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Personality disorders and outcome after multidisciplinary pain therapy

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Abstract

Objectives: Interdisciplinary treatment programmes are the gold standard for patients suffering from chronic pain. However, several patient-related factors seem to influence the patients' outcome. The aim of our study was to inquire whether patients with personality disorders (PD) might benefit less from an interdisciplinary treatment programme compared to patients without PD.

Methods: A prospective, observational study with chronic pain patients attending a 5-week interdisciplinary treatment programme was performed. Main outcome parameters were psychological stabilization and pain intensity before and after the programme.

Results: Out of the 104 included patients, 71 (68.3%) showed personality accentuations and 16 (15.4%) were diagnosed with PDs. PDs were mostly classified as histrionic, followed by borderline and narcistic personality. Patients diagnosed with histrionic accentuation showed a significantly better treatment response in terms of pain. Reduction in ADS (Allgemeine Depressionsskala – depression scale) was 3.4 in patients with PD and 11.1 in those without PD. Borderline patients showed a significant increase of ADS (by 2.0; $p < 0.05$) after programme completion.

Discussion: Patients with chronic pain and personality accentuations or disorder only showed a slightly different outcome after interdisciplinary treatment programme and should therefore not be excluded from these programmes. Registered at German Clinical Trials Register (DRKS-ID: DRKS00015141).

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Introduction

Chronic pain is a common phenomenon and its pathophysiology is complex. It has not only a significant impact on the affected individual, but also on society.[1] While acute pain is caused by a pre-existing disease or by an injury, chronic pain is an independent condition and not solely a concomitant symptom of other complaints.[2] Chronic pain therefore has its own medical definitions and its taxonomy is based on the biopsychosocial model.[3]

Pain conditions are rated in the top ten of leading diseases that patients suffer for many years.[4] Although considerable efforts were made to understand the pathophysiology of chronic pain, scientific knowledge in this field is still fragmentary. Multiple factors are involved in the development and maintenance of chronic pain and psychological factors play a key role.[5] Therefore, interdisciplinary treatment programmes are recommended as gold standard for chronic pain treatment by national and international guidelines and scientific data proved the effectiveness of those programmes.[6–9] Also efficacy could be demonstrated in terms of long-term cost-efficiency and positive patient related longitudinal effects,[9] leading to functional restoration, pain relief, and return to work.[10,11]

Although, individual results of these interdisciplinary treatment programmes seem to be quite variable with some patients improving only slightly or not at all.[12] Several factors are associated with worse outcome after interdisciplinary biopsychosocial treatment programmes such as genetic dysregulations, disabilities, age, gender, education, anxiety, and pain levels before therapy.[7,13–15] However, the role of psychological factors, especially personality disorders (PD), has barely been examined so far.

PD are an important issue with a prevalence up to 15% in the adult population.[16] Most frequent types of PDs in the general population are obsessive-compulsive, paranoid, antisocial, narcissistic, borderline and histrionic. In patients suffering from chronic pain, the prevalence of PDs is even higher and account up to 59%.[17,18] These patients are not only challenging for most therapeutic settings but are also assumed to be associated with poor individual outcomes.[19] In the setting of group therapy, which is also used in interdisciplinary treatment programmes, it seems obvious that PDs may have a negative impact on the therapy outcome since there are numerous opportunities for interpersonal conflicts as well as emotional upheavals. For this reason, patients with PDs are frequently excluded from these treatment programmes.

Therefore, we hypothesized that patients with PDs may influence the effect of interdisciplinary pain therapy. More specific, these patients might benefit less from the therapy than patients without PDs. Since different PDs have different characteristics, it might be also most likely that the treatment effect might be also different in patients with different PD. In this study, we therefore analysed, if an association exists between PDs and two main outcome parameters of chronic pain therapy: pain reduction (measures on NRS) and psychological stabilization (measured by ADS).

