Original Article

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The Investigation of the Effects of Psychogenic Factors on Craniocervical Pain and Disability in Academics

Akademisyenlerde Psikojenik Faktörlerin Kraniyoservikal Ağrı ve Özürlülük Üzerindeki Etkilerinin Araştırılması

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ABSTRACT

Objective: This study aimed to investigate how perceived stress, job burnout and mental fatigue affect neck and craniofacial pain and disability in academics.

Methods: The study included 592 academics with a mean age of 40.11±9.82 years. Neck pain and disability status were determined using the neck disability index (NDI), cranial and facial pain status with the Craniofacial Pain and Disability Index (CFPDI), perceived stress levels with the perceived stress scale-14 (PSS-14), job burnout with the burnout assessment tool (BAT), and mental fatigue was measured using the mental fatigue subscale of the Chalder Fatigue Scale (CFS-mental).

Results: Moderate positive correlations were found between the NDI and PSS-14, BAT, and CFS-mental (r=0.418-0.573, p<0.001). Weak positive correlations were found between the CFPDI and PSS-14, BAT and CFS-mental scores (r=0.232-0.354, p<0.001). The PSS-14, BAT and CFS parameters explained 34.2% of the variance in NDI and 13.2% of the variance in CFPDI.

Conclusion: Psychogenic factors were found to affect neck and craniofacial pain and disability in academics. Therefore, when treating this professional group, psychogenic factors should be considered.

Keywords: Disability, craniofacial pain, psychology, physiotherapy

ÖZ

Amaç: Bu çalışmanın amacı, algılanan stres, iş tükenmişliği ve zihinsel yorgunluğun akademisyenlerde boyun ve kraniyofasiyal ağrı ve sakatlığı nasıl etkilediğini araştırmaktır.

Yöntemler: Çalışmaya yaş ortalaması 40,11±9,82 yıl olan 592 akademisyen dahil edilmiştir. Boyun ağrısı ve engellilik durumu boyun özür indeksi (BÖİ), kraniyal ve yüz ağrısı durumu Kraniyofasiyal Ağrı ve Özürlülük İndeksi (KAÖİ), algılanan stres düzeyleri algılanan stres ölçeği 14 (ASS-14), iş tükenmişliği tükenmişlik değerlendirme aracı (TDA) ve zihinsel yorgunluk Chalder Yorgunluk Ölçeği'nin mental yorgunluk alt ölçeği (CYÖ-mental) kullanılarak ölçülmüştür.

Bulgular: BÖİ ile ASS-14, TDA ve CYÖ-mental arasında orta düzeyde pozitif korelasyon bulundu (r=0,418-0,573, p<0,001). KAÖ ile ASS-14, TDA ve CYÖ-mental puanları arasında zayıf pozitif korelasyon bulunmuştur (r=0,232-0,354, p<0,001). ASS-14, TDA ve CYÖ-mental parametreleri BÖİ'deki varyansın %34,2'sini ve KAÖİ'deki varyansın %13,2'sini açıklamıştır.

Sonuç: Psikojenik faktörlerin akademisyenlerde boyun ve kraniyofasiyal ağrı ve sakatlığı etkilediği bulunmuştur. Bu nedenle, bu meslek grubunu tedavi ederken psikojenik faktörler göz önünde bulundurulmalıdır.

Anahtar Kelimeler: Özür, kraniyofasiyal ağrı, psikoloji, fizyoterapi

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Introduction

Depressive symptoms are one of the most common global health problems, which are thought to affect around 264 million people worldwide. This rate varies between 5.5% and 29.5% among academic staff, and it has been reported that 5.5% of academic staff are employed at private universities experience burnout syndrome (1,2). An excessive workload, demanding job responsibilities, and the pressure to advance academically have all been linked to psychological stress (3,4). Moreover, it is evident that diminished job satisfaction and disagreements with colleagues are known to intensify depressive symptoms within the academic population. Due to the high mental effort involved, constant pressure to perform, the obligation to publish, and institutional responsibilities, academic life can cause intense stress and feelings of burnout in individuals (5).

Neck pain is a very widespread musculoskeletal problem, affecting between 40.4% and 80.1% of academic staff (5). Among the psychogenic causes of neck pain, chronic stress, anxiety, depression, and burnout syndrome are cited as factors.

It has been emphasized that psychogenic factors may be an important risk factor in the onset and development of craniofacial pain (6). Another study reported that craniofacial pain is closely related to psychological factors (7).

There is an increasing body of evidence in the literature suggesting that psychological factors may be associated with musculoskeletal problems, particularly those affecting the craniofacial region and neck (8,9). However, no studies could be found in the literature that have examined the severity of neck and craniofacial pain experienced by academics from a broad psychological perspective.

