

ORIGINAL RESEARCH

Psychosocial assessment of male patients with persistent idiopathic facial pain—a pilot study

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Abstract

Studies have shown that up to 70% of patients with depressive and anxiety disorders may also experience chronic pain. This study aimed to examine the correlation between depression, anxiety symptoms, sleep quality and personality traits in male patients with persistent idiopathic facial pain. The research protocol was registered to international clinical trials registre. Adult patients who had visited the Hospital of University of Health Sciences clinics between 2019 and 2021 with a diagnosis of G50.1 (International Classification of Disease Tenth revision (ICD-10)) “Atypical Facial Pain” were included in the study. The control group comprised patients with an obvious cause of chronic pain—unilateral post-fracture mandibular pain. The factors assessed in this study were pain, the tendency towards depression and anxiety, sleep quality and personality traits. Of the 20 patients eligible, we found no significant differences between the two groups in terms of personality traits, anxiety, depression and sleep quality. However, we found that pain score was significantly correlated with higher depression scores and that anxiety and depression scores were positively intercorrelated in the experimental group. Our findings indicate that male patients with persistent idiopathic facial pain may present with prominent, but not dominant, depression and anxiety symptoms, and a significant proportion may also have sleep disorders. Neuroticism appears to be associated with both mood disorders and poor sleep quality in male patients with persistent idiopathic facial pain.

Keywords

Persistent idiopathic facial pain; Depression; Anxiety; Sleep disorder; Personality traits

1. Introduction

Chronic pain is a prevalent issue that affects a significant proportion of the general population, with up to 15% of individuals experiencing orofacial discomfort [1]. Orofacial pain may be attributed to various causes, such as diseases affecting dentoalveolar and related structures, myofascial pain, temporomandibular joint pain, cranial nerve lesions or diseases, or it may simply be idiopathic in nature [2]. Notably, nondental pain may also be associated with myofascial pain, temporomandibular joint pain or a combination of these conditions.

Persistent idiopathic facial pain (PIFP), a type of idiopathic orofacial pain, is characterized by persistent facial discomfort with varying features that repeat daily for more than two hours and lasts for more than three months in the absence of any clinical neurological deficiency or previous causative factor [3]. PIFP is typically poorly localized and does not follow the distribution of peripheral nerves, often presenting as a dull, aching or nagging sensation [3].

Chronic pain, including chronic orofacial pain conditions such as PIFP, has been linked to various factors, including physical, social and psychological factors [4]. Mental health,

particularly depressive or anxiety disorders, has been found to be not only associated with the development of chronic pain but also with worse treatment outcomes [5, 6]. Research indicates that up to 70% of patients with depressive and anxiety disorders may also experience chronic pain [7]. Studies have reported that the prevalence of depression and chronic pain in women is approximately twice that of men [4]. Nevertheless, men with chronic pain should also be closely screened for incident depression, as the male population is also susceptible to developing affective mood disorders in chronic pain conditions (sources). In regard to PIFP, co-morbidity with mental disorders, especially mood/affective disorders, has been described in the literature, with the most prominent being depressive and anxiety disorders [8–10]. Although it has also been noted that personality traits, particularly neuroticism, might be related to PIFP [8] and mental (especially mood/affective) disorders [11–13], related evidence remains limited. As PIFP is more prevalent among women at the time of onset, typically around their mid-forties, there is relatively less research on the male population with PIFP [11], and there is little to no data available on the psychosocial assessment of male patients with PIFP.

In our previous studies, we performed psychosocial assessments and assessed other factors related to the general population with PIFP [12, 13]. Herein, we investigated the relationship between depression, anxiety symptoms, sleep quality and prominent personality traits in male patients with PIFP.

2. Materials and methods

This cross-sectional, single-center, controlled and parallel-group study was conducted at the Department of Oral and Maxillofacial Surgery of the Lithuanian University of Health Sciences Hospital Lithuanian Clinics from 2019 to 2021.

Study protocol was prospectively registered on [ClinicalTrials.gov](https://clinicaltrials.gov) (identifier: NCT04775758). In addition, the manuscript was prepared following the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) guidelines [14].

Adult patients who visited the Hospital of University of Health Sciences in between 2019 and 2021 and whose last diagnosis in the hospital's internal patient register system was identified as G50.1 in International Classification of Diseases, Tenth Revision (ICD-10) "Atypical Facial Pain" were considered as the main inclusion criteria for this study.

