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Predictors of treatment outcome in headache patients with the Millon Clinical Multiaxial Inventory III (MCMI-III)

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Abstract The objective was to discover possible psychological factors influencing treatment outcome for headache patients referred to psychological treatment in a tertiary headache centre by initial assessment using the Millon Clinical Multiaxial Inventory III (MCMI-III). The MCMI-III was administered to 136 referred patients. Patients with valid protocols who had completed their treatment by October 2003 were included. Multidisciplinary treatment was offered including psychological treatment, mainly pain and stress management, pharmacological treatment and physiotherapy. Medians of MCMI-III scales for patients with and without reduction in headache frequency were compared. All of the eligible 58 patients were included in the study. Patients with reduction in headache frequency after treatment had lower scores on the MCMI-III Somatoform, Major depression and Avoidant personality pattern scales and higher scores on the Alcohol Dependence, Self-Defeating personality pattern, Depressive personality pattern, Drug Dependence, Aggressive personality pattern and Bipolar: Manic scales before treatment compared to patients without effect. Patients with a positive treatment effect reported less symptoms of depression and seemed less inclined to somatisation than non-responders. Responders also appeared more likely to experience increased social or occupational distress and report difficulties with handling emotions and an enduring tendency to focus on negative aspects of the self-image. The results can give valuable information regarding treatment planning and development.

Keywords Tension-type headache · Migraine · MCMI-III · Psychological treatment · Prognostic indicators

Introduction

Headache is a very common disease, which in mild or infrequent cases often can be helped by medical treatment alone. The most frequent headache diseases like chronic tension-type headache and migraine can often be a major diagnostic and therapeutic problem.

Since 1988 clear international diagnostic criteria for these primary headache diseases (ICHD-I and ICHD-II criteria [1, 2]) have been used in relation to clinical, epidemiological and pharmacological research. Holroyd [3]

emphasises the importance of using these criteria also in studies concerning psychological treatment of headache patients, as various headache disorders may have different responses to psychological treatment.

Interdisciplinary and non-pharmacological treatment of headache have become very common and have shown good effect, even though patient-groups have not always been diagnosed according to the International Headache Society (IHS) classification (e.g. [4]). Relaxation training, biofeedback and cognitive therapy have shown significant reduction in headache for both tension-type headache and migraine [5–7]. However, these treatments are time-consuming and not effective in all patients [4, 8]. This has led to an interest for prognostic indicators [4, 8].

Kurman et al. [9] found in a study using the Minnesota Multiphasic Personality Inventory II (MMPI-II) that 42 of 86 persons having chronic headache (post-traumatic headache or severe headaches lasting at least 72 h with or without medication overuse) showed significant levels of psychopathology in their MMPI-II profiles. They assumed that the degree of psychopathology for the 13 persons with the highest scores would interfere with the pharmacological treatment of the headache. The assumption was based on studies [10, 11] showing an association between poorer treatment outcome and higher levels of psychological distress and psychopathology among patients with chronic headache.

Millon and Davis [12] argued that the personality constitution among other things will influence the ability to cope with substantial stressors like chronic pain and the individual's capability to engage in social relations. Ciechanowski et al. [13] found that attachment style influenced adaptation and treatment results for 111 patients with different chronic pain diseases. Saper and Lake [14] have described the consequences of borderline personality disorders for the treatment of headache patients. Reich and Vasile [15] found support for the adverse impact of personality disorders on treatment outcome for a variety of clinical syndromes. It is thus very likely that the personality constitution can influence the ability to cope with severe headache as well as the possibilities of profiting from interdisciplinary treatment of the headache.

So far there have been few studies concerning the association between treatment outcome and psychopathology and most of these studies have used versions of the MMPI, which is a time-consuming instrument (MMPI-II contains 567 items) [10, 16, 17]. MCMI-III [18] is an inventory for assessment of personality constitution and psychopathology according to the Axis II (enduring personality characteristics) and Axis I (acute clinical disturbances) from the DSM-IV in persons having emotional and interpersonal difficulties. It is worth noting that 3 scales deals with depressive symptoms: the Depressive Personality Pattern scale (representing enduring patterns or traits of thoughts, and self-image related to depression), the Dysthymia Scale (representing mild and moderate symptoms or states of depression) and the Major Depression Scale (with high scores suggesting severe states of depression). The inventory is used parallel to the MMPI and has the advantage of relatively few items (175) compared to the MMPI. The original version of MCMI (MCMI-I) and another Millon instrument (Millon Behavioral Health Inventory) have been used in two earlier studies of headache patients and both studies found that certain scales of the MBHI and MCMI-I showed significant differences between headache patients and headache-free controls [19, 20].

