



Effects of pain localization and duration on disability and quality of life among individuals with neck pain

Şeyda CANDENİZ^a, Seyit ÇITAKER^b

^a Ankara University, Department of Physiotherapy, Ankara, Türkiye

^b Gazi University, Health Sciences Faculty, Department of Physiotherapy and Rehabilitation, Ankara, Türkiye

ARTICLE INFO

RESEARCH ARTICLE

Article history:

Received: 13 April 2022

Accepted: 12 June 2022

Available : 30 December 2022

^a<https://orcid.org/0000-0003-1318-6580>

^b<https://orcid.org/0000-0002-4215-6797>

*Correspondence: Şeyda CANDENİZ

Department of Physiotherapy, Ankara University,
Kızılcahamam, Ankara, Türkiye

e-mail: seydacuma15@gmail.com

Turkish Journal of Health Science and Life

2022, Vol.5, No.3, 161-166

DOI: <https://doi.org/10.56150/tjhsl.1102134>

ABSTRACT

Purpose: This study aimed to identify effects of pain characteristics on disability and quality of life.

Methods : 208 patients with non-specific neck pain diagnosis were included in the study. Patients' resting, activity and sleep pain intensities were evaluated with Visual Analog Scale . Effects of demographic and clinical data on quality of life and pain were evaluated with Neck Disability Index, Short Form-36 and the Neck Outcome Score. The data were analyzed in SPSS 11.5 Windows edition. Statistical significance level was accepted to be 0.05.

Results: As pain localizations expanded, individuals' pain scores were higher while their scores of general health such as activities, participation and quality of life were found to be lower. Whereas individuals with chronic pain had higher pain scores, their scores of general health such as mobility, sleep disorder, social functionality and quality of life were found to be lower.

Conclusion: Neck pain duration and localization affect individuals' quality of life and disability.

Key Words: Neck pain, pain duration, pain localization, quality of life

INTRODUCTION

Neck problems are phenomena frequently experienced by individuals from all walks of society around the world. Neck pain may be related to several reasons. In general, it was reported that the prevalence is the most common among around 50-year-old individuals, and it is higher among women than men [1]. Neck pain is generally accompanied by headache and spread of complaints to upper extremity [1,2]. Staying in incorrect posture for longer periods, loading the neck in hyperextension, being a woman, a stressful life and depression are primary factors causing neck pain. Moreover, poor general health, poor quality of life, smoking, obesity and

neck pain history, previously experienced back pain and trauma are considered important risk factors [3]. There is a common agreement on the fact that these factors affect start and progress of neck pain [4]. Understanding what defines the progress of neck pain and accurate identification of subgroups of neck pain populations will help service providers create more effective and constructive healthcare policies. In addition, accurate classification of individuals with neck pains in different patterns will help determine how pain characteristics such as pain localization, duration and level affect parameters such as individuals' quality of life, participation in everyday life and activity limitation. Clinically, it is common that

patients with non-specific neck pain report problems about upper extremity function. It has been reported in many studies that neck pain causes reduction in muscle strength and endurance [5,6], but studies on the effects of differences in pain localization on limitations and quality of life are insufficient.

Pain duration has also impacts on limitations and recovery process. Studies reported that neck pain in acute period was eliminated more rapidly but left limitations behind [7]. One needs to study whether this sequelae is more during acute or chronic period. The methods used for identifying the factors which cause these determined limitations and aggravate the pain and for classifying the pain include clinical examinations, psychological evaluations, and investigation of sociodemographic factors and functional measuring methods. We planned to measure the effects of demographic factors and neck pain's clinical characteristics on quality of life, functionality, pain and participation parameters with Neck Disability Index [8], Short Form-36 [9] and the Neck OutCome Score [10] which are commonly used and of which validity and reliability were proven.

