severity		***1.73 (1.29; 2.32)
Breathlessness, dyspnea	**1.49 (1.15; 1.92)	***1.84 (1.39; 2.42)
including extreme severity		*1.58 (1.12; 2.23)
Muscle spasms that cause twisting/turning of head		***1.97 (1.41; 2.74)
including extreme severity		**3.73 (1.62; 8.56)
Muscle pains, e.g., back pain, etc.	*1.28 (1; 1.65)	***1.72 (1.29; 2.29)
Skin itching or temporary rashes	***1.62 (1.28; 2.06)	**1.62 (1.23; 2.13)
Panic attacks		**1.52 (1.16; 1.98)
Anxiety when in crowds	*1.27 (1; 1.61)	**1.52 (1.16; 1.98)
Periodic loss of sensation of pain or touch	*1.30 (1.01; 1.68)	*1.53 (1.12; 2.07)
Periodic aphonia	**1.49 (1.15; 1.92)	**1.56 (1.17; 2.09)
Restlessness, motor tension		**1.68 (1.19; 2.37)
including extreme severity		*1.51 (1.07; 2.13)
Blasphemous or immoral thoughts and images		**1.51 (1.15; 1.98)
including extreme severity		*1.64 (1.03; 2.61)
Loss of appetite		**1.54 (1.17; 2.01)
Muscle cramps		***1.64 (1.25; 2.14)
Feeling of underappreciation		**1.66 (1.24; 2.23)
including extreme severity		**1.75 (1.24; 2.47)
Pains or other disorders in the sexual organs		**1.71 (1.24; 2.37)
Muscle tensions		**1.54 (1.17; 2.04)
Need to be alone		**1.54 (1.17; 2.04)
including extreme severity		*1.63 (1.13; 2.35)
Buzzing in the ears	*1.36 (1.07; 1.72)	**1.61 (1.23; 2.1)

The significance of the odds ratios (OR coefficients): * $p < 0.05$; ** $p < 0.005$; *** $p < 0.0005$.

Table 4 presents neurotic symptoms that occurred with a significantly higher probability in patients with head and brain injuries in the past. Such symptoms, both in women and in men, were various somatization symptoms. Most of them resemble the symptoms appearing in neurological diseases and disorders, but also in other somatic diseases: dizziness (also in extreme severity in women OR = 1.44 and men OR = 2.15); headaches (also extremely severe in both sexes); sensation of a rush of blood to the head; disorders of balance (also extremely severe in men); hypersensitivity to stimuli (also in extreme severity in women OR = 1.39 and in men OR = 2.44); fatigue (also extremely severe in men); cramps when performing activities; syncope;

pre-syncope; periodic loss of vision, hearing, touch, speech (conversion symptoms); tinnitus (buzzing in the ears); myalgia. In men, symptoms related to muscular complaints were particularly evident: muscle spasms that cause turning of the head (also in extreme severity OR = 3.73), general muscle cramps, muscle tension, cramps while performing activities (in extreme severity).

The group of neuropsychological symptoms (increased probability of occurrence in both sexes) is associated with the above-mentioned "paraneurological" symptoms: derealization, déjà vécu, déjà vu (especially high probability in men OR = 2.00 vs. OR = 1.33). Only men were found to be more likely to experience difficulties in concentration, distractedness, and pressure of thoughts. Men also had a greater risk of the following symptoms in extreme severity: déjà vécu (OR = 2.11), déjà vu, difficulty in concentration, distractedness, and pressure of thoughts.

Men with a history of head injuries more often than patients without trauma had difficulties in controlling the expression of their emotions, experienced outbursts of anger, restlessness, motor tension, and intrusive thoughts with aggressive content. All of the above symptoms occurred in men with a greater probability also in extreme intensity. Destroying objects in anger concerned both groups (men and women), but only men (OR = 2.22) had a significantly increased risk of extreme severity of this symptom.

Symptoms of obsessive-compulsive disorder were strongly associated with head injuries, but only in men (e.g., item counting, OR = 2.18). Intrusive thoughts with aggressive content and blasphemous, immoral thoughts were also more likely to be extremely severe.

Both sexes were more likely to develop anxiety-related symptoms, such as anxiety when in a crowd, fear of losing control and catastrophic fears (also in extreme severity in men OR = 2.43), dyspnea (a symptom from the cardiovascular system, often associated with anxiety, also in extreme severity in men). Only panic attacks were more likely in men.