The study inclusion criteria were as follows: Male patients with diagnosed persistent idiopathic facial pain. The research team's diagnosis was supported by the diagnostic criteria for persistent idiopathic face pain listed in the International Classification of Orofacial Pain, 1st Edition (ICOP) [2]: Repeating daily for more than two hours per day for more than three months, inadequately localized, not resembling the path of a peripheral nerve, dull, painful or irritating. To eliminate the possibility of other sources of pain, all patients underwent necessary diagnostic procedures, such as magnetic resonance imaging (MRI), computed tomography (CT) scans and dental X-rays, as advised by medical specialists such as neurologists, dentists, otolaryngologists, ophthalmologists, radiologists or oral or maxillofacial surgeons, and the findings were recorded in their medical files. The results of the clinical and radiological exams for all patients had to be normal, and local etiologies were ruled out. Not explained by a different ICOP or The International Classification of Headache Disorders (ICHD-3) diagnosis.

The study exclusion criteria were as follows: (1) Cases of severe trauma that have been the cause of occurrences of facial pain, (2) Patients previously diagnosed with a mental illness by a psychiatrist, (3) Presence of a systemic illness that could interfere with the study, such as fibromyalgia, Temporomandibular joint (TMJ) arthritis, multiple sclerosis, *etc.*, (4) Painful conditions affecting patient's oral health, (5) A diagnosis of head and neck cancer, (6) A history of drug or alcohol addiction, and (7) Pregnancy.

Patients in the control group were eligible if they had a clear indication of chronic pain, such as unilateral post-fracture mandibular pain (S02.6 according to ICD-10), eight weeks after intermaxillary fixation and were not on any painkillers. The diagnosis was verified independently by two researchers based on the clinical assessment and radiological information. The same exclusion criteria for the experimental group were applied to the control group. One day before participating

in the study, the participants were advised to discontinue any medication that could affect their pain experience. All study participants received the necessary consultations to continue their regular care.

In the case of excruciating pain or pain-related issues, the patients were offered rescue treatment. For this study, only male patients who met the previously specified inclusion criteria for PIFP and post-traumatic chronic mandibular pain underwent further examination. The patients' demographic data, including age and gender, were collected before they were given the questionnaire results.

Patient pain was evaluated during a single visit using the Visual Analogue Scale (VAS), which ranged from 0 (no pain) to 10 (unbearable or unimaginable pain) [15].

Patients' tendency towards depression and anxiety was evaluated using the Hospital Anxiety and Depression Scale (HADS), which was conducted with permission from Granada Learning (GL) assessment, with account number 202422 and reader code 28603 obtained on 20 September 2020. The HADS is a fourteen-item scale, with seven items relating to anxiety and seven items relating to depression. The anxiety and depression subscales each have a range of 0 to 21, with higher scores indicating greater levels of anxiety/depression symptoms. Patients were considered to have anxiety or depression symptoms if their subscale score was 8 or higher [16].

The Pittsburgh Sleep Quality Index (PSQI) was used to evaluate patients' sleep quality. The PSQI comprises 19 self-rating questions that assess seven different aspects of sleep, including: (1) Subjective sleep quality; (2) Sleep latency; (3) Sleep duration; (4) Habitual sleep efficiency; (5) Sleep disturbances; (6) Use of sleeping medications; and (7) Daytime dysfunction.

The 19 self-rated items in the PSQI were used to generate seven component scores, each with a range of 0 to 3, with 0 indicating no difficulty and 3 indicating severe difficulty. Then, a global score was produced by adding the seven component scores, which ranged from 0 to 21 points. A score of 5 was considered the threshold for sleep disorders, with a score of 21 indicating severe problems in all seven areas of sleep quality [17]. Personality traits were evaluated using the Five Factor Model (FFM) questionnaire developed by Costa and McCrae in 1992. The questionnaire comprises 25 pairs of adjectives, with a score ranging from 1 to 7 on a Likert scale. The sums of certain items correspond to one of the five personality traits: extraversion, conscientiousness, agreeableness, neuroticism and openness [18]. A translation of the questionnaire was obtained from A. Bunevičius in 2006 [19].

