

Characteristics according to pain intensity and duration in patients with nonspecific neck pain

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Nonspecific neck pain occurs without a clear cause and has a variety of causes. We investigated the characteristics and subjective feelings according to the intensity and duration of pain in patients with nonspecific neck pain. A survey was conducted on 43 patients complaining of neck pain according to pain duration and pain intensity. As a result, there was a significant difference between pain intensity and sleep ($P < 0.05$). There was a significant difference between pain duration and sleep, pain duration and emotion ($P < 0.05$). In addition, common feelings

such as stiff, heavy, tight, and throbbing were observed according to pain intensity and duration. Therefore, consideration of sleep and emotion is necessary when composing an intervention to improve pain in patients with nonspecific neck pain.

Keywords: Nonspecific neck pain, Pain intensity, Pain duration, Sleep, Emotion

INTRODUCTION


The cervical vertebrae support the cranial bones and protect the vertebral artery and spinal nerves, constituting an essential component of the vertebral column. Biomechanically, the cervical spine provides a range of motion necessary for daily activities (Alizadeh et al., 2020). Compared to the thoracic and lumbar vertebrae, the cervical vertebrae have a greater range of motion; however, their joint stability is relatively weak. Poor posture or external pathological conditions affect the cervical spine structure (Heidsieck et al., 2022), which causes neck pain (Gay, 1993).

Neck pain is a representative musculoskeletal symptom that approximately 67% of adults experience at least once in their lifetime (Bovim et al., 1994). Neck pain can restrict the range of motion in the cervical joints and lead to crepitation and stiffness of the neck, ultimately causing functional impairments of the cervical spine (Armstrong et al., 2005). When neck pain is perceived as a mild symptom and left unaddressed in daily life, it can ultimately progress to chronic neck pain. This progression not only

leads to excessive healthcare costs but also results in a decline in quality of life, causing both social and economic losses.

Nonspecific neck pain occurs between the upper cervical vertebrae and the upper thoracic region, characterized by discomfort without specific pathological causes or neurological signs and symptoms, regardless of the presence of primary structural pathology (Hidalgo et al., 2017). The underlying mechanism of nonspecific neck pain is not known, but factors such as gender, age, genetics, sleep disorders, trauma, physical labor, and sports activity appear to be associated with poor posture and daily habits (Croft et al., 2001). Psychosocial factors such as stress, anxiety, depression, work environment, and social status are strongly correlated with nonspecific neck pain and affect pain perception (Ortego et al., 2016).

Pharmacological and nonpharmacological treatment methods have been applied as interventions for the management of nonspecific neck pain, but a definitive treatment method has not yet been established. Understanding the symptoms and characteristics of patients with nonspecific neck pain is essential for the development of effective treatment methods. Therefore, this study aimed

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to investigate the characteristics of pain intensity and duration in this patient population. We seek to provide detailed insights into how pain intensity and duration manifest among individuals with nonspecific neck pain. Ultimately, our findings aim to contribute to the development of targeted interventions that can improve patient outcomes.

MATERIALS AND METHODS

Participants

Forty-seven patients with nonspecific neck pain were recruited, 4 patients were excluded due to insufficient questionnaire responses, and 43 patients were recruited. The general characteristics of the participants are shown in Table 1. Nonspecific neck pain should not be associated with specific pathological symptoms or neurological signs (Hidalgo et al., 2017). Therefore, we recruited participants based on the following selection criteria. The inclusion

criteria were as follows: (a) Those complaining of neck pain corresponding to those aged 20–50, (b) Those without brain disease, nervous system disease, or symptoms, (c) Those without neurological problems in the neck area (such as paralysis, weakness, or loss of deep tendon reflexes), (d) Those complaining of discomfort in the neck area but without a clear medical diagnosis. The exclusion criteria were as follows: (a) Those diagnosed with cervical fracture, cervical disc herniation, cervical spondylosis, cervical myelopathy, cervical spinal stenosis, or radiculopathy, (b) Those with cognitive impairment, alcohol or drug abuse, or taking medications that may affect dizziness.