Material and methods

Patients and design

Our study was a prospective, observational trial in patients with chronic pain. The study took place at the outpatient clinic of the Interdisciplinary Pain Centre, Klinikum Landsberg am Lech, Germany. In all patients, indication for an

interdisciplinary treatment programme was confirmed after a two-day assessment according to the evidence-based national guidelines by the ad hoc commission on multimodal pain therapy of the German Pain Society.

The assessment was performed by a team consisting of a physician (pain specialist with an experience of at least ten years in pain medicine), a psychologist, an occupational therapist and a physiotherapist (each with additional qualification in pain therapy). After completion of the assessment, this team discussed the medical, psychosocial, and physical-functional findings and gave a therapy recommendation.

Inclusion criteria for our study was to consent for the complete participation in an interdisciplinary treatment programme for patients with chronic pain at our centre. Exclusion criteria were age younger than 18 and older than 80 years, pregnancy, ongoing pension proceedings and active drug abuse. Personality disorder or accentuation was not an inclusion criterion, since the aim of our study was to analyse patients with these PD/accentuations in a common treatment setting with patients having no PD/accentuations.

Informed consent was obtained before inclusion into the study. All participants were informed of the purpose of the study and were asked to complete two surveys at the beginning and in the end of interdisciplinary treatment programme. The first survey covered pain related questions and was strongly aligned to the survey of the German Pain Society[20]; the second survey covered topics of personal and sociodemographic factors.[21] Patients included in this study have also been part of a recently published study by Heyn et al.[22]

Diagnosis of PD

Classification and/or diagnosis of individual and psychological factors was based on the results of the surveys and on discussions of the interdisciplinary treatment team after the programme. By using this approach, the diagnostic process also considered the interactive behaviour of each patient (interaction with other patients and therapists) during the multidisciplinary treatment programme. Our specific setting allowed a solid and exact capture of psychological disorders and a fine distinction between personality accentuation and PD.

The diagnosis and distinction between personality accentuation and personality disorder was made according to the DSM-5 criteria and categorized in three clusters:

Cluster A: paranoid, schizoid, schizoid typical
Cluster B: borderline, histrionic, anti-social, narcissistic
Cluster C: avoiding, dependent, compulsive, passive-aggressive, combined

To avoid a bias, the team determined the diagnosis of PD before the outcome of the study was available. Statistical analysis of the results was performed by an independent biostatistician who had no contact to the treated patients.

Therapy/methods

All patients underwent our interdisciplinary outpatient treatment programme. The programme follows a biopsychosocial approach and comprises medical (examination, education), physical (exercise), work-related, and behavioural therapy components. Specialists of different professional groups (e.g. physicians, physiotherapists, psychotherapists, occupational co-therapists) are involved in the programme. Duration of the programme is five weeks (five days a week, eight hours a day). The programme includes individual and group approaches for the patient and daily meetings of the interdisciplinary treatment team. It is aligned with the recommendations on structural and process parameters of the ad hoc commission 'Interdisciplinary Multimodal Pain Therapy' of the German Pain Society.[20]

Outcome

After termination of the interdisciplinary treatment programme, outcome parameters as

Table 1. Demographic factors of the participants including pain and psychological factors as well as personality variables.

Variable	N (%)	Median (IQR)
General variables		
Sex – female	81 (77.9)	
Age [years]		54 (47.75–57)
Education {14 NAs}		
None	2 (2.2)	
Lower secondary school	41 (45.5)	
Secondary school	34 (37.8)	
A-level	7 (7.8)	
University	6 (6.7)	
Reduction of pain achieved	79 (76.0)	
Pain at start [NRS]		7 (6–8)
Pain at end [NRS]		4 (3–6)
Psychological improvement – yes	84 (82.4)	
ADS at start [Score]		26.5 (17.25–34)
ADS at end [Score]		14.5 (8–24)
Personality variables		
Accentuation | Manifest disorder	71 (68.2) | 16 (15.4)	
Schizoid	1 (0.9) | 1 (0.9)	
Borderline	18 (17.3) | 5 (4.8)	
Histrionic	27 (26.0) | 3 (2.9)	
Narcissistic	13 (12.5) | 2 (1.9)	
Avoiding	1 (0.9) | 1 (0.9)	
Dependent	8 (7.7) | 2 (1.9)	
Compulsive	2 (1.9) | 1 (0.9)	
Combined	1 (0.9) | 1 (0.9)	
Chronic pain characteristics		
Headache	24 (23.1)	
Back pain	60 (57.7)	
Neuropathic pain	17 (16.3)	
Multilocal / Myofacial pain	50 (48.1)	
Arthrosis	17 (16.3)	
CRPS	3 (2.9)	
Psychological comorbidities		
Depression	97 (93.3)	
Anxiety disorder	5 (4.8)	
PTBS	10 (9.6)	
Sleep disorder	68 (65.4)	
Addiction history	44 (42.3)	

