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ORIGINAL RESEARCH

Pain in dystonia: investigating its role as a non-motor symptom with a focus on oromandibular dystonia

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Abstract

Background: Dystonia is a movement disorder characterized by abnormal, repetitive movements or postures. Non-motor symptoms, including pain, depression and anxiety, significantly affect the quality of life of patients. However, studies investigating the prevalence and relationship of pain with other factors across different dystonia subtypes are limited. This study examines the presence of pain in dystonia and its relationship with sociodemographic factors, depression and dystonia severity, with a particular focus on the prevalence of pain in different dystonia subtypes. **Methods**: This retrospective cross-sectional study evaluated 61 patients with dystonia. Collected data included sociodemographic characteristics, dystonia localization, pain occurrence and assessment scores for dystonia severity (Global Dystonia Severity Rating Scale), pain (Visual Analog Scale) and depression (Beck Depression Inventory-II). Statistical analysis was performed using SPSS 11.5, with p-values < 0.05 considered statistically significant. **Results**: The cohort (73.77% female, mean age 47.04 $\pm$ 14.04 years) included 85.24% idiopathic and 14.76% acquired dystonia cases. Pain was reported in 34.43% of patients, with the highest prevalence in oromandibular dystonia (80%). No significant associations were found between pain and age or dystonia severity. Pain was significantly more common in oromandibular dystonia and was strongly associated with depression ($p < 0.001$). **Conclusions**: Pain is a prevalent symptom, especially in oromandibular dystonia, and is closely linked to depression. Comprehensive management of dystonia should consider both physical and psychological factors to improve patients' quality of life. Given the limited studies on pain in dystonia, further research is needed in this area.

Keywords

Cervical dystonia; Dystonia; Oromandibular dystonia; Pain

1. Introduction

Dystonia is the third most common movement disorder, characterized by sustained or intermittent abnormal, repetitive movements or postures due to involuntary muscle contractions [1]. Dystonia involves both motor and non-motor symptoms (NMS), including pain, depression and anxiety, which significantly impair patients' quality of life [2, 3]. Classification of dystonia generally follows two axes: the first includes the age of onset, clinical features, temporal spread and associated conditions, while the second axis is based on etiology [1]. Dystonia can be classified into focal, segmental, hemi dystonia, multifocal and generalized forms based on the anatomical distribution of symptoms, and is further categorized etiologically as idiopathic or acquired [1]. While motor symptoms of dystonia have been widely studied, NMS such as pain are often underrecognized and undertreated, despite their substantial impact on daily functioning and overall well-being [4–7]. Pain, in particular, has been linked to reduced quality of life, decreased productivity, and social isolation in dystonia patients [7, 8]. Proposed mechanisms for pain in dystonia include prolonged muscle contraction, lowered pain thresholds due to altered nociceptive pathways, and changes in the cortical somatosensory system [9–13]. However, most studies have focused on cervical dystonia, leaving a gap in the literature regarding pain in other dystonia subtypes, particularly oromandibular dystonia (OMD), which has been associated with a high prevalence of pain [7–14]. Oromandibular dystonia, a focal form of dystonia affecting the mouth and jaw, is notably associated with a higher prevalence of pain, presents unique challenges due to the essential functions of speaking and eating being affected [10, 14].

This study aims to investigate the prevalence and severity of pain across various dystonia subtypes, focusing on its relationship with sociodemographic characteristics, depression, and dystonia severity. By exploring these associations, we hope to highlight the need for comprehensive treatment approaches that address both motor and non-motor symptoms.

2. Method

In this retrospective, single-center, descriptive cross-sectional study, we evaluated the medical records of 61 patients diagnosed with dystonia and followed at the Movement Disorders and Botulinum Toxin Applications Clinic between March 2022 and October 2023. The diagnosis of dystonia was based on criteria established by the *Ad Hoc* Committee of the Dystonia Medical Research Foundation, which include clinical features, exclusion of similar conditions, assessment of treatment response, and genetic testing when necessary. Clinically, dystonia is defined by sustained or intermittent muscle contractions causing abnormal, repetitive movements or postures [15]. The study protocol was approved by the Health Sciences University Sancaktepe Sehit Prof. Dr. Ilhan Varank Research and Training Hospital Ethics Committee on 26 June 2024 (approval number: 199/2024). All participants provided informed consent prior to data collection. Sociodemographic data, dystonia localization, presence and localization of pain were retrospectively assessed thorough patient files. The severity of dystonia was evaluated via the Global Dystonia Severity Rating Scale (GDS), pain severity was assessed using the Visual Analog Scale (VAS), and emotional assessment was obtained using the Beck Depression Inventory-II (BDI-II) retrospectively, all of which were included in the patient files.