Dysthymic/depressive symptoms and symptoms associated with them were more likely in the group of men with a history of brain injury, and they included: suicidal thoughts, pessimism, need to be alone, feeling of underappreciation (all of the above also in extreme severity, especially high OR = 2.39 in the suicidal thoughts symptom). An increased probability of loss of appetite and pain in the genitals was also found in the male group.

Greater probability of occurrence of allergic symptoms was found in both women (OR = 1.43) and men (OR = 2.04) with a history of head/brain injury, while allergic skin ailments were found only in the group of men. Vomiting in stressful situations was more likely to occur only in the female group (OR = 1.69), also in extreme severity (OR = 1.80).

Table 4 also shows that in men with head injuries, the increased probability of neurotic symptoms was related to a much greater total number of symptoms than in women with head injuries in the past. The same relationship was observed in the case of extreme intensity of symptoms.

Discussion

According to the present study, neuropsychiatric symptoms more likely to occur in patients with neurotic and/or personality disorders with a history of head injuries coincide with possible long-term effects of head injuries, brain tissue injuries, and concussions reported in other studies of patients with other primary diagnoses [26]. This applies to "bodily" symptoms (neurological or similar – "pseudoneurological") [8, 27, 28], neuropsychological [29, 30], emotional (difficulty controlling affect, especially anger [31]) and other psychopathological symptoms – depressive [32], anxiety [9, 33], obsessive-compulsive [34]. All of the above symptoms can coexist in both neurological and psychiatric disorders. The results of the study seem to confirm that considering neurotic disorders as functional and neurological diseases as organic is an oversimplification. Neurological disorders may manifest as symptoms of mental disorders, and mental disorders may be accompanied by symptoms characteristic of neurological patients. Both in psychiatric and neurological disorders there are neuroanatomical and neurofunctional changes; however, from the perspective of neuroimaging, they are two different classes of disorders [35].

The limitation of this study, due to its retrospective design, is the inability to extend the analyses with data on the time of the injury and its detailed nature. This would help to estimate to what extent the symptoms reported by neurotic patients with head trauma are exclusively neurotic symptoms, neurotic symptoms resulting from a head injury (in tragic circumstances related to psychological trauma) or neurological symptoms. In the opinion of the authors of this study, the inclusion of this type of data will be a valuable element broadening the diagnosis and understanding of patients, especially those with symptoms of unclear etiology.

It is possible that the symptoms in patients with neurotic disorders with a history of head injuries are mainly of a neurological nature (they represent long-term effects of the injury). Apart from psychiatric examination, patients were subjected to neuropsychological evaluation with the use of appropriate tests [25, 36]. On the other hand, the data from this study – the occurrence of a given group of symptoms – can be interpreted as the influence of certain characteristics of patients with neurotic disorders. One of these characteristics is the specific functioning of autobiographical memory. Individuals with depressed mood experience cognitive distortions, as a result of which they perceive their past mainly through negative events in their lives. This is associated with an atypical pattern of affective fading of memories – the affective fading of negative memories is much slower than of positive ones. As a result, negative events are remembered better and longer because they remain in the memory as more emotionally expressive. A well-known phenomenon is also the greater cognitive availability of elements whose affective content is consistent with the current emotional state. Therefore, patients seeking help in connection with a depressed mood more easily recall negative events [37]. The above dependencies may, therefore, mean that patients with neurotic disorders who have experienced even a minor head injury may remember it more explicitly and much longer than people without such disorders. The existence of such cognitive distortions in the study group is likely, especially since the study

also showed the presence of other cognitive disorders – identifying memory illusions (paramnesia), e.g., déjà vu and déjà vécu.