N: number; IQR: interquartile range; N/A: not available; ADS: Allgemeine Depressionsskala (depression scale); NRS: numeric rating scale; CRPS: complex regional pain syndrome; PTBS: Post-Traumatic Stress Disorder.

recorded by the two surveys were analysed separately for pain and psychological stabilization. Average pain levels (last week) were determined by using a numeric rating scale with 0 meaning ''no pain at all'' and 10 meaning ''worst pain imaginable''. To analyse psychological stabilization, we used the German version of the 'Center for Epidemiologic

Studies Depression Scale' (ADS).[23,24] This scale uses rather 20 questions (answers rated between 0 and 3 points) considering typical symptoms for depression during the last week in the affective, cognitive, somatic and social domain. Each question can be answered between 0 and 3, leading to a sum score of which a cut-off of more than 19 points in chronic pain is defined as clinically relevant depression.

Statistical analyses

Statistical analysis was performed using R Version 3.6.0.[25] Minimal sample size was determined based on the number of patients benefitting from the interdisciplinary treatment programme in terms of pain reduction and psychological stabilization. Based on the yearly evaluation of treatment efficacy of our programme during the last years, between 70 and 80% of patients benefit from this programme.

For sample size calculation, we used the least favourable therapeutic response rate of 70% resulting in the most conservative sample size of 81 patients for the given knowledge. (The level of significance was assumed as $\alpha = 0.05$, accuracy as $e = 0.1$).

Personality accentuations and disorders were analysed using the Wilcox-Mann-Whitney test in combination with a Bonferroni correction to account for multiple testing.

Confounder analysis was performed in terms of age, gender, level of education, depression anxiety disorder, and post-traumatic stress disorder (PTBS) using Chi^2-, Wilcox-, Kruskal-Wallis-Tests as well as logistic and linear regression when appropriate. With this approach a confounding effect on the interaction of personality accentuated traits and pain reduction or psychological stabilization could be excluded.

Ethics

The study followed the principles of the Declaration of Helsinki and was approved by the Institutional Review Board of the Ludwig Maximilians University Munich (approval number: 18-125). The study has also been registered in the German Clinical Trials Register (DRKS-ID: DRKS00015141).

Results

Study sample and demographics

After 15 month 104 patients have been enrolled into the study. All 104 included patients completed a 5-week interdisciplinary pain programme. In two of the 104 patients, ADS scores were not collected. Therefore, data of 104 patients were analysed in terms of pain, and data of 102 patients were evaluated regarding psychological stabilization. 81 (76.0%) of the patients were female, mean age of female patients was 50.6 years (median: 52, interquantile range (IQR): 44–56) and 51.7 years in male participants (median: 55, IQR: 51–57; Wilcox test: $W = 813.5$, $P = 0.357$). The demographic factors of the enrolled patients are summarized in Table 1.

Personality accentuation and – disorder

Out of the 104 patients, 71 (68.3%, confidence interval (CI): [58.4, 77.0]) showed personality accentuations and 16 patients (15.4%, CI: [9.1, 23.8]) were diagnosed with a personality disorder. These PD were mostly classified as histrionic (accentuated: $n = 27$, manifest: $n = 3$), followed by borderline (accentuated: $n = 18$, manifest: $n = 5$) and narcistic (accentuated: $n = 13$, manifest: $n = 2$).