2. MATERIALS AND METHODS

208 patients within the age range of 18-65 years diagnosed with non-specific neck pain were included in the study. Patients diagnosed with non-specific neck pain who accepted to participate in the study and knew how to read and write were included. Patients with severe neurological disorder, perceptual problems, psychological disorders, who are illiterate and addicted to alcohol or substance were not included in the study. Data collection took place at the Gazi University Hospital and three private physiotherapy clinics.

Localization of patients' neck pain was divided into three categories: "those with pain only in neck area", "those with expansive pain in neck and shoulder areas", and "those with reflective pain in shoulders and arms along with neck".

Pain durations of the participant patients were classified according to the recommendations of

Neck Pain Task Force which is a non-specific neck pain duration classification. The group identified as neck pain that lasted 7 days or more, but less than 3 months is acute, and the group identified as neck pain that lasted 3 months or more is chronic[4].

Patients' resting, activity and sleep pain intensities were evaluated with Visual Analog Scale (VAS). The Neck OutCome Score (NOOS-Tr), NDI and SF-36 questionnaires were applied to all patients in face-to-face interviews.

Neck OutCome Score

The questionnaire was translated into Turkish and its validity and reliability study was performed by Candeniz et al. in 2018 [11]. NOOS is a 34-question questionnaire that investigates neck mobility, individual's sleep disturbance, participation in everyday activities, quality of life, and neck's symptoms. It involves five subscales: "mobility" (7 items), "symptoms" (5 items), "sleep disturbance" (4 items), "everyday activity and pain" (8 items), and "participation in everyday life" (10 items).

Short Form-36

SF-36 survey was used for evaluating the quality of life. The survey was translated into Turkish and its validity and reliability study was performed by Koçyigit et al. in 1999 [12]. The 36-item questionnaire is composed of sub-parameters of physical function, social function, role limitations because of physical problems, role limitations because of emotional problems, mental health, bodily pain, energy/vitality, pain and general health perceptions.

Neck Disability Index

NDI adapted into Turkish language was utilized for identifying neck and analyzing pain's effects on everyday life [13]. This index evaluates under 10 titles which are pain intensity, personal care, lifting, reading, headaches, concentration, work, driving, sleeping and recreation.

Statistical Analysis

The data were analyzed in SPSS 11.5 Windows edition. Descriptive statistics given in the study were mean±standard deviation and median (minimum-maximum) for quantitative variables and number of

cases (percentage) for qualitative variables. Since normal distribution assumptions were not met, Kruskal Wallis H test was used to see whether there was a statistically significant difference between three qualitative variable groups by quantitative variable. For variables not normally distributed, Bonferroni-correction Mann-Whitney U test was performed to see pair subgroups which created a statistically significant difference, if any, between the three groups by quantitative variable. Mann-Whitney U test was performed to see whether there was a statistically significant difference between qualitative variable groups with two groups by quantitative variable. Statistical significance level was accepted to be 0.05.

Power Analysis

Taking the mean ± standard deviation for the Participation sub-parameter as 73.25±18.14, 65.38±18.01 and 54.11±17.82 for the group variable categories of Neck, Neck and Shoulder and Neck,

Shoulder and Arms, the power was found to be 0.99 according to the power calculation using the Kruskal Wallis H test with 208 patients at the significance level of 0.05.

3. RESULT AND DISCUSSION

208 patients (144 [69.2%] women, 64 [30.8% men] who had complaint of neck pain, agreed to participate in the study. As for the sociodemographic data of the participants, their ages varied between 18 and 65 years and their mean age was found to be 35.88±13.79 years.

Mean body mass index (BMI) of all participants was 25.08±4.53 kg/m², mean BMI of the female participants was 24.81±5.09 kg/m², and mean BMI of the male participants was found to be 25.68±2.5 kg/m².

The participants were divided into two groups by their pain durations. Groups' scores of the scales are given in Table 1.