Another feature of this group of respondents may be the tendency to catastrophic interpretation of somatic experiences [38]. This tendency is characteristic of panic and depressive disorders. The mechanism of catastrophic interpretation of somatic experiences consists in assigning physiological bodily sensations a threatening meaning (for health or even life). This applies to both somatically healthy patients, as well as to those with serious medical conditions. In the case of patients with somatic diseases, a catastrophic interpretation of somatic experiences may intensify anxiety symptoms, difficult to differentiate from symptoms of underlying diseases. The persistent pattern of interpreting somatic experiences in the above way leads to a worsening of the symptoms of somatic disease – for example, the severity of asthma, as demonstrated in the study by Potoczek [39]. The mechanism of somatosensory amplification works similarly, which concerns the tendency to perceive somatic sensations as intense, harmful, and disturbing. Somatosensory amplification is an excessive concentration on bodily sensations, a tendency to focus on rare and low-intensity sensations, and a tendency to respond to somatic sensations with intense emotions and negative interpretations. This enhancement covers a wide range of stimuli – from normal physiological reactions to symptoms of serious somatic diseases [40]. Patients with neurotic disorders with a history of head trauma can therefore interpret long-term symptoms after brain trauma or somatization and neurological-like conversion symptoms in a more threatening, anxious manner than people without such disorders. Moreover, the way in which difficult life experiences are interpreted and incorporated into the narrative structure of identity may have consequences in terms of personality development, personality traits and lower life satisfaction [41]. Patients who consider a head injury as an event that significantly adversely affects their quality of life and thus include it in their narrative about themselves, may find in the trauma an explanation for their worsened mental state.

An interesting relationship, which was revealed in the study, is a higher probability of head injuries and a greater number and severity of neurotic symptoms in men from the study group. Research suggests that the increased risk of suffering a head injury by men is probably related to the fact that from childhood onwards, men more often than women engage in risky behaviors, participate in contact sports, and consume alcohol more frequently [26]. It is worth noting that in this study, 29% of men were diagnosed with personality disorders, which in some cases may be associated with a tendency to risky behavior.

The results of this study indicate that men with head injuries have an increased risk of neurotic symptoms – both in their number and severity. Among others, they have greater difficulties in controlling affect (outbursts of anger, nervousness). It is difficult to determine the cause-effect direction of the above-mentioned relationships, because affect control difficulties can be simultaneously treated as a neurological and psychiatric (neuropsychiatric) symptom. It is possible that the difficulties in controlling emotions appeared in the respondents as a result of the injury; on the other hand, earlier, i.e., pre-traumatic difficulties of this type could predispose the respondents to engage in risky situations in which physical injuries were more likely to occur.

The authors of other studies on this topic suggest that this relationship probably works by a feedback loop where lower levels of impulse control increase the likelihood of a head injury, which in turn results in a lower level of impulse control, etc. It would be valuable to analyze more detailed data of patients with a history of head injuries and neurotic disorders in subsequent studies. Expanding information about the family, interpersonal and socioeconomic environment, as well as important life events (past and present) may increase knowledge about the cause and circumstances of head injuries (e.g., environmental factors) [42].

Clinical practice provides the basis for anticipating significant long-term effects of head injuries in childhood on the relationship of a significant proportion of patients with their caregivers, e.g., feeling guilty for an accident, or for putting the child at risk or even physical abuse. As, unfortunately, we do not have data on the time frame of injuries and on the presence and impact of influential persons on their occurrence, this issue remains open for further research.

The risk of obsessive-compulsive symptoms and depressed mood in the study group was higher in men. In other studies on depressive symptoms, the data did not indicate gender differences, apart from the observation that in the initial period after a head injury (up to 12 months), depressive symptoms were described as more severe in women [43]. The above differences may be related to the severity of head injuries – the analyzed data do not provide information on this subject, but it is probable that men suffered injuries not only more often, but also more serious ones. The consequence of this could be more intense and more numerous complaints in men, associated with further difficulties in functioning in various spheres of life, and thus with more intense depression. However, analysis of these relationships would require further research.

Vomiting in stressful situations was the only symptom that appeared with an increased risk in the female group with head injuries. Since in the general population vomiting in stressful situations is a symptom significantly more often reported by women in epidemiological studies on neurotic disorders [44], this result may be explained by the general tendency of this symptom to occur more frequently in women. It may also be a symptom persistently associated with head injury – as a "pseudoneurological" symptom chronically associated with trauma (vomiting is a frequent phenomenon immediately after a head injury or brain concussion) [45], which, however, would not explain its greater prevalence among women.

One of the limitations of the study was the nature of the data collected – subjective and retrospectively reported by patients, and therefore difficult to verify. However, this limitation does not seem so severe when several thousand respondents were examined. The specificity of the group is an advantage of the study – there are few publications on psychiatric patients with head injuries, and even more rare are those involving patients with neurotic and/or personality disorders.