This study was a cross-sectional study. The examiner distributed questionnaires to patients with nonspecific neck pain and asked them to personally check the appropriate areas according to pain intensity and duration. We explained the purpose and method of the study to the participants and conducted it after obtaining their consent. This study was approved by the Kyungnam National University Research Ethics Committee (1040460-A-2023-038).

Table 1. General characteristics of participants (N = 43)

Characteristic	No (%)
Sex	
Female	33 (76.7)
Male	10 (23.3)
Age (yr)	
20–29	20 (46.5)
30–39	14 (32.6)
40–49	8 (18.6)
50–59	1 (2.3)
Height (cm)	
150–159	8 (18.6)
160–169	24 (55.8)
≥ 170	11 (25.6)
Weight (kg)	
< 50	6 (14)
50–59	19 (44.2)
60–69	10 (23.2)
≥ 70	8 (18.6)
Pain intensity (point)	
No pain (0)	0 (0)
Mild pain (1–4)	24 (55.8)
Moderate pain (5–6)	17 (39.5)
Severe pain (7–10)	2 (4.7)
Pain duration	
Acute (within 2 wk)	0 (0)
Subacute (2 wk–3 mo)	5 (11.6)
Early chronic (3 mo–6 mo)	6 (14)
Late chronic (more than 6 mo)	32 (74.4)

Modified neck pain disability questionnaire

We used the modified Neck Pain Disability Questionnaire to assess the degree of symptoms and disability associated with nonspecific neck pain in daily life. The items related to the sensations and intensity of pain experienced during neck pain were adapted from the Korean version of the Short Form McGill Pain Questionnaire (Melzack, 1987). The pain intensity was evaluated using the Numeric Pain Rating Scale (Oldenmenger et al., 2013): 0 points were classified as ‘no pain,’ 1 to 4 points as ‘mild pain,’ 5 to 6 points as ‘moderate pain,’ and 7 to 10 points as ‘severe pain.’ The pain duration was classified as acute (within 2 weeks), subacute (2 weeks to 3 months), early chronic (3 months to 6 months), and late chronic (more than 6 months). Items regarding the conditions experienced during neck pain were referenced from the neck pain and disability scale (Lee et al., 2013).

Statistical analysis

The results were expressed as frequency and percentage. The collected data were analyzed using IBM SPSS Statistics version 21.0 (IBM Corp., Armonk, NY, USA). A chi-square test was performed to determine the relationship between the characteristics according to the duration of pain and pain intensity in patients with nonspecific neck pain. The Kaiser–Meyer–Olkin measurement value of the modified neck pain disability questionnaire was 0.775, and the Bartlett test was 0.000. The reliability of the modified neck pain disability questionnaire was high (Cronbach al-

pha = 0.899). The statistical significance level was 0.05.

RESULTS

Characteristics based on pain intensity in patients with nonspecific neck pain

There was a significant difference in sleep depending on pain intensity ($P < 0.05$). Twenty-two (51.2%) of the total had sleep disorders, of which 8 (33.3%) of mild pain, 13 (76.5%) of moderate pain, and 1 (50%) of severe pain patients had sleep disorders (Table 2).

Characteristics based on pain duration in patients with nonspecific neck pain

There were significant differences in sleep and emotion depending on pain duration ($P < 0.05$). Thirty-six (86%) of the total had emotional disorders, of which 2 (40%) of the subacute, 6 (100%) of the early chronic, and 29 (90.6%) of the late chronic patients had emotional disorders. Twenty-two (51.2%) of the total had sleep disorders, of which 1 (20%) of the subacute, 6 (100%) of the early chronic, and 15 (46.9%) of the late chronic patients had sleep disorders (Table 3).

Subjective feelings according to pain intensity and duration in patients with nonspecific neck pain

There was no significant difference in subjective feeling according to pain intensity, but patients with mild intensity complained of squeezing (91.7%), stiff (87.5%), tight (66.7%), and throbbing (50%), patients with moderate intensity complained of stiff (88.2%), heavy (64.7%), throbbing (58.8%), and tight (58.8%), and patients with severe intensity complained of stiff (100%), heavy (100%), tight (100%), throbbing (50%), exhausted and listless (50%) (Table 4).