The aim of this study was to investigate the effects of perceived stress levels, professional burnout, and mental fatigue on craniofacial and neck pain and disability severity among academics working at universities.

Methods

Participants

The study included 592 academics, comprising 304 females and 288 males with an average age of 40.11 years ±9.82 years. All the participants were reached via Google Forms, and all were academics working at higher education institutions. The participants were academic staff working in the departments of physical therapy and rehabilitation, nursing, occupational therapy, child development, and audiology at a total of 32 universities in the Central Anatolia region. Data were collected between June 1, 2025, and October 1, 2025. Participants were contacted by sending invitations to the email addresses listed on their institutions' websites.

A total of 3,602 participants were reached. The response rate for the study was 17.62%. A total of 43 participants were excluded from the study due to missing data. Participants aged 25-65 years who had been working as academics for at least 1 year were included. Individuals with any neurological or rheumatological disease and those with a history of surgery in the neck and craniofacial region, were not included in the study.

This study was also approved by the Research Ethics Committee of Hacettepe University Faculty of Physiotherapy and Rehabilitation (decision no: FTREK25/70, date: 29.05.2025). Informed consent was obtained from all participants.

Evaluations

The age, height, weight, academic experience, and additional medical conditions of all the participants included in the study were recorded.

Self-reported Outcomes

The perceived stress scale-14(PSS-14) was used to measure the emotional stress levels of the study participants. This 14-item scale is used to assess an individual's perceived psychological state, with each item scored on a 5-point Likert scale, ranging from 0 (never) to 4 (very often), to give a total possible score of 56 points (10).

The burnout assessment tool (BAT) was used to assess levels of burnout. This questionnaire, developed by Schaufeli et al. (11), in 2004, consists of six factors and 34 questions. The responses are scored from 1=never to 5=always, with a higher score representing greater burnout, while a low score represents less burnout.

The mental fatigue levels of the participants were assessed with the mental fatigue sub-parameter of the Chalder Fatigue Scale (CFS). The mental fatigue sub-section consists of 4 questions in total, with responses scored on a four-point Likert scale (less than usual, as much as usual, more than usual, much more than usual), in the range of 0 to 3 points, to give a total score of 0 to 12 points. Higher scores suggest more severe fatigue (12).

The neck disability index (NDI) consists of 10 items, 4 of which are related to subjective symptoms and 6 of which are related to activities of daily living. In each section, there are 6 different options for the patient to rate their condition The scoring ranges from 0-5 points for each item providing a maximum score of 50. Higher scores indicate more severe levels of disability (13).

The assessment of pain and resulting disability involving the facial structures and the entire cranium was performed using the 21-item Craniofacial Pain and Disability Index (CFPDI). The total score of this questionnaire ranges from 0 to 63 points, with higher scores indicating more severe pain and disability (14).

Statistical Analysis

Data were analyzed statistically using IBM SPSS version 21.0 software. Conformity to parametric conditions was examined with the Shapiro-Wilk test and all data were seen to be normally distributed. Numerical variables were stated as mean ± standard deviation and minimum-maximum values, and categorical data were reported as number (n) and percentage (%). Correlations between parameters were evaluated with Pearson correlation coefficients. Multiple linear regression was performed to determine the independent variables that contributed significantly to the variance in NDI and CFPDI data. A value of $p<0.05$ was accepted as the level of statistical significance.

Results

The demographic characteristics of the participants and the total scores obtained in the assessment scales are shown in Table 1.

The average age of participants included in the study was 40.11 years, their height was 166.18 cm, their body weight was 68.42 kg, work experience in academia was 12.89 years, PSS-14 scores were 30.03 points, BAT scores were 94.60 points, CFS (mental) scores were 5.42 points, NDI scores were 12.73 points, and CFPDI scores were 10.21 points. All values are given as averages.

Table 1. Demographic data and scale scores of the study participants

n=592	Min-max	Mean ± SD
Age (years)	26-64	40.11±9.82
Height (cm)	148-197	166.18±8.04
Weight (kg)	44-124	68.43±14.88
Duration of working in academia (years)	1-41	12.89±9.43
PSS-14 (points)	9-56	30.03±6.86
BAT (points)	43-163	94.60±22.14
CFS (mental) (points)	0-12	5.42±2.50
NDI (points)	2-42	12.73±6.38
CFPDI (points)	3-59	10.21±7.78

SD: Standard deviation, PSS-14: Perceived stress scale-14, BAT: Burnout assessment tool, CFS (mental): Mental fatigue subscale of the Chalder Fatigue Scale, NDI: Neck disability index, CFPDI: Craniofacial Pain and Disability Index

Correlation analysis revealed significant positive correlations between the NDI and the PSS-14 ($r=0.417$, $p<0.001$), between the NDI and the BAT ($r=0.573$, $p<0.001$), and between the NDI and the CFS-mental ($r=0.418$, $p<0.001$). A significant positive correlation was found between PSS-14 and BAT ($r=0.653$, $p<0.001$) and between PSS-14 and CFS (mental) ($r=0.417$, $p<0.001$). Similarly, a significant positive correlation was observed between BAT and CFS (mental) ($r=0.554$, $p<0.001$) (Table 2).