Inclusion criteria for the study were being 18 years or older, having a confirmed diagnosis of dystonia followed at the movement disorders and botulinum toxin applications clinic, having complete sociodemographic data, dystonia localization, and assessment scores (GDS, VAS, BDI-II) recorded in the patient's medical files, and providing consent for the use of their data in the study.

Exclusion criteria included a diagnosis of dementia or chronic pain syndromes such as fibromyalgia, migraine, myofascial pain syndrome or radiculopathy (confirmed by magnetic resonance imaging), being under the age of 18, having incomplete medical records or follow-up data, and being evaluated within less than 16 weeks following the most recent botulinum toxin application.

2.1 Data collection tools

Sociodemographic data (age, gender, *etc.*), dystonia localization and type, presence of pain, severity of dystonia, Global Dystonia Severity Rating Scale (GDS), pain intensity, Visual Analog Scale (VAS), depression levels, Beck Depression Inventory-II (BDI-II), were retrospectively assessed the following information from patient files.

2.2 Measures

BDI-II is a self-assessment scale with 21 items, scored from 0–63. Scores are categorized as 0–13 (minimal depression), 14–19 (mild), 20–28 (moderate) and 29–63 (severe).

GDS is a clinician-rated Likert scale ranging from 0 to 140, with scores from 0 to 10 for each body region, used to evaluate dystonia severity.

VAS is a 100 mm line used to assess pain intensity, ranging from "no pain" (0) to "worst pain" (100). In this study, we classified pain as no/mild (0–44 mm) and moderate/severe (45–100 mm) for analysis.

2.3 Statistical analysis

Data were analyzed using SPSS version 11.5 (SPSS Inc., Chicago, IL, USA). Descriptive statistics for continuous variables were presented as mean $\pm$ standard deviation or median (minimum–maximum). *T*-tests were used for normally distributed variables, and Mann-Whitney U tests for non-normally distributed variables. Relationships between categorical variables were assessed using Chi-square and Fisher's exact tests. Correlation analyses were performed with Pearson and Spearman tests for normally and non-normally distributed variables, respectively. Logistic regression and subgroup analyses were also conducted. A p-value < 0.05 was considered statistically significant.

3. Results

3.1 Sociodemographic data and descriptive statistics

Sociodemographic and clinical data are summarized in Table 1. Of the 61 patients included in the study, 73.77% (n = 45) were female and 26.23% (n = 16) were male, with a mean age of 47.04 $\pm$ 14.04 years (range: 19–75). The majority (85.24%) had idiopathic dystonia, while 14.76% had acquired dystonia. Of these acquired cases, 5 were generalized dystonia due to cerebral palsy, and 4 presented with hemi dystonia, with 3 cases being secondary to stroke and 1 secondary to trauma following a traffic accident. Regarding dystonia distribution, 80.33% of patients (n = 49) had focal dystonia, 4.92% (n = 3) had segmental dystonia, 6.56% (n = 4) had hemi dystonia and 8.19% (n = 5) had generalized dystonia. The most common subtype was cervical dystonia (47.55%, n = 29), followed by blepharospasm (21.32%, n = 13), oromandibular dystonia (16.39%, n = 10), hemi dystonia (6.55%, n = 4) and generalized dystonia (8.19%, n = 5).

3.2 Examination of the pain presence

Pain prevalence (severe-moderate-mild pain) in the cohort was 34.43% (n = 21). Pain assessment via the VAS showed that 65.57% (n = 40) of patients reported no pain. Among cervical dystonia patients, 31.03% (n = 9) experienced moderate to severe pain, while 68.07% (n = 20) reported no pain. In the blepharospasm group, 23.07% (n = 3) reported moderate/severe pain, while 76.93% (n = 10) had no pain. Notably, 80% of OMD patients (n = 8) reported pain, with 60% (n = 6) experiencing moderate/severe pain. Bar graph of the pain prevalence and severity by dystonia type is presented in Fig. 1.

A Chi-square test confirmed a significant association between dystonia subtype and pain, with OMD patients being significantly more likely to experience pain compared to other types ($\chi^2 = 9.29$, $p = 0.0023$).