The sample size for this study was estimated using the Daniel sample size calculation based on epidemiological data. Questionnaire data were collected, and a power analysis was conducted. Based on the findings of the experimental group, the null hypothesis was correctly rejected. The statistical power of the Spearman correlation analysis was determined to be at least 0.88.

The main endpoints of this study were the VAS, HADS, PSQI and FFM indices for each group, with each questionnaire completed during a single visit. The normal distributions were evaluated using the Kolmogorov-Smirnov test. The gender

homogeneity between the groups was assessed using the Chi-squared test, and the interdependence of qualitative evidence was evaluated using the chi-square criterion. The internal consistency of the surveys was assessed using Cronbach's alpha. To assess differences in indices between the groups, we conducted a non-parametric Mann-Whitney test, while Spearman's correlation analysis was employed to assess correlations between various indices. All statistical analyses were performed using the IBM SPSS Statistics software (version 20, IBM Corp., Armonk, NY, USA), and a p -value < 0.05 was considered statistically significant.

3. Results

A total of 140 patients were initially selected to participate in the study, but 39 were excluded for not meeting the pre-defined inclusion criteria, and 6 patients declined to participate. The final sample consisted of 95 patients, comprising 20 men (21.1%) and 75 women (78.9%). For the purposes of this article, only the male population was included in the analysis, comprising 9 (45.0%) respondents in the control group and 11 (55%) respondents in the experimental group. All quantitative data are presented in Table 1.

The mean age of this study cohort was 48.75 (SD, 12.409) years, with no significant differences observed between the two groups ($p = 0.909$).

The results showed that the mean pain expression in this cohort was 4.27 (SD, 2.703), but the differences between the two groups were not significant ($p = 0.18$).

No significant differences were detected between the groups in terms of personality traits. The most prominent personality trait was agreeableness 27.15 (SD, 3.453), followed by conscientiousness 26.7 (SD, 4.555), extraversion 24.0 (SD, 4.267), openness 19.75 (SD, 5.437) and neuroticism 18.00 (SD, 4.401).

In our study sample, there were no significant differences between the experimental and control groups regarding anxiety (mean 9.55 (SD, 5.574) vs. 5.56 (SD, 4.035), $p = 0.147$) and depression scores (mean 6.82 (SD, 4.996) vs. 3.11 (SD, 2.369), $p = 0.091$).

Considering an HADS-anxiety cut-off point of ≥ 8 , 7 (63.6%) respondents in the experimental group were found to have exceeded the HADS-anxiety threshold ≥ 8 , while 4 (44.4%) participants exceeded the threshold in the control group. However, the difference between the two groups was not statistically significant (Chi-squared test (2-sided), $p = 0.653$).

No participants in the control group exceeded the HADS-depression threshold (≥ 8); however, 5 (45.5%) of respondents in the experimental group had increased depressive symptomatology (crossing cut-off point ≥ 8), and the difference between the two groups was statistically significant (Chi-squared test, $p = 0.02$).

In regard to sleep quality, the mean PSQI score in this study cohort was 8.90 (SD, 5.004). Although the PSQI scoring was relatively higher in the experimental group, no significant differences between the two groups were observed ($p = 0.343$). Based on the cut-off point of PSQI, 9 (81.8%) respondents from the experimental group had a threshold of >5 , indicating

poor sleep quality, and although only 4 (44.4%) respondents from the control group had a threshold of >5 , the difference was not significant (Chi-square test, $p = 0.16$). The associations between HADS, PSQI and FFM are represented in Table 2.

The results showed no significant association between anxiety, depression, sleep indexes and FFM in the control group. However, significant and positive correlations were observed between neuroticism and anxiety/depression/sleep indexes in the experimental group. Moreover, in the experimental group, a significant and negative correlation was observed between extraversion and depression, as well as a negative correlation was observed between agreeableness and anxiety/depression/sleep quality indexes.

Further, VAS was found to be significantly correlated with higher depression scores ($r = 0.8$, $p = 0.003$, r —Spearman correlation coefficient) and higher PSQI scores ($r = 0.7$, $p = 0.021$, r —Spearman correlation coefficient) in the experimental group.

Moreover, a positive intercorrelation was observed between anxiety and depression scores in the experimental group $r = 0.8$, $p = 0.001$, r —Spearman correlation coefficient).