Changes in pain and psychological stabilization

Mean pain level at the beginning of the study was NRS 6.9 (median: 7, IQR: 6–8). The pain level decreased during the interdisciplinary treatment programme; patients stated a mean NRS of 4.2 at the end of the treatment period (median: 4, IQR: 3–6; Wilcox rank

sum test: V = 4472, $P < 0.001$). 76.0% of the patients showed a clinically relevant reduction in pain of NRS ≥ 2. Hence, mean pain reduction was 2.6 (median: 3, IQR: 1–4) points.

The mean ADS before the treatment programme started was 26.1 (median: 26.5, IQR: 17.25–34.0) and 16.1 (median: 14.5, IQR: 8.0–24.0) after the patients completed the interdisciplinary treatment programme giving a mean reduction of 10.0 points (Wilcox rank sum test: V = 416, $P < 0.001$).

Association between pain and personality accentuation and – disorder

Overall, we observed a mean reduction of pain by 2.6 (median: 3, IQR: 1–4) points (NRS). Patients with a histrionic accentuation showed a significant better treatment response in terms of pain (reduction of NRS by 3.4 (median: 3, IQR: 2.5–5, Wilcox test: W = 1398, $P = 0.033$, Bonferroni corrected, Figure 1(a)). Since these patients usually have the tendency to overstate, we also analysed initial pain levels of patients with a histrionic accentuation and compared them to those without histrionic accentuation. Interestingly, statistical analysis revealed no significant difference: patients with histrionic accentuated personality had a mean NRS of 7.2 (median: 7, IQR: 6–8), patients without this accentuation a NRS of 6.8 (median: 7, IQR: 5–8, Wilcox test: W = 889, $P = 0.2592$). Patients with histrionic disorder did not show the beneficial pain reduction found in patients with histrionic accentuation (median: 2, IQR: 1.5–2.5, Wilcox test: W = 116, $P = 1.0^*$, Figure 1(b)). All other PD also showed no significantly different effect on pain levels compared to the overall group after the interdisciplinary treatment programme.

Association between psychological stabilization and personality

Patients without PD showed an average reduction of ADS by 11.1 points (median: 10, IQR: 4–18, Wilcox test: W = 395, $P = 0.045$, Bonferroni corrected) after completion of the programme. In contrast, patients diagnosed with personality disorder had a mean ADS reduction by 3.4 points (median: 4, IQR: −2.5–9.0) only. Contrary, patients with borderline disorders displayed even an increased ADS after completion of the treatment programme by 2.0 (median: 1, IQR: −4–2, Wilcox test: W = 87, $P = 0.048$, Bonferroni corrected) points (Figure 2). For all other PD and accentuations no significant effect on ADS after the end of the interdisciplinary treatment programme could be demonstrated (data not shown).

Discussion

Although chronic pain is a common problem, limited evidence exists for the question, which therapeutic strategies are most effective for specific patients. Interdisciplinary treatment programmes over the years are emerging to be some kind of 'gold-standard' for the therapy of the complex and multidimensional problem of chronic pain. These programmes are proven to be beneficial in a high number of chronic pain patients.[26,27]

Despite these programmes undergoing a process of continuous adaptation and optimization, it is also known that there is a certain number of patients who do not benefit from these programmes.[12] The influence of individual personality and especially of pre-existing PD in the context of group therapy may be suspected to be one possible explanation for these findings. Currently, there are insufficient scientific data supporting these assumptions. With our study we could show that these concerns are unfounded, patients with PDs had similar outcomes after these treatment programmes when compared to patients without PDs.