We analyzed pain by comparing the presence of pain (mild, moderate or severe) versus no pain. We believe this approach was the most suitable for assessing pain in this patient group. Although there was no statistically significant difference between dystonia subtypes when considering only moderate and

TABLE 1. Sociodemographic and clinical data of the patients.

Characteristic	Values
Age (mean ± Standard Deviation)	47.04 ± 14.04
Number of Patients	61
Gender	
Female	N = 45 (73.77%)
Male	N = 16 (26.23%)
Dystonia Etiology	
Idiopathic	N = 52 (85.24%)
Acquired	N = 9 (14.76%)
Dystonia Type	
Focal	N = 49 (80.33%)
Segmental	N = 3 (4.92%)
Hemi dystonia	N = 4 (6.56%)
Generalized Dystonia	N = 5 (8.19%)
Localization	
Cervical Dystonia	N = 29 (47.55%)
Blepharospasm	N = 13 (21.32%)
Oromandibular Dystonia	N = 10 (16.39%)
Hemi dystonia	N = 4 (6.55%)
Generalized Dystonia	N = 5 (8.19%)
Chronic Pain	
Present	N = 21 (34.42%)
Absent	N = 40 (65.58%)
Depression (Back Depression Inventory-II)	
Minimal	N = 36 (59.02%)
Mild	N = 7 (11.47%)
Moderate	N = 7 (11.47%)
Severe	N = 11(18.04%)

severe pain as presented in Table 2, a significant difference was found between oromandibular dystonia and other groups when looking at the overall presence of pain.

These findings highlight the variability in pain experiences across different types of dystonia.

Pain characteristics were evaluated in all dystonia patients. In cervical dystonia patients, pain was described as dull and constant, localized primarily in the neck and head regions. Oromandibular dystonia patients reported sharp, squeezing and occasionally throbbing pain, which was localized to the head, temporal and jaw areas. Blepharospasm patients who experienced pain described it as a tension-type headache with a squeezing sensation around the eyes. Notably, pain in blepharospasm patients tended to occur intermittently, whereas pain in cervical and oromandibular dystonia patients was predominantly constant.

3.3 Examination of the relationship between pain and sociodemographic characteristics, depression and dystonia severity

Correlations between pain, depression, age, gender and dystonia severity are presented in Table 3. Depression severity (BDI-II) was minimal in 59% of patients, mild in 11.5%, moderate in 11.5% and severe in 18%. Higher BDI-II scores were significantly associated with pain presence ($p < 0.001$), suggesting a strong link between depression and pain in dystonia patients.

No significant associations were identified between pain levels and age ($p = 0.598$) or dystonia severity ($p = 0.114$) (Table 3). Dystonia etiology (whether idiopathic or acquired) did not show a significant relationship with pain ($p = 0.613$). This suggests that pain perception and its impact on quality of