Lastly, the results indicated a positive correlation between PSQI and depression ($r = 0.9$, $p < 0.001$, r —Spearman correlation coefficient) or anxiety ($r = 0.8$, $p < 0.001$) scores in the experimental group.

4. Discussion

Our previous study demonstrated that PIFP could be associated with affective mood disorders, poor sleep quality, and neuroticism in male and female patients combined [12, 13], because of limited data available regarding psychosocial assessments of male patients with PIFP, this present research article aimed to evaluate anxiety and depression symptoms, sleep quality, and personality traits in male patients diagnosed with PIFP using three psychosocial assessment tools.

The pathophysiology of PIFP and its relationship with affective disorders are not yet fully understood. Although a previous study included patients with neurovascular compression in a PIFP study sample [20], the current understanding is that neurovascular compression of the trigeminal dorsal root entry zone does not play a significant role in the pathophysiology of PIFP [3].

Some studies suggest that PIFP and post-traumatic trigeminal neuropathy may be two entities on the same spectrum of pathophysiological mechanisms based on reports of trauma in PIFP patients [21], and despite that several studies have reported sensory changes in PIFP could be a neuropathic syndrome, related evidence remains inconsistent [3].

Regarding psychosocial qualities, previous studies have suggested a relationship between PIFP and mental disorders, although the causative relationship is still unclear [22]. It is currently believed that co-morbidity with affective (mood) disorders in PIFP may be best explained as a shared vulnerability for both chronic pain conditions and affective (mood) disorders rather than a direct pathophysiological mechanism [22]. However, data across studies remain inconsistent in regard to psychosocial

TABLE 1. Characteristics of respondents between the experimental group and the control group.

Factors	Total	Experimental	Control	<i>p</i> -value
Age (yr), mean (SD)	48.80 (12.409)	48.27 (14.907)	49.33 (9.341)	0.909
Pain, mean (SD)	4.27 (2.703)	4.36 (2.461)	2.89 (2.205)	0.180
Extraversion	24.00 (4.267)	23.55 (3.751)	24.56 (5.003)	0.766
Conscientiousness	26.70 (4.555)	27.55 (4.503)	25.67 (4.664)	0.370
Agreeableness	27.15 (3.453)	27.45 (3.236)	26.78 (3.866)	0.552
Neuroticism	18.00 (4.401)	18.45 (4.803)	17.44 (4.065)	0.552
Openness	19.75 (5.437)	20.82 (5.997)	18.44 (4.667)	0.152
Depression, mean (SD)	5.15 (4.368)	6.82 (4.996)	3.11 (2.369)	0.091
Anxiety, mean (SD)	7.75 (5.230)	9.55 (5.574)	5.56 (4.035)	0.147
Sleep, mean (SD)	8.90 (5.004)	10.09 (4.989)	7.44 (4.902)	0.343

SD, standard deviation; p-values estimated using Mann-Whitney Asymp. Sig. (2-tailed test).

TABLE 2. Correlation coefficients between hospital anxiety and depression scale, Pittsburgh sleep quality index and five factor model.

Factors	Extraversion	Conscientiousness	Agreeableness	Neuroticism	Openness
Control group (n = 9)					
Anxiety	0.200	-0.200	0.100	0.200	0.030
Depression	-0.500	-0.100	-0.050	0.300	-0.600
Sleep	0.034	-0.068	0.397	0.216	0.186
Experimental group (n = 11)					
Anxiety	-0.400	-0.400	-0.700*	0.800**	0.050
Depression	-0.600*	-0.500	-0.700*	0.700*	-0.010
Sleep	-0.435	-0.512	-0.606*	0.871**	-0.037

* $p < 0.05$; ** $p < 0.01$, Spearman correlation coefficient (2-tailed).

assessment. Some studies with PIFP patients did not find increased depressive symptoms using subjective [20, 23] and objective questionnaires [23]. Conversely, our previous study indicated that PIFP patients had higher levels of depressive and anxiety symptoms [12, 13], and two studies reported significant morbidity with depressive disorders [11, 23].

In this study, we found that male patients with PIFP did not exhibit significantly higher levels of depression, anxiety, poor sleep quality or specific personality traits than the control group. However, it is worth noting that 55.0% of male patients with PIFP reported increased anxiety symptoms, while 45.5% reported increased depressive symptoms, which is consistent with findings from previous studies [11–13, 23]. These results suggest that depression and anxiety symptoms may be present but not necessarily dominant among male patients with PIFP.