In psychiatric and psychotherapeutic sciences, PD are a topic of high concern. However, in pain research there has been little discussion on this subject to date. Some studies in patients with borderline personalities suffering from pain demonstrated an altered perception of pain and an association between

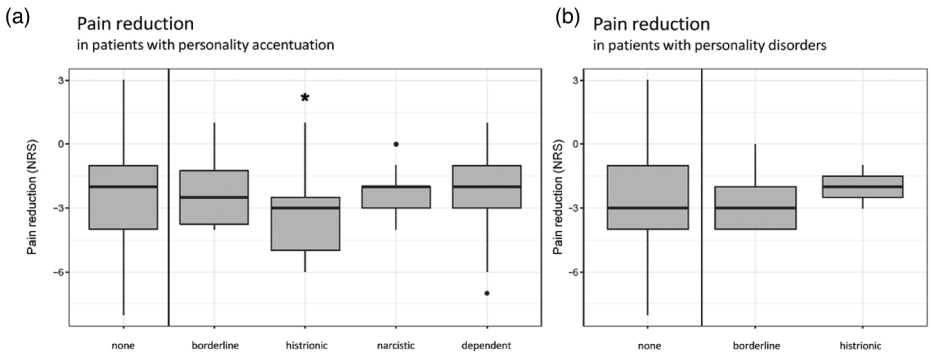

Figure 1. Patients with personal accentuation (a) or disorder (b) show similar changes in pain reduction (NRS) after an interdisciplinary treatment programme. Only patients with a histrionic accentuation showed a significant better treatment response in terms of pain. Data are given as means ± SD; $^{*}p < 0.05$.

physical symptoms and occurrence of borderline-specific symptoms.[12,28]

Furthermore, research on narcissistic disorders and pain showed an association between the extent of narcissism (measured by the Pathological Narcissism Inventory, PNI) and the extent of physical symptoms. In women, a positive association was demonstrated between somatic symptoms and narcissistic vulnerability, but not grandiosity. Among men, somatic symptoms were positively associated with narcissistic grandiosity, but not vulnerability. The study also demonstrated a connection between pathological narcissism and hypersensitivity, which is also an interesting finding in the context of chronic pain.[29]

In clinical pain therapy, challenges coming along with individual personalities and especially with PD have not been systematically incorporated yet. Particularly, in the context of interdisciplinary treatment programmes, once the indication for an interdisciplinary treatment is set, all patients go through the same programme. Moreover, because of the interaction between psychopathology and the group dynamics, sometimes chronic pain patients with PD are excluded from treatments working with group therapy. As most parts of these structured programmes are held in a group setting, we hypothesized that patients with a personality accentuation or – disorder could be prone to have less or different outcomes compared to patients without these conditions.

Analyzing the outcome parameter pain, our prospective observational study revealed an interesting aspect: Whereas the overall reduction of pain in our study was 2.6 points (NRS, median: 3, IQR: 1–4), patients with a histrionic personality accentuation showed a significant better reduction of pain suggesting that these patients benefit from an interdisciplinary pain treatment programme more than others. This wider difference in pain reduction could not be explained by a significantly different pain baseline before therapy, as one could assume knowing that patients with histrionic personal accentuation run to emotional extremes, dramatize and exaggerate situations or feelings.[30] However, it might be possible that these patients overestimate the support and attention during the programme, which resulted in a greater pain reduction. All other personality accentuations and disorders analysed in our study did not have an influence on pain intensity.

Moreover, our data showed no association between the outcome of psychic stabilization during the interdisciplinary treatment programme and pre-existing personality accentuation nor personality disorder. Nevertheless,