There was no significant difference in subjective feeling according to pain duration, but patients with subacute complained of stiff (100%), heavy (60%), tight (60%), patients with early chronic complained of stiff (83.3%), exhausted and listless (66.7%), heavy (50%), and tight (50%), and patients with late chronic complained of burning (100%), stinging (100%), fearing (100%), tearing (96.9%), stabbing (96.9%), nauseous (96.9%), sensitive (93.8%), squeezing (90.6%) (Table 5).

DISCUSSION

We investigated the characteristics and subjective feelings of

Table 2. Characteristics according to pain intensity in patients with nonspecific neck pain

Characteristic	Mild (n=24)	Moderate (n=17)	Severe (n=2)	Total (N=43)	χ^2	P-value
Sex					0.648	0.723
Female	18 (75)	13 (76.5)	2 (100)	33 (76.7)		
Male	6 (25)	4 (23.5)	0 (0)	10 (23.3)		
Dizziness					2.395	0.302
Yes	12 (50)	11 (64.7)	2 (100)	25 (58.1)		
No	12 (50)	6 (25.3)	0 (0)	18 (41.9)		
Vomit					1.629	0.443
Yes	10 (41.7)	8 (47.1)	0 (0)	18 (41.9)		
No	14 (58.3)	9 (52.9)	2 (100)	25 (58.1)		
Headache					1.116	0.572
Yes	22 (91.7)	14 (82.4)	2 (100)	38 (88.4)		
No	2 (8.3)	3 (17.6)	0 (0)	5 (11.6)		
Pain with turning the head left or right					2.376	0.305
Yes	17 (70.8)	15 (88.2)	2 (100)	34 (79.1)		
No	7 (29.2)	2 (11.8)	0 (0)	9 (20.9)		
Pain with looking up or down					2.760	0.305
Yes	17 (70.8)	15 (88.2)	2 (100)	34 (79.1)		
No	7 (29.2)	2 (11.8)	0 (0)	9 (20.9)		
Concentration					4.183	0.123
Yes	15 (62.5)	15 (88.2)	2 (100)	32 (74.4)		
No	9 (37.5)	2 (11.8)	0 (0)	11 (25.6)		
Emotion					0.539	0.764
Yes	20 (83.3)	15 (88.2)	2 (100)	37 (86)		
No	4 (16.7)	2 (11.8)	0 (0)	6 (14)		
Sleep					7.412	0.025*
Yes	8 (33.3)	13 (76.5)	1 (50)	22 (51.2)		
No	16 (66.7)	4 (23.5)	1 (50)	21 (48.8)		
Work					3.136	0.078
Yes	12 (50)	12 (70.6)	2 (100)	26 (60.5)		
No	12 (50)	5 (29.4)	0 (0)	17 (39.5)		
Leisure activities					1.287	0.525
Yes	16 (66.7)	13 (76.5)	2 (100)	31 (72.1)		
No	8 (33.3)	4 (23.5)	0 (0)	12 (27.9)		
Reading					0.887	0.642
Yes	17 (70.8)	13 (76.5)	2 (100)	32 (74.4)		
No	7 (29.2)	4 (23.5)	0 (0)	11 (25.6)		

Values are presented as number (%).

* $P < 0.05$, statistically significant differences.

pain according to intensity and duration in patients with nonspecific neck pain. In this study, there was a significant difference in pain intensity and sleep in patients with nonspecific neck pain. When neck pain occurs, excessive secretion of adrenaline causes problems with the autonomic nervous system and impaired secretion of serotonin, a neurotransmitter related to sleep (Evans, 1997).

Table 3. Characteristics according to pain duration in patients with nonspecific neck pain