As psychological treatment may require both more time and effort to complete than pharmacological treatment [21], it would be useful to have predictors of treatment outcome that can be easily applied. In addition, identification of prognostic patient characteristics would be of considerable value for the development of improved treatment possibilities.

The aim of the present study was to examine whether patients with more pronounced personality patterns or clinical syndromes (as measured by MCMI-III scales for personality patterns and clinical syndromes) would experience less reduction in headache frequency after treatment in a tertiary headache centre compared to patients with lower scores.

Methods

Material

All patients consecutively referred to psychological treatment at a tertiary and national headache centre from 1 January 2002 to 31 December 2002 and having completed treatment by October 2003.

Method

All patients underwent an initial neurological examination and were diagnosed by an experienced neurologist according to IHS criteria and based on completion of prospective diagnostic headache diaries for minimum 4 weeks and a structured interview. The patients were afterwards referred to psychological treatment at the headache centre. Referral criteria: patients reporting daily hassles leading to worsening of the headache, patients reporting symptoms of depression or anxiety, patients with chronic headache having tried several prophylactic pharmacological treatments without significant reduction in headache amount or patients asking for psychological treatment.

The psychological treatment consisted primarily of 8 weekly 2-h group sessions (8 participants) conducted by a trained psy-

chologist and focused on teaching of relaxation and stress-management skills. Some patients were seen for individual sessions during 2 weeks of hospitalisation.

In this study the patients were primarily categorised according to treatment effect at the termination of treatment at the Danish Headache Centre: one group with more than 30% reduction in headache frequency measured in days per month (REDUC) and a group with 30% or less reduction in frequency (NOREDUC). Headache frequencies were based on one-month headache diaries filled out at admission and termination of treatment and treatment results thus include effects of psychological treatment, medical treatment (abortive and prophylactic) and physiotherapy.

The MCMI-III was administered to all patients referred to psychological treatment at their first meeting with the psychologist. The MCMI-III is a questionnaire with 175 items answered "right" or "wrong" for identification of personality traits and clinical syndromes, most of which corresponds with DSM-IV criteria. The 14 personality scales and 10 clinical scales are scored using Base Rate (BR) scores based on the prevalence of any personality pattern or clinical syndrome in the target population contrary to the often-used T-score approach, which assumes uniform prevalence rates [22]. A BR score of 75 is assumed to reflect presence of some features of a given personality pattern or clinical syndrome and a BR score of 85 is assumed to indicate definite presence of the personality pattern or clinical syndrome [23]. The MCMI-III was provided in a Danish version for The Danish Headache Centre by Erik Simonsen and Ask Elklit in co-operation with Dansk Psykologisk Forlag A/S (Danish Psychological Publishers Ltd.) [22].

Statistics

The primary efficacy parameter was characterisation of treatment responders versus non-responders on the basis of clinically relevant differences in MCMI-III scales. A difference between groups of 10 points or greater in MCMI-III scale medians was considered clinically relevant.

Results

A total of 136 patients were referred to psychological treatment. All of the 58 patients [71% women (n=41) and 29% men (n=17)] who had completed treatment at the end of the study period were included in the study.

Of the 58 included patients, 72% (n=42) had also been offered physiotherapy. Eighty-six percent (n=50) of the patients were treated as outpatients and 14% (n=8) were seen as inpatients (primarily due to medication overuse). The group sessions on pain and stress management were offered to 83% (n=48) of the patients. The rest were seen individually (mostly during 2 weeks' hospitalisation).

In all patients optimisation of acute and prophylactic pharmacological treatment was performed. Clinical characteristics of patients are shown in Table 1.

The mean number of headache days per month for the total population (n=58) was 24 (range 6–30). The corresponding numbers for the different headache diagnoses were TTH 26 (6–30), MIG 17 (6–30), MOH 25 (11–30) and Other 29 (21–30).

In this material there were more patients with TTH and MOH but less with MIG compared to the distribution of headache diagnoses in the total population in the Danish Headache Centre in the same period (n=336). In the total sample 19% had TTH, 40% had MIG and 20% had MOH [24]. Likewise patients referred to psychological treatment had a tendency toward higher headache frequency on average compared to the total population in the headache centre with 24 and 19 days/month respectively [24].

The most common elevated scales for personality patterns were Depressive (28%), Narcissistic (26%), Dependent (21%) and Avoidant (21%) and the most frequent elevated scale for clinical syndrome was Anxiety (33%) (Table 2).

In total, 42 (72%) patients had a BR score of more than 74 on at least one scale of personality patterns and 23 (40%) patients had a BR score of more than 74 on at least one scale of clinical syndromes.