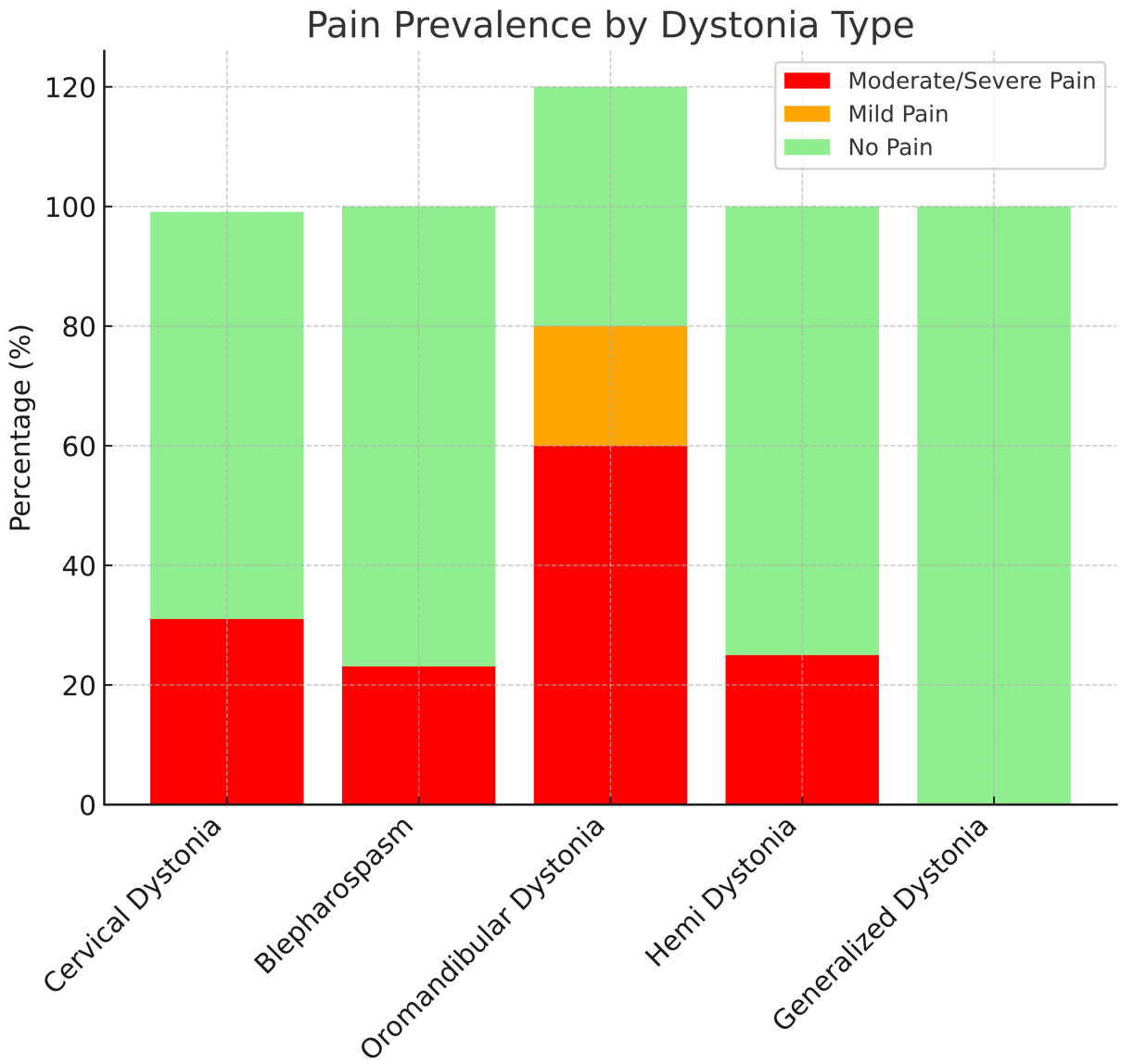

FIGURE 1. Bar graph of the pain prevalence by dystonia type (Cited in Examination of the Pain Presence section in results).

TABLE 2. Distribution of pain presence by dystonia localization.

	Moderate/Severe Pain	No Pain	Mild Pain
Cervical Dystonia	N = 9 (31.03%)	N = 20 (68.07%)	
Blepharospasm	N = 3 (23.07%)	N = 10 (76.93%)	
Oromandibular Dystonia	N = 6 (60%)	N = 2 (40%)	N = 2 (20%)
Hemi dystonia	N = 1 (25%)	N = 3 (75%)	
Generalized Dystonia	N = 0 (0%)	N = 5 (100%)	

TABLE 3. Correlation of pain levels with depression, age, gender and dystonia severity.

Variable	*p*-value	Significance
Depression	<0.001	Significant positive correlation
Age	0.598	Not significant
Dystonia Severity	0.114	Not significant
Gender (Female)	0.035	Significant
Dystonia Etiology	0.613	Not significant

life may be more influenced by psychosocial factors, such as depression, rather than the underlying cause of dystonia itself. When pain levels were grouped into "no pain/mild pain" versus "moderate/severe pain", significant correlations were found between pain level and BDI-II scores ($p < 0.001$), reaffirming the strong link between depression and pain intensity. No significant correlations were found between pain levels and age ($p = 0.598$) or dystonia severity ($p = 0.114$) (Table 3).

Female patients were more likely to report pain ($p = 0.035$) in correlation analysis (Table 3); however, this was not confirmed by logistic regression analysis (Table 4). Only depression and pain relationship ($p = 0.001$) were confirmed in logistic regression analysis (Table 4).

Table 4 presents the results of the logistic regression analysis evaluating factors associated with pain in dystonia patients. The BDI-II score was a significant predictor of pain presence, indicating that higher levels of depression increase the likelihood of experiencing pain. Oromandibular dystonia was significantly associated with the presence of pain compared to the reference group (blepharospasm) ($p = 0.007$). Other variables, including GDS score, gender, age and cervical dystonia, were not found to be statistically significant predictors of pain in this population (Table 4).