Characteristic	Acute (n=0)	Subacute (n=5)	Early chronic (n=6)	Late chronic (n=32)	Total (N=43)	χ^2	P-value
Sex						1.911	0.385
Female	0 (0)	5 (100)	4 (66.7)	24 (75)	33 (76.7)		
Male	0 (0)	0 (0)	2 (33.3)	8 (25)	10 (23.3)		
Dizziness						0.875	0.646
Yes	0 (0)	2 (60)	4 (66.7)	19 (59.4)	25 (58.1)		
No	0 (0)	3 (40)	2 (33.3)	13 (40.6)	18 (41.9)		
Vomit						0.233	0.809
Yes	0 (0)	2 (60)	2 (33.3)	14 (43.8)	18 (41.9)		
No	0 (0)	3 (40)	4 (66.7)	18 (56.2)	25 (58.1)		
Headache						1.154	0.562
Yes	0 (0)	4 (80)	6 (100)	28 (87.5)	38 (88.4)		
No	0 (0)	1 (20)	0 (0)	4 (12.5)	5 (11.6)		
Pain with turning the head left or right						0.086	0.958
Yes	0 (0)	4 (80)	5 (83.3)	25 (78.1)	34 (79.1)		
No	0 (0)	1 (20)	1 (16.7)	7 (21.9)	9 (20.9)		
Pain with looking up or down						1.899	0.387
Yes	0 (0)	5 (100)	4 (66.7)	25 (78.1)	34 (79.1)		
No	0 (0)	0 (0)	2 (33.3)	7 (21.9)	9 (20.9)		
Concentration						0.802	0.670
Yes	0 (0)	3 (60)	5 (83.3)	24 (75)	32 (74.4)		
No	0 (0)	2 (40)	1 (16.7)	8 (25)	11 (25.6)		
Emotion						10.361	0.006*
Yes	0 (0)	2 (40)	6 (100)	29 (90.6)	37 (86)		
No	0 (0)	3 (60)	0 (0)	3 (9.4)	6 (14)		
Sleep						7.906	0.019*
Yes	0 (0)	1 (20)	6 (100)	15 (46.9)	22 (51.2)		
No	0 (0)	4 (80)	0 (0)	17 (53.1)	21 (48.8)		
Work						3.878	0.144
Yes	0 (0)	1 (20)	4 (66.7)	21 (65.6)	26 (60.5)		
No	0 (0)	4 (80)	2 (33.3)	11 (34.4)	17 (39.5)		
Leisure activities						3.071	0.215
Yes	0 (0)	2 (40)	5 (83.3)	24 (75)	31 (72.1)		
No	0 (0)	3 (60)	1 (16.7)	8 (25)	21 (27.9)		
Reading						0.966	0.617
Yes	0 (0)	3 (60)	4 (66.7)	25 (78.1)	32 (74.4)		
No	0 (0)	2 (40)	2 (33.3)	7 (21.9)	11 (25.6)		

Values are presented as number (%).

* $P < 0.05$, statistically significant differences.

Serotonin secretion disorders cause emotional (mental health) and sleep problems (Ursin, 2002). Moon and Shin (2024) reported that psychosocial factors such as depression and anxiety have a greater impact on pain intensity and disability in patients with nonspecific neck pain. This suggests that the degree of impact on the autonomic nervous system varies with pain intensity, and as pain progresses from acute to chronic, emotional symptoms such as depression may emerge, thereby affecting sleep. Previous research

has shown that neck pain is a significant factor affecting sleep quality (Aldabbas et al., 2022). In this study, sleep problems were 76.5% and 50% in moderate and severe, respectively, which was higher than the 33.3% in mild. Since the degree of influence on the autonomic nervous system varies depending on the pain intensity (Liu et al., 2018), it is thought that more severe pain was complained at high intensity than at low intensity.

Chronic pain patients experience more emotional difficulties

Table 4. The subjective feeling expressed by pain intensity in patients with nonspecific neck pain