Studies have shown that poor sleep quality is associated with chronic pain conditions, although it is rarely investigated in regard to PIFP [24–27]. Our findings indicate that 81.8% of male patients with PIFP presented with poor sleep quality, which is consistent with our previous study [12]. Furthermore, we observed a positive correlation between depression scores and PSQI in male patients, indicating a close relationship between these symptoms in chronic pain conditions [28]. Moreover, higher pain scores were found to be correlated with mood (affective) disorder scores and sleep quality index scores, suggest-

ing a bidirectional relationship between psychosocial factors and pain perception [12].

We observed a significant positive correlation between neuroticism and depression, anxiety, and PSQI scores in male patients with PIFP, which is consistent with previous studies investigating the relationship between affective disorders and personality traits [22, 29–31]. Despite no significant differences in FFM scoring between the groups, we found that a low attribute of agreeableness was associated with increased worry, despair and poorer sleep in male patients. Furthermore, increased depressive symptoms were linked to reduced extraversion in male patients. Collectively, these findings align with those of Ibrahim ME *et al.* [32]'s (2020) study, which suggested that neurotic individuals are more susceptible to developing depression and anxiety in chronic pain circumstances [32].

The results of our study suggest a significant correlation between depression, anxiety symptoms, poor sleep quality, neuroticism and elevated pain levels in male PIFP patients. Although the pathogenesis of PIFP is still not completely understood, our findings suggest that psychosocial factors may complicate its diagnosis and treatment outcomes. Further research is needed to investigate the long-term effects of these factors on the treatment of PIFP in male patients.

The biggest limitation of our study was small sample size.

This study also had some limitations, which might be related to the inclusion criteria used for selecting patients in the experimental group. Also, excluding other pathologies commonly associated with PIFP might have introduced inclusion bias. It is important to note that the self-reporting questionnaires used in this study might have led to an overestimation of associated indices and less satisfactory responses. Additionally, we did not assess pain intensity over time, which could have resulted in various chronicity patterns and increased the risk of depression. Thus, future studies are needed to investigate the impact of pain duration on PIFP. Furthermore, the study did not include other demographic questionnaires, such as quality of life and psychosocial assessment tools, which could have provided valuable insights into male PIFP patients. Lastly, the study's sample size was relatively small and was solely based on male participants.

This study has several strengths worth noting. Firstly, it is the first study to apply a comprehensive psychosocial evaluation exclusively to male patients with PIFP. Secondly, we utilized multiple validated tools to ensure the accuracy and reliability of our findings. Additionally, unlike other chronic pain illnesses, the associations between PIFP, sleep disturbances and personality factors have not been thoroughly explored. Therefore, our study provides valuable insights into the psychosocial factors that may contribute to PIFP in male patients.

5. Conclusions

Our study findings indicate that male patients with PIFP may exhibit notable, but not dominant, symptoms of depression and anxiety, and a significant proportion of male PIFP patients may experience sleep disorders. We also found a correlation between neuroticism and both mood disorders and poor sleep quality in male PIFP patients. Collectively, these results highlight the importance of conducting a comprehensive psychosocial evaluation, including assessing depression, anxiety and sleep quality, when diagnosing PIFP, which could lead to more effective treatment outcomes and aid in preventing misdiagnosis.

AVAILABILITY OF DATA AND MATERIALS

The data are contained within this article.

AUTHOR CONTRIBUTIONS

JPR, AI and GJ—designed the research study; JPR, AI and VG—performed the research; GJ and DR—supervised the whole study, provided help and advice on creating research protocol; GŠ, JPR and AI—analyzed the data; GŠ and AI—wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was conducted in accordance with International Standards of Quality for Clinical Trials and the Declaration of Helsinki in its revised version (Seoul, Korea, 2008). Approval for the research was granted by the Kaunas Regional Biomedical Research Ethics Committee (No. BE-2-19). All patients included in the study signed the clinical trial informed consent form. Both groups were subjected to the same research protocol which was prospectively registered in [ClinicalTrials.gov](https://www.clinicaltrials.gov) (identifier: NCT04775758).

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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