3.4 Examination of the relationship between depression and pain across different dystonia subtypes

A subgroup analysis was conducted to explore the relationship between pain and depression across different dystonia subtypes. Table 5 shows the results of chi-square tests performed separately for each subtype, assessing the association between pain presence and depression levels.

For patients with blepharospasm, the significant p-value ($p < 0.05$) indicates a meaningful relationship between pain and depression. This suggests that pain in these patients is more likely to be associated with higher levels of depression. Patients with blepharospasm may experience a more pronounced psychological impact when they suffer from pain.

For oromandibular dystonia (OMD), the non-significant p-value ($p > 0.05$) suggests that there is no statistically significant relationship between pain and depression. This indicates that in OMD, pain does not necessarily correlate with higher depression levels and may be influenced by other factors.

For cervical dystonia, the highly significant p-value ($p < 0.001$) suggests a strong association between pain and depression. Patients with cervical dystonia who experience pain are likely to also have higher depression levels, indicating that pain has a substantial psychological impact in this group.

In the acquired dystonia group, the non-significant p-value ($p > 0.05$) shows no significant association between pain and depression.

4. Discussion

Chronic pain is a widespread issue affecting about 30% of the global population, significantly impacting individuals' quality of life and creating substantial personal and economic burdens [16]. In dystonia, the relationship between pain and dystonia has been primarily studied in the context of cervical dystonia, with reported pain prevalence ranging from 55% to 90% [9, 14, 17, 18]. This pain, often identified as dystonia-associated head and neck pain, is thought to result from repetitive postures and movements [14, 17–20]. However, similar to Parkinson's disease, pain in cervical dystonia is not entirely attributable to motor symptoms or posture [17–19]. In many cases, pain severity is independent of dystonia severity and duration, and botulinum toxin treatment, although effective in correcting dystonic contractions, is not always successful in alleviating pain [14, 19–22]. This suggests that chronic pain in dystonia may be an independent non-motor symptom. The underlying mechanisms likely involve disruptions in modulatory pathways within pain circuits, leading to sensory dysfunction [11–13]. Imaging and electrophysiological studies of sensorimotor

TABLE 4. Logistic regression analysis of factors associated with pain presence in dystonia patients.

Variable	Coefficient	Standard Error	z-value	p-value
Constant	−0.1464	2.490	−0.059	0.953
Beck depression inventory Score	0.1459	0.045	3.241	0.001
Global dystonia severity scale score	−0.0214	0.024	−0.873	0.383
Gender (Female)	−2.3256	1.392	−1.671	0.095
Age	−0.0265	0.037	−0.713	0.476
Oromandibular Dystonia (*vs.* Blepharospasm)	4.4082	1.636	2.694	0.007
Cervical Dystonia (*vs.* Blepharospasm)	1.3162	1.084	1.214	0.225

TABLE 5. Subgroup chi-square test results for the relationship between pain and depression levels across dystonia subtypes.

Subgroup	Chi-square	p-value	Degrees of Freedom
Blepharospasm	8.444444	0.037666	3
Oromandibular Dystonia	1.666667	0.434598	2
Cervical Dystonia	21.855771	0.000070	3
Acquired Dystonia (hemi-dystonia-generalized dystonia)	0.740741	0.863582	3

networks, along with the therapeutic effects of tactile stimulation (gesture antagonists), support this hypothesis [12, 13, 17–23].