Variable	Mild (n=24)	Moderate (n=17)	Severe (n=2)	Total (N=43)	χ^2	P-value
Throbbing						
Yes	12 (50)	10 (58.8)	1 (50)	23 (53.5)	0.322	0.851
No	12 (50)	7 (41.2)	1 (50)	20 (46.5)		
Stabbing						
Yes	0 (0)	1 (5.9)	0 (0)	1 (2.3)	1.566	0.457
No	24 (100)	16 (94.1)	2 (100)	42 (97.7)		
Stiff						
Yes	21 (87.5)	15 (88.2)	2 (100)	38 (88.4)	0.328	0.849
No	3 (12.5)	2 (11.8)	0 (0)	5 (11.6)		
Squeezing						
Yes	2 (9.1)	1 (5.9)	0 (0)	3 (7)	0.249	0.883
No	22 (8.3)	16 (94.1)	2 (100)	40 (93)		
Annoyingly						
Yes	6 (25)	5 (29.4)	0 (0)	11 (25.6)	0.668	0.716
No	18 (75)	12 (70.6)	2 (100)	32 (74.4)		
Burning						
Yes	0 (0)	0 (0)	0 (0)	0 (0)	-	-
No	24 (100)	17 (100)	0 (0)	43 (100)		
Hot sensation						
Yes	0 (0)	1 (5.9)	0 (0)	1 (2.3)	1.566	0.457
No	24 (100)	16 (94.1)	2 (100)	42 (97.7)		
Stinging						
Yes	0 (0)	0 (0)	0 (0)	0 (0)	-	-
No	24 (100)	17 (100)	2 (100)	43 (100)		
Heavy						
Yes	17 (70.8)	11 (64.7)	2 (100)	30 (69.8)	1.086	0.581
No	7 (29.2)	6 (35.3)	0 (0)	13 (30.2)		
Sensitive						
Yes	0 (0)	2 (11.8)	0 (0)	2 (4.7)	3.208	0.071
No	24 (100)	15 (88.2)	2 (100)	41 (95.3)		
Tearing						
Yes	0 (0)	1 (5.9)	0 (0)	1 (2.3)	1.566	0.457
No	24 (100)	16 (94.1)	2 (100)	42 (97.7)		
Tight						
Yes	16 (66.7)	10 (58.8)	2 (100)	28 (65.1)	1.393	0.498
No	8 (33.3)	7 (41.2)	0 (0)	15 (34.9)		
Nauseous						
Yes	1 (4.2)	2 (11.8)	0 (0)	3 (7)	1.043	0.594
No	23 (95.8)	15 (88.2)	2 (100)	40 (93)		
Fearful						
Yes	0 (0)	0 (0)	0 (0)	0 (0)	-	-
No	24 (100)	17 (100)	2 (100)	43 (100)		
Exhausted and listless						
Yes	10 (41.7)	5 (29.4)	1 (50)	16 (37.2)	0.787	0.675
No	14 (58.3)	12 (70.6)	1 (50)	27 (62.8)		

Values are presented as number (%).

such as anxiety, depression, and anger toward themselves than those without pain, and their physical activities are also restricted (Zis et al., 2017). This can lead to mental health problems such as depression (Atkinson et al., 1991). In addition, mental health problems can interfere with the pain suppression process, which can aggravate musculoskeletal pain, especially neck pain, and lead to dysfunction of the neck (Liu et al., 2018). Previous studies have indicated that managing neck pain can aid in the prevention and alleviation of depression (Andias and Silva, 2020) and that environmental and lifestyle factors can influence both neck pain and sleep quality (Almutairi et al., 2022). In this study, there were significant differences in pain duration and emotion, pain duration and sleep in patients with chronic neck pain. In emotion, patients in the early and late chronic stages were 100% and 90.6%, respectively, which were higher than 40% in the subacute stage. In sleep, patients in the early, late chronic, and subacute stages were 100%, 46.9%, and 20%, respectively, which was higher in the chronic stage than in the subacute stage. Although we did not investigate the influence of neurotransmitters in patients with nonspecific neck pain, it is thought that the longer duration of pain may have an impact on hormones, affecting emotion and sleep.

Nonspecific neck pain can cause pain by affecting the muscles and nerves due to changes in muscle length caused by postural problems or mechanical causes. Circulatory disorders in the muscles due to muscle tension cause symptoms such as stiffness, heaviness, headache, and difficulty moving. Muscle tension compresses the nerves, causing abnormal sensations such as stabbing, stinging, numbness, tingling, and burning, and neuropathic pain caused by nervous system abnormalities is expressed as burning, cutting, and aching. In this study, patients with nonspecific neck pain mainly expressed stiffness, heaviness, and tightness depending on the pain intensity and duration. These feelings are related to pain that appears as musculoskeletal abnormalities, and it is thought that the cause of nonspecific neck pain is closer to musculoskeletal problems. As the disease progressed to chronicity, the symptoms of stiff, heavy, tight increased, and subjective expressions related to neuropathic pain appeared in the late chronic stage. It is thought that this is due to the central nervous system hypersensitivity reaction that appears in the chronic stage, and that neurological symptoms appear because the intensity of pain, limitation of function, and persistence of disability increase as the chronic stage progresses (Arendt-Nielsen, 2016).