At the end of treatment at the Danish Headache Centre, 24 patients had more than 30% reduction of headache frequency and 34 patients had 30% or less reduction in headache frequency. The mean headache frequencies (days/month) for the two groups were 22 and 26 respectively before treatment and 6 and 27 respectively after treatment. In the REDUC group 42% had MOH, 21% had

Table 1 Clinical characteristics of patients in relation to headache diagnoses (n=58)

	TTH		MIG		MOH		Other*	
	n	%	n	%	n	%	n	%
Total	19	33	13	22	17	29	9	16
Women (n=41)	12	29	11	27	11	27	7	17
Men (n=17)	7	41	2	12	6	35	2	12

*Other: primarily new daily persistent headache and chronic post-traumatic headache

Table 2 MCMI-III personality patterns and clinical syndromes for headache patients (*n*=58)

	BR score ≥75			BR score ≥85	
	n	*%*		*n*	*%*
Modifying indices					
Disclosure	5	8.6		2	3.4
Desirability	20	34.5		5	8.6
Debasement	3	5.2		0	0
Personality patterns					
Schizoid	9	15.5		2	3.4
Avoidant	12	20.7		3	5.2
Depressive	16	27.6		3	5.2
Dependent	12	20.7		3	5.2
Histrionic	1	1.7		0	0
Narcissistic	15	25.9		5	8.6
Antisocial	3	5.2		0	0
Aggressive	6	10.3		1	1.7
Compulsive	0	0		0	0
Passive–aggressive	5	8.6		0	0
Self-defeating	7	12.1		1	1.7
Schizotypal	0	0		0	0
Borderline	3	5.2		2	3.4
Paranoid	2	3.4		0	0
Clinical syndromes					
Anxiety	19	32.8		4	6.9
Somatoform	3	5.2		0	0
Bipolar: manic	3	5.2		1	1.7
Dysthymia	5	8.6		1	1.7
Alcohol dependence	1	1.7		0	0
Drug dependence	1	1.7		0	0
Posttraumatic stress disorder	1	1.7		1	1.7
Thought disorder	2	3.4		0	0
Major depression	4	6.9		1	1.7
Delusional disorder	1	1.7		1	1.7

TTH, 29% had MIG and 8% had other headache diagnoses. In the NOREDUC group the percentages were 21, 41, 18 and 21 respectively.

There were 9 MCMI-III subscales with differences in medians greater than 10 for the 2 groups of patients. The REDUC group had higher medians than the NOREDUC group on the Alcohol Dependence, Self-Defeating personality pattern, Depressive personality pattern, Drug Dependence, Aggressive personality pattern and Bipolar: Manic scales, and lower scores on the Somatoform, Major Depression and Avoidant personality pattern scales (Figs. 1 and 2).

Discussion

One of the important findings in the present study was that patients with a positive treatment effect seemed less depressed and less inclined to somatisation compared to non-responders. These findings corresponds with earlier studies of outcome for headache patients [25–27] and a study of hypochondriasis, which showed more somatisation among non-responders [28]. In the present study most patients were offered 8 group sessions focused on different relaxation techniques and behavioural and cognitive
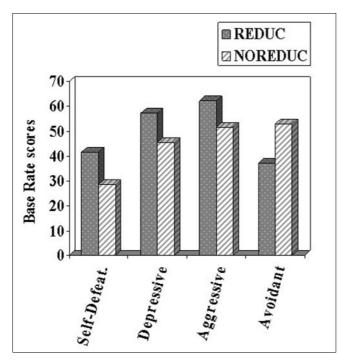
Fig. 1 MCMI-III personality patterns for REDUC and NOREDUC patients. Median values of Base Rate scores for the 2 groups are presented
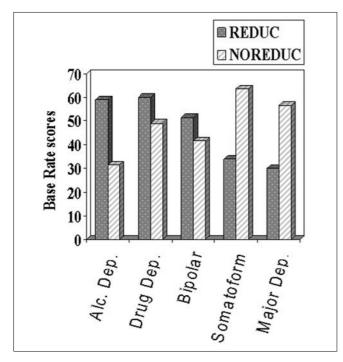

Fig. 2 MCMI-III clinical syndromes for REDUC and NOREDUC patients. Median values of Base Rate scores for the 2 groups are presented

stress management. This could indicate that patients presenting with more somatisation features may need a more

comprehensive approach (e.g., group therapy more focused on emotional processing rather than general stress and pain management), and that patients with depressive disorders may benefit more from pain and stress management interventions if receiving prior medical or psychological treatment for depression.

An earlier study of mediators of non-pharmacological headache treatment showed a significant relationship between reduction in headache and expression of somatic concerns [29], indicating that for headache patients endorsement of some somatisation items may merely reflect the level of headache. The finding of higher scores on the Somatisation scale in the NOREDUC group in this study thus could also be due to the higher level of headache frequency in this group.