The prevalence of chronic pain in our dystonia cohort (34.43%) is slightly higher than in the general population (30%) [16]. To our knowledge, no studies have evaluated the association between pain and different dystonia subtypes, including oromandibular dystonia (OMD), generalized dystonia, blepharospasm and hemi dystonia. In this study, 21.32% of patients had blepharospasm, 16.39% had OMD, 47.55% had cervical dystonia, 6.55% had hemi dystonia and 8.19% had generalized dystonia. By evaluating pain across various dystonia subtypes, our study differs from previous work, which has focused primarily on cervical dystonia. Our findings report a lower prevalence of pain in cervical dystonia (31.03%) compared to the broader range of 55% to 90% seen in the literature [7, 9, 14, 17–19, 22]. However, we found that 23.07% of blepharospasm patients and 60% of OMD patients reported moderate/severe pain. Including mild pain cases, 80% of OMD patients experienced pain. Conversely, pain was relatively insignificant in our study's hemi dystonia and generalized dystonia patients, all of whom had acquired dystonia. These findings suggest that pain is most strongly associated with OMD among dystonia subtypes. OMD, in particular, shows a strong association with severe pain, likely due to a combination of anatomical, functional and neurological factors. The muscles involved in OMD (jaw, mouth and face) are crucial for essential activities such as speaking, chewing and swallowing. The continuous muscle contractions and spasms in these regions can lead to temporomandibular joint dysfunction and muscle overuse, contributing to persistent and severe pain [7, 10, 24]. Unlike dystonia affecting larger muscle groups (*e.g.*, cervical dystonia), OMD pain is compounded by the functional demands placed on these small, sensitive muscle groups in daily activities [10, 14, 24, 25]. Moreover, OMD's proximity to the trigeminal nerve, which plays a central role in transmitting sensory information from the face and jaw, may intensify pain perception [10, 24, 25]. Repeated stimulations of this nerve due to abnormal muscle contractions could amplify pain signals, making them more intense and challenging to manage [7, 10, 25]. Additionally, central sensitization may occur, where the central nervous system becomes more sensitive to pain signals over time, a process commonly seen in chronic pain syndromes. This could be a factor in dystonia, where abnormal movements persist for long periods, reinforcing pain intensity and duration [11–14]. The involvement of the trigeminal nerve in OMD suggests that the pain may have more neuropathic characteristics, distinguishing it from the musculoskeletal pain seen in other dystonia types like cervical dystonia [10–14, 25]. Despite the high prevalence of pain in OMD in our cohort, the literature predominantly associates pain with cervical dystonia. This may be due to the larger number of studies evaluating cervical dystonia and pain. In cervical dystonia, patients often report musculoskeletal pain localized to the neck and shoulders, arising from prolonged abnormal postures and muscle spasms [7, 9, 14, 18, 22]. Similarly, dystonia affecting the face, such as blepharospasm, can lead to tension-type headaches and eye pain due to constant eyelid muscle contractions [3, 25, 26]. While most pain in dystonia is classified as musculoskeletal, neuropathic pain has also been reported, albeit less frequently [12, 17].

Thus, pain management in dystonia presents unique challenges due to the heterogeneity of the condition and its subtypes [2, 7, 24, 27]. Personalized pain management strategies are essential, as different dystonia subtypes may require different approaches. For example, in OMD, treatments targeting both temporomandibular joint dysfunction and specific pain pathways may be more effective [10, 11, 24, 27]. In contrast, cervical dystonia patients may benefit from therapies that focus on muscular relaxation and reducing neck and shoulder spasms [9, 17, 21–23].

The etiology of dystonia, whether idiopathic or acquired, plays a crucial role in determining the nature and prevalence of pain [2, 7–9, 17–22, 24, 27]. Idiopathic dystonia, often hereditary, typically manifests at an earlier age and tends to involve more generalized symptoms affecting multiple muscle groups [1, 27, 28]. In such cases, pain is frequently associated with prolonged muscle contractions and abnormal postures, leading to musculoskeletal discomfort [7–9, 13, 14, 18, 22]. Studies suggest that idiopathic dystonia may present with a higher incidence of pain due to continuous involuntary movements, as seen in cervical dystonia or OMD [7, 10, 14, 17, 19]. In contrast, acquired dystonia, often resulting from external factors such as trauma, stroke, or drug-induced conditions (*e.g.*, neuroleptic-induced tardive dystonia), typically presents later in life and is more focal [1, 4, 5, 24, 27]. Pain in acquired dystonia may be less prevalent but more severe, particularly in conditions like post-stroke hemi dystonia, where pain can arise from the neurological insult affecting sensory and motor pathways. Traumatic brain injury or ischemic events can lead to complex pain syndromes due to both muscle hyperactivity and direct nerve damage, resulting in neuropathic pain as well as musculoskeletal discomfort [10–14, 17, 18]. In our cohort, 85.24% of patients had idiopathic dystonia, and 14.76% had acquired dystonia. The higher prevalence of pain in idiopathic dystonia may be related to its broader involvement of muscle groups and chronic symptoms, while acquired dystonia tends to present with more localized but potentially intense pain related to the underlying neurological insult.

While the literature has not reached a consensus on the relationship between pain and dystonia severity or duration, many studies have found no significant association, particularly in cervical dystonia patients [8, 9, 14, 18]. In our study, no significant relationship was found between pain and dystonia severity across all dystonia groups.