In summary, in patients with nonspecific neck pain, the intensity of pain affected sleep, and the duration of pain affected sleep

Table 5. The subjective feeling expressed by pain duration in patients with nonspecific neck pain

Variable	Acute (n=0)	Subacute (n=5)	Early chronic (n=6)	Late chronic (n=32)	Total (N=43)	χ^2	P-value
Throbbing						2.394	0.302
Yes	0 (0)	1 (20)	2 (33.3)	17 (53.1)	20 (46.5)		
No	0 (0)	4 (80)	4 (66.7)	15 (46.9)	23 (53.5)		
Stabbing						0.352	0.839
Yes	0 (0)	0 (0)	0 (0)	1 (3.1)	1 (2.3)		
No	0 (0)	5 (100)	6 (100)	31 (96.9)	42 (97.7)		
Stiff						1.382	0.501
Yes	0 (0)	5 (100)	5 (83.3)	28 (87.5)	38 (88.4)		
No	0 (0)	0 (0)	1 (16.7)	4 (12.5)	5 (11.6)		
Squeezing						1.109	0.574
Yes	0 (0)	0 (0)	0 (0)	3 (9.4)	3 (7)		
No	0 (0)	5 (100)	6 (100)	29 (90.6)	40 (93)		
Annoyingly						2.017	0.365
Yes	0 (0)	0 (0)	2 (33.3)	9 (28.1)	11 (25.6)		
No	0 (0)	5 (100)	4 (66.7)	23 (71.9)	32 (74.4)		
Burning						-	-
Yes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)		
No	0 (0)	5 (100)	6 (100)	32 (100)	43 (100)		
Hot sensation						0.352	0.839
Yes	0 (0)	0 (0)	0 (0)	1 (3.1)	1 (2.3)		
No	0 (0)	5 (100)	6 (100)	31 (96.9)	42 (97.7)		
Stinging						-	-
Yes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)		
No	0 (0)	5 (100)	6 (100)	32 (100)	43 (100)		
Heavy						1.753	0.416
Yes	0 (0)	3 (60)	3 (50)	24 (75)	30 (69.8)		
No	0 (0)	2 (40)	3 (50)	8 (25)	13 (30.2)		
Sensitive						0.721	0.597
Yes	0 (0)	0 (0)	0 (0)	2 (6.2)	2 (4.7)		
No	0 (0)	5 (100)	6 (100)	30 (93.8)	41 (95.3)		
Tearing						0.352	0.839
Yes	0 (0)	0 (0)	0 (0)	1 (3.1)	1 (2.3)		
No	0 (0)	5 (100)	6 (100)	31 (96.9)	42 (97.7)		
Tight						0.847	0.655
Yes	0 (0)	3 (60)	3 (50)	22 (68.8)	28 (65.1)		
No	0 (0)	2 (40)	3 (50)	10 (31.2)	15 (34.9)		
Nauseous						2.906	0.234
Yes	0 (0)	1 (20)	1 (16.7)	1 (3.1)	3 (7)		
No	0 (0)	4 (80)	5 (83.3)	31 (96.9)	40 (93)		
Fearful						-	-
Yes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)		
No	0 (0)	5 (100)	6 (100)	32 (100)	43 (100)		
Exhausted and listless						2.972	0.226
Yes	0 (0)	1 (20)	4 (66.7)	11 (34.4)	16 (37.2)		
No	0 (0)	4 (80)	2 (33.3)	21 (65.6)	27 (62.8)		

Values are presented as number (%).

and emotion. Therefore, the effects on sleep and emotions should also be considered when constructing interventions for patients with nonspecific neck pain. The limitations of this study include the small number of subjects, making it difficult to generalize the results. Environmental factors and hormone-related assessments of the subjects were not performed. Future studies should be conducted to supplement these limitations.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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