Correlation analysis revealed significant positive correlations between the CFPDI and PSS-14 ($r=0.232$, $p<0.001$), between CFPDI and BAT ($r=0.354$, $p<0.001$), and between CFPDI and CFS (mental) ($r=0.282$, $p<0.001$). A significant positive correlation was found between PSS-14 and BAT ($r=0.653$, $p<0.001$) and between PSS-14 and CFS (mental) ($r=0.417$, $p<0.001$). Similarly, a significant positive correlation was observed between BAT and CFS (mental) ($r=0.554$, $p<0.001$) (Table 3).

The results of the regression analysis with NDI and CFPDI as dependent variables are given in Table 4. The first model, in which PSS, BAT, and CFS-mental are independent variables, explained 34.2% of the variance in NDI, while the second model explained 13.2% of the variance in CFPDI.

Discussion

The aim of this study was to examine how perceived stress levels, job burnout, and mental fatigue affect craniofacial pain and disability in academic staff. Previous studies have shown that perceived stress, burnout and mental fatigue are associated with neck and craniofacial pain and disability. These psychogenic factors have been found to partially affect craniofacial pain and disability, particularly in cases of neck pain. The original value of this study can be considered to be that it reveals the effects of various psychogenic factors on neck and craniofacial pain, which are quite common in this occupational group, given that academics are a professional group with various psychological risk factors and that the study was conducted on a large sample size. Moreover, the original value of this study is increased by the fact that the factors examined were studied in a professional group on which very limited research has been conducted.

It has been emphasized that pain is partly an emotional experience (15). Vogt and Sikes (16) reported that the medial pain system, which is part of the lateral and medial

Table 2. Pearson correlation coefficients showing associations among the NDI, PSS-14, BAT, and mental fatigue scores

n=592	NDI	PSS-14	BAT	CFS (mental)
NDI		0.417*	0.573*	0.418*
PSS-14	0.417*		0.653*	0.416*
BAT	0.573*	0.653*		0.554*
CFS (mental)	0.418*	0.416*	0.554*	

*: $p<0.001$, Pearson correlation, NDI: Neck disability index, PSS-14: Perceived stress scale-14, BAT: Burnout assessment tool, CFS (mental): Mental fatigue subscale of the Chalder Fatigue Scale

pain systems and supports the affective-motivational dimension of pain, extends medially within the spinothalamic system and extends to the cingulate cortex and limbic system, which are very important for emotional processes, via the medial thalamus. However, Kulkarni et al. (17) emphasised that the medial pain system is also closely related to several subcortical regions that play a key role in emotional processing, such as the amygdala, hypothalamus and periaqueductal grey matter. These neurophysiological mechanisms highlight the close relationship between pain and emotional factors.

Studies have found that perceived stress is associated with neck disability (18,19). Mork et al. (20) demonstrated a moderate association between emotional stress and neck pain (21). One of the other factors that increase pain is hormonal changes. Various studies have shown that negative psychogenic factors—such as emotional stress, mental fatigue, and symptoms of burnout—lower serotonin levels and increase cortisol levels in the body, thereby lowering the pain threshold. However, attributing pain solely to this cause-and-effect relationship would not be an accurate approach. These changes in serotonin and cortisol levels may be only one of the factors affecting pain (22,23). It has been suggested that factors such as stress and depressive symptoms may cause changes in the central pain processing at the spinal cord, medulla oblongata, or cortical levels, which in turn may lead to hyperalgesia (24). The factors mentioned above may be among the reasons why negative psychogenic factors show a positive correlation with neck pain, and regression analysis has shown that they partially explain this pain. However, it has also been emphasized that such negative psychogenic factors can increase muscle tone, and that increased muscle tone can cause various musculoskeletal pains, such as neck pain. In this case, it may again be just one of the factors contributing to increased pain (25). In a study by Kivimäki et al. (26) a four-fold increase in new cases of musculoskeletal pain was found among employees exposed to workplace bullying, and a two-fold increase among those with high workloads and low decision-making autonomy. Therefore, it was concluded that work-related stress factors may trigger or exacerbate pain.