Another limitation is the inability to retrospectively obtain accurate information on the nature of an injury to the head or brain tissue from nearly 4,000 subjects treated for disorders other than those typically associated with such injuries. Knowledge about the location of the injury could be valuable information explaining the complexion of symptoms reported by patients. Data on the extent of the injury and the

circumstances of its occurrence could also broaden the understanding of the subjects' psychopathology.

Lack of information on the time of injury may also arouse uncertainty, especially since the methods of treatment and diagnosis of head injuries have made significant progress in recent decades. The data used in this study have been collected since the 1980s, and patient-reported head injuries could have occurred more than thirty years earlier (the average age of respondents was 33 years for women and 32 years for men). Due to the potential importance of changes in the occurrence, diagnosis and treatment of head injuries (greater availability and better quality of medical care, changes in the road situation – rapid automotive progress, greater availability of motor vehicles, the development of technologies securing the driver and passenger, better road quality, etc.), to discuss our results in this context, the recently published research by Brazinova et al. [46] seems to be particularly important. According to their review, which included 66 articles containing data from 1966-2014, it is not possible to clearly indicate a decrease or increase in the frequency of TBI over time. The main causes of TBI, as presented by the authors, are the injuries resulting from: traffic accidents, falls, violence, playing sports, accidents at home and at work, and suicide attempts. Also, Roozenbeek et al. [47] in the publication from 2013 pointed to the increasing frequency of TBI, which they attributed to the greater availability of motor vehicles. In high-income countries, people in motor vehicles are more likely to suffer head injuries, and in middle – and low-income countries – pedestrians, motorcyclists and cyclists. Based on the data from observational studies from 1984-2004, the authors conclude that the incidence of TBI among older people in rich countries is increasing, mainly due to falls. In their opinion, despite advances in medical care, the overall death rate from head injuries has not decreased since 1990. In a 2015 review of 28 TBI epidemiological studies from 16 European countries, published in 2015 by Peeters et al. [48], the most common causes of TBI were falls and road accidents. Road accidents were more often associated with serious head injuries and concerned young adults, while falls – children and the elderly. One of the conclusions of the cited review is that there is no evidence that the incidence of head injuries in Europe is on a downward trend. The second important observation, as in the publication [47] cited above, is the increasing share of falls as the cause of TBI. Other conclusions were drawn by Tagliaferri et al. [49], pointing to a decrease in the number of TBI over time, both at the level of countries and regional populations, but at the same time they indicated little or no change in mortality rates.

Referring to the above publications, it is difficult to precisely compare the circumstances in which our group of patients was exposed to head injuries with the data on injuries in the latest epidemiological studies. However, most of these publications show that the incidence of head injuries has not changed significantly over the past decades, and neither has the prognosis after the injury. The results of this study can therefore be extrapolated to the current population in terms of the number of injuries. However, insufficient data on the variability of management and access to treatment do not allow to refer to clinical changes over time. The question of possible differences in the occurrence and clinical picture of mental disorders related to head injuries remains

unanswered. Examination of the above changes could provide additional information on the etiology of mental disorders after head injuries – if the number of these disorders decreased over time, it would indicate an organic etiology (more modern medical management), but if the number did not change, it would suggest the psychological basis of the disorder (excluding fast progressing psychological management, such as crisis intervention, rehabilitation).

Conclusions

1. Men who qualified for psychotherapy treatment due to neurotic and/or personality disorders much more often reported previous head or brain trauma than women from the analogous group.
2. Subjects who had a history of head trauma obtained a significantly higher value of the global severity of neurotic complaints in the symptom checklist KO "0" than patients without head trauma. The same relationship concerned both the male and female group.
3. Men with head injuries had a higher risk of occurrence of neurotic symptoms – greater number of symptoms, also in their extreme severity.
4. The study showed a significant relationship between head injuries and the group of anxiety, somatization and conversion symptoms. Both in men and in women, symptoms similar to those occurring in neurological disorders, dissociative, derealization and anxiety disorders were more common.
5. Men with a history of head injuries were more likely than women to experience difficulties in the control of emotional expression, muscle cramps and tension, obsessive-compulsive symptoms, allergic complaints, and symptoms of depressive disorders.
6. In the group of women, the only symptom that occurred more often than in the group of men was vomiting in stressful situations.

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