The REDUC group also had higher scores than the NOREDUC group on scales for alcohol and drug dependence. Patients with high scores on these scales are likely to experience social, family or occupational distress [23]. The higher scores on these scales in the REDUC group are probably related to this facet rather than misuse of substances, as patients seen in headache centres rarely seem to have problems with excessive alcohol consumption, only excessive medication use. An explanation for the possible association of experiencing distress with better treatment outcome could be that these patients may find some symptom relief in applying techniques taught in our pain- and stress-management programme (restructuring of negative thoughts, communication skills etc.) [30].

The higher proportion of patients with MOH in the REDUC group may also have contributed to this finding as patients with MOH tended to have higher scores on the Alcohol and Drug Dependence scales compared to the other diagnostic groups.

Furthermore, the REDUC group tended to have higher scores on the scales for depressive personality and self-defeating personality than the NOREDUC group. Persons with a depressive or self-defeating personality style are supposed to have potential for developing depth of insight [23]. This is probably an asset in terms of profiting from psychological interventions and a study of cognitive-behavioural group treatment of major depression showed no adverse effect on outcome due to presence of depressive personality traits [31].

Both the REDUC and NOREDUC groups had relatively high scores on the scale for Aggressive personality, with the REDUC group having the highest median (medians 62 and 52 respectively). The median for persons without significant psychological problems is arbitrarily set to 35 [18]. The tendency to higher scores on the Aggressive personality scale among REDUC patients seems to be in concordance with studies showing less control with anger expression among headache patients [32, 33] and a sug-

gestion that anger of pain patients is appraisal related [34] and thus would be amenable to cognitive therapy.

The NOREDUC group tended to have higher scores on the scale for avoidant personality. This tendency among NOREDUC patients may limit their possibilities of profiting from treatment delivered in a group format, which have been shown in studies of group treatment for social phobia, where participants with avoidant personality had poorer outcome [35, 36].

It thus seems likely that headache patients presenting with psychological, social or occupational distress, poor self-image or irritable mood may profit well from psychological group treatment focused on pain and stress management, whereas patients presenting with significant depressive symptoms or features of somatisation may need treatment focused on the depressive symptoms or psychological treatment focused more on emotional processing. Also, some patients may not profit from psychological treatment delivered in a group format due to elevated levels of anxiety in social situations.

An outcome study of 156 persons with tension-type headache showed no significant relationship between measures of psychological distress and personality and positive treatment outcome (50% reduction in headache index) after treatment with autogenic training and cognitive self-hypnosis [37]. This result – apparently contradictory of the findings in this study – may reflect differences in study populations due to the recruitment method (93 subjects were recruited through advertisements) and exclusion criteria (presence of major affective disorder or psychiatric diagnosis requiring immediate treatment) used in the study by ter Kuile and colleagues [37].

In the present study all participants were patients consecutively referred to psychological treatment in a multidisciplinary headache centre and all patients were diagnosed by experienced neurologists based on clinical examination and the patients' fulfilment of one-month headache diaries.

Some precautions must be observed, as the sample was rather small and most patients were offered multimodal treatment. Another source of possible error is the employment of an inventory using Base Rate scores that is based on the prevalence of any given personality trait or clinical syndrome in the original target population (North American psychiatric patients), as the respective prevalence rates are not known in the present population. Elklit and Simonsen [22] found in a study of 2323 Danish MCMI-III protocols from persons referred to psychologists or psychiatrists that the correlations between raw scores and Base Rate scores were equal to those found in the American reference material and all the patients included in this study were referred to psychological treatment and thus seem to fulfil the criteria for use of the inventory [22].

In summary, possible factors associated with good treatment outcome in this study were lower scores on scales reflecting Somatoform Disorder, Major Depression and Avoidant Personality, and higher scores on scales reflecting Alcohol and Drug Dependence syndromes, Depressive, Aggressive and Self-Defeating Personality, and Bipolar Manic syndrome.

Headache patients presenting with significant depressive symptoms or features of somatisation may need treatment more focused on these problems in order to profit from conventional treatment in multidisciplinary headache centres, whereas headache patients experiencing social, family or occupational distress may attain some headache relief from psychological interventions.

A replication of this study with larger material and statistical analyses of the possible moderators of treatment found in this study should be performed to confirm our findings. This could also allow for analyses of the possible impact of the extent of psychopathology on treatment outcome and analysis of specific item endorsements may shed further light on some of the questions raised by the current findings. Also, it may be worthwhile considering other psychological factors such as motivation, emotional processing and headache-specific locus of control and self-efficacy as possible moderators or mediators of treatment outcome.

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