Similarly, craniofacial pain has been reported to be associated with psychogenic factors. Craniofacial pain and disability is a health problem characterised by cranial pain, primarily temporomandibular dysfunction (TMD). As stated by Turk and Rudy (27), one of the main symptoms of TMD is pain, and the management of this is made more difficult by emotional stress and depressive symptoms. Schwartz (28) also suggested that emotional stress is a key contributor to spasms and myofascial pain, particularly in the masticatory muscles.

There are many recent publications on the psychosocial aspects of pain. Grünenwald et al. (29) noted that patients with chronic pain had lower well-being and social belonging, and higher depression. However, they explained the relationship between chronic pain and depression in terms of stress perception and inadequate coping. Fillingim et al. (30) have worked on blood immunological tests, bone and brain imaging, and biomarkers obtained from genetics. In this study, which was conducted with a very large sample size, it was emphasized that biological markers alone are not sufficient for predicting chronic pain and that psychosocial factors must be taken into account. In conclusion, it has been emphasized that a biopsychosocial approach will enable a better understanding of the pain experience in medical conditions. In a study conducted by Chen et al. (31) they examined changes in the amygdala structure in patients with chronic pain and accompanying emotional stress (depression/anxiety). A significant reduction in right amygdala size has been demonstrated in patients with chronic pain and emotional stress. It is emphasized that chronic pain is not merely a sensory experience, but also a source of stress that causes structural changes in emotional processing centers such as the amygdala. It has been noted that these findings once again emphasize that pain and emotional health are intertwined. In their published article, Eich et al. (32) state that for the effective management of chronic pain, psychosocial factors must be recognized, and interdisciplinary, multimodal treatment approaches must

Table 3. Pearson correlation coefficients for associations among the CFPDI, PSS-14, BAT, and CFS (mental) scores

n=592	CFPDI	PSS-14	BAT	CFS (mental)
CFPDI		0.232*	0.354*	0.282*
PSS-14	0.232*		0.653*	0.416*
BAT	0.354*	0.653*		0.554*
CFS (mental)	0.282*	0.416*	0.554*	

*: p<0.001, Pearson correlation, CFPDI: Craniofacial Pain and Disability Index, PSS-14: Perceived stress scale-14, BAT: Burnout assessment tool, CFS (mental): Mental fatigue subscale of the Chalder Fatigue Scale

Table 4. Regression analysis with ndi and CFPDI as the dependent variables

	NDI				CFPDI			
	β	t	p	R^2	β	t	p	R^2
PSS-14	0.055	1.336	0.182	0.342	-0.015	-0.258	0.796	0.132
BAT	0.132	9.509	0.000*		0.103	5.308	<0.001*	
CFS (mental)	0.357	3.477	<0.001*		0.390	2.710	0.007*	

*: p<0.001, NDI: Neck disability index, CFPDI: Craniofacial Pain and Disability Index, PSS-14: Perceived stress scale-14, BAT: Burnout assessment tool, CFS (mental): Mental fatigue subscale of the Chalder Fatigue Scale

be structurally, financially, and educationally supported and consistently integrated into clinical practice. In this way, they have emphasized that both the quality of care will increase and long-term social costs will decrease.

Study Limitations

The fact that craniocervical and neck pain barriers were assessed solely through self-reported questionnaires, the lack of clinical assessment (e.g., physical examination, EMG measurements, imaging methods), and the inability to establish cause-and-effect relationships due to single-time cross-sectional data collection can be considered limitations of this study. The wide range of ages and academic experience of the participating academics can also be considered a limitation.

Finally, another limitation is that no information is provided about the participants' regional distribution, field, or level (research assistant, faculty member, etc.).

Conclusion

The model explained 34.2% of the variance in NDI and 13.2% of the variance in CFPDI. Psychogenic factors should be considered when treating these two issues. Nevertheless, there remains a need for further studies using more objective methods in groups with high emotional stress levels, such as academics.

Ethics

Ethics Committee Approval: This study was also approved by the Research Ethics Committee of Hacettepe University Faculty of Physiotherapy and Rehabilitation (decision no: FTREK25/70, date: 29.05.2025).

Informed Consent: Informed consent was obtained from all participants.

Footnotes

Authorship Contributions

Concept: H.E.K., Ö.Ü., Design: H.E.K., Ö.Ü., Data Collection or Processing: H.E.K., Analysis or Interpretation: H.E.K., Ö.Ü., Literature Search: H.E.K., Writing: H.E.K., Ö.Ü.

Conflict of Interest: No conflict of interest was declared by the authors.

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