Studies examining the relationship between sociodemographic characteristics and pain in dystonia are limited. In one study, younger patients with cervical dystonia were more likely to report moderate/severe pain, although no difference was found between male and female patients [2, 14, 28]. Our study found no association between pain and age, while pain was more frequently reported by female patients. However, this finding was not confirmed by multivariate analysis.

Depression, a common non-motor symptom in dystonia, has been shown to negatively affect quality of life [2–5, 27,

28]. Most studies examining non-motor symptoms in cervical dystonia have observed a strong relationship between pain and depression [3–5, 7, 8, 28]. Our study also revealed a strong association between pain and depression in dystonia patients. However, the relationship between pain and depression is complex. It is debated whether pain contributes to depression as a major stressor, depression influences pain perception or both phenomena emerge independently as non-motor symptoms [2, 4, 5, 7, 8, 28]. Our subgroup analysis (Table 5) suggests that the relationship between pain and depression varies across dystonia subtypes. Blepharospasm and cervical dystonia show significant associations between pain and depression, suggesting that pain management in these groups may improve mental health outcomes. In contrast, pain does not appear to play as strong a role in depression for OMD and acquired dystonia. This highlights the importance of subgroup-specific treatment approaches, where pain management may be more critical for addressing depression in some dystonia types, while in others, additional factors should be considered.

Addressing both psychological and physical components of pain across dystonia types may lead to more effective, holistic treatment outcomes.

Several limitations should be acknowledged in this study. Firstly, the retrospective design inherently restricts the type and depth of data that can be collected. Consequently, we relied solely on available patient files, which did not include comprehensive assessments of other non-motor symptoms, such as sleep disturbances or anxiety—both of which may significantly influence pain perception. Additionally, the relatively small sample size of 61 patients, while informative, may limit the generalizability of our findings to the broader dystonia population. A larger and more diverse sample could yield more robust results and improve external validity.

The cross-sectional nature of the study also limits our ability to infer causal relationships between variables such as pain, depression and dystonia characteristics. Longitudinal studies are needed to better understand temporal relationships and causative factors. Furthermore, the reliance on self-reported measures (*e.g.*, VAS for pain, BDI-II for depression) introduces potential biases, such as recall bias and subjective symptom interpretation. Objective measures and clinical assessments could complement these findings to enhance accuracy. Moreover, the use of a single pain assessment tool (VAS) restricts the depth of pain characterization. Incorporating more comprehensive pain assessment instruments could provide a more nuanced understanding of pain dimensions, including intensity, quality and duration. Lastly, controlling for treatment variations would offer clearer insights into the relationships studied, especially considering the wide range of therapeutic interventions used in dystonia management.

By acknowledging these limitations, future research can be more effectively designed to address these gaps and provide a more comprehensive understanding of the relationship between dystonia, pain and associated non-motor symptoms.

5. Conclusions

In our investigation of the relationship between dystonia and pain, several critical findings were identified. First, pain is notably more prevalent among oromandibular dystonia (OMD) patients compared to the general population and other dystonia subtypes. Second, our findings indicate that pain in these dystonia patients may be significantly associated with the localization of dystonia, particularly in OMD. Among the various dystonia subtypes, OMD exhibited the strongest association with pain, followed by cervical dystonia, whereas acquired dystonia types, such as hemi dystonia and generalized dystonia, showed no significant pain prevalence. These distinctions underscore the importance of considering dystonia subtypes in developing tailored pain management strategies. Additionally, we identified a strong association between pain and depression in dystonia patients, highlighting the need for a holistic approach that addresses both the physical and psychological aspects of the condition. In conclusion, managing both the physical and psychological aspects of dystonia is essential for improving patient outcomes. A comprehensive approach should be adopted to address non-motor symptoms such as pain and depression, which are often underrecognized but significantly affect patients' quality of life. Clinicians should be vigilant in monitoring for signs of depression and should implement comprehensive management strategies that target both motor symptoms and pain, particularly in patients with OMD and cervical dystonia. By addressing both the physical and psychological components, we aim to enhance the overall quality of life for individuals living with dystonia.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

AUTHOR CONTRIBUTIONS

OGO—designed the research study, performed the research, analyzed the data, wrote the manuscript. The author read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the ethics committee of Sancaktepe Sehit Prof. Dr. Ilhan Varank Research and Teaching Hospital with decision number of 199/2024. Written informed consent was obtained from patients.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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