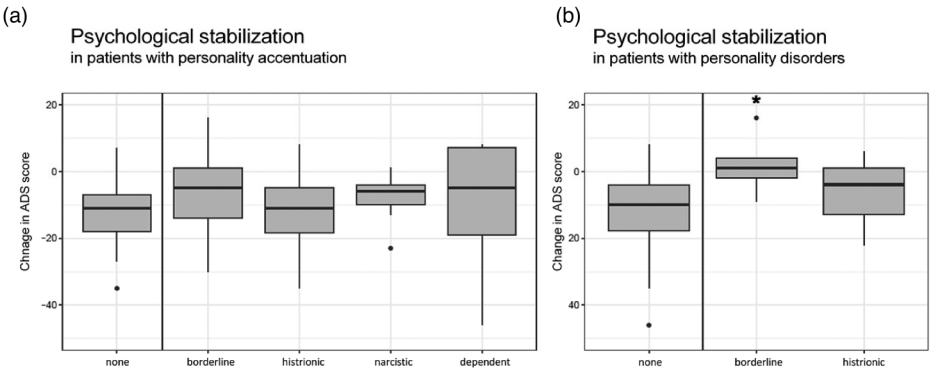

Figure 2. Patients with personal accentuation (a) or disorder (b) show similar changes in ADS after an interdisciplinary treatment programme when compared to patients with personality accentuation/changes. Only patients with a borderline disorder were different, these patients showed a significant increase in ADS score. Data are given as means ± SD; $^{*}p < 0.05$.

for the group of patients with a borderline personality disorder there was even a slight but significant impairment in psychological stabilization during the programme.

PD are common in patients suffering from pain with a described prevalence of 31 to 59%.[18,31,32] In comparison, 67% of the patients in our study showed personality accentuations and 15% PD. This discrepancy might be explained by a different approach of diagnosing and the distinguished subdivision into accentuation and disorder. In most studies, PD are captured by surveys. In contrast, we used the combination of surveys and a broad psychological analysis before, during and after the programme during our study. Thereby, we were able to analyse the patients in individual conversations with different members of the treatment team and during group treatments and not only in the context of a one-time presentation. By using this approach, it was possible to analyse the interactions of individual participants also within the group setting. Thus, it may be possible that in our study more personality accentuations and disorders might have been identified than by using the conventional approaches.

In summary, our data contrast with our initial hypothesis, PDs have a negative effect on outcome after interdisciplinary treatment programmes. We could show that most patients undergoing such a programme showed no or not more than a weak association between PD and therapeutic outcome (as measured by pain reduction and psychological stabilization). This result might be at least in part related to a close relationship of therapists and patient during the interdisciplinary treatment programme, which also helps to detect interactional problems (in the group) early. Further research is warranted to support our findings, to enable generalizability and to evaluate the impact of factors that contribute to a positive therapeutic outcome even in patients with PD in more detail.

Limitations

As our study was performed at a single centre, it might be therefore possible, that performing such an evaluation at another institution might lead to different results. Beyond that, some psychological disorders were detected very seldom. In study populations with a focus on a specific personality disorder, a different picture might be revealed.

Although diagnosis for PD was determined without the team being aware of the individual outcomes yet, the therapeutic team knew the

patients very well at this point, enabling a potential bias. On the other hand, this fact may also be considered as a potential strength of our study because a close therapeutic relationship and a good knowledge of the individual patient enabled the team to diagnose the PD more precisely.

Finally, our treatment groups included patients with different pain origins, therefore the results should be interpreted in this context. Results might be different, if patients with a specific origin of pain (e.g. headache) are analysed.

Conclusion

Our data show at most a weak association between personality accentuations or PD with pain reduction or psychological stabilization in chronic pain patients undergoing an interdisciplinary treatment programme. However, only patients with a histrionic accentuation showed a greater reduction of pain after completion of the treatment. Based on our findings, physicians should not exclude patients with personality accentuations or disorders from interdisciplinary treatment programmes, as long as the treatment team is vigilant to detect any undesirable developments early.

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Author contributions

BL and JH were involved in protocol development, data analysis and writing the first draft of the manuscript. BL, BU and RC performed patient recruitment. JH, BU, NB, and IK researched literature. LM performed the statistical analysis. All authors were involved in the interpretation of the study results and they all reviewed and edited the manuscript and approved the final version of the manuscript.

Declaration of conflicting interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: JH is also employee of Sandoz/Hexal, which had no influence of the composition of the study and the interpretation of the results. The study was not financially supported. All authors have no conflicts of interest to declare.

Ethical approval

The study followed the principles of the Declaration of Helsinki and was approved by the Institutional Review Board of the Ludwig Maximilians University Munich (approval number: 18-125). The study has also been registered in the German Clinical Trials Register (DRKS-ID: DRKS00015141).

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Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

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Trial registration

The study has been registered in the German Clinical Trials Register (DRKS-ID: DRKS00015141).

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