Table 1. Pain Duration

Variables	Pain Duration				p value
	Acute (n=77)		Chronic (n=131)		
	Mean±SD	Median (Min - Max)	Mean±SD	Median (Min - Max)	
rVAS	3.27±2.26	3.00 (0.00-10.00)	3.67±2.20	3.00 (0.00-10.00)	0.212 ^b
aVAS	5.34±2.16	5.00 (0.00-9.00)	5.71±2.10	6.00 (0.00-10.00)	0.232 ^b
sVAS	2.13±2.45	2.00 (0.00-10.00)	2.94±2.74	2.00 (0.00-10.00)	0.028 ^b
Mobility	64.94±18.92	64.29 (14.29-100.00)	57.44±17.56	57.14 (17.86-100.00)	0.004 ^b
Symptoms	52.99±16.61	50.00 (15.00-90.00)	48.89±18.25	50.00 (10.00-95.00)	0.146 ^b
Sleep Disorder	70.37±22.15	75.00 (12.50-100.00)	62.50±21.41	62.50 (12.50-100.00)	0.009 ^b
Activity Pain	57.75±19.55	59.38 (12.50-96.88)	53.87±17.41	56.25 (9.38-93.75)	0.152 ^b
Participation	68.64±19.22	70.00 (10.00-100.00)	60.37±18.95	60.00 (15.00-97.50)	0.002 ^b
NDI	11.49±6.53	11.00 (0.00-36.00)	13.92±6.83	13.00 (2.00-33.00)	0.008 ^b
Sf Physical Function	79.09±18.70	80.00 (20.00-100.00)	73.63±20.44	75.00 (15.00-100.00)	0.059 ^b
Sf Role Difficulty	60.93±36.58	75.00 (0.00-100.00)	52.86±39.55	50.00 (0.00-100.00)	0.151 ^b
Sf Emotional	61.45±40.13	66.60 (0.00-100.00)	49.41±40.91	33.30 (0.00-100.00)	0.043 ^b
Sf Energy Vitality	51.62±19.87	50.00 (0.00-95.00)	48.05±20.75	50.00 (0.00-100.00)	0.007 ^b
Sf Mental Health	62.31±18.14	64.00 (82.00-96.00)	59.31±18.42	64.00 (8.00-96.00)	0.333 ^b
Sf Social Functionality	76.85±19.31	75.00 (25.00-100.00)	64.03±21.10	62.50 (0.00-100.00)	<0.001 ^b
Sf Pain	59.16±21.56	57.50 (10.00-100.00)	52.50±19.78	55.00 (0.00-100.00)	0.024 ^b
Sf General Health	58.79±20.49	60.00 (20.00-100.00)	54.55±18.92	55.00 (10.00-100.00)	0.079 ^b

a: Student's t test, b: Mann-Whitney U test

Whereas individuals with chronic pain had higher pain scores, their scores of general health such as mobility, sleep disorder, social functionality and quality of life were found to be lower.

Participants' scores of neck pain localizations are shown in Table 2. As pain localizations expanded,

individuals' pain scores were higher while their scores of general health such as activities, participation and quality of life were found to be lower. The participants with pain only in neck area were found to be healthier and more functional than other groups.

Table 2. Pain Localization

Variables	Pain Localization						p value
	Neck (n=53)		Neck and Shoulder (n=82)		Neck, Shoulder and Arms (n=73)		
	Mean±SD	Median (Min - Max)	Mean±SD	Median (Min - Max)	Mean±SD	Median (Min - Max)	
rVAS	2.58±1.73	2.00 (0.00-7.00)	3.01±2.06	3.00 (0.00-8.00)	4.78±2.35	5.00 (0.00-10.00)	<0.001 ^b
aVAS	4.68±1.97	5.00 (0.00-8.00)	5.41±2.14	5.00 (0.00-10.00)	6.40±1.92	7.00 (1.00-10.00)	<0.001 ^b
sVAS	1.87±2.24	1.00 (0.00-8.00)	2.16±2.27	2.00 (0.00-10.00)	3.74±2.99	3.00 (0.00-10.00)	<0.001 ^b
Mobility	68.06±17.40	67.86 (32.14-100.00)	61.67±18.49	60.71 (17.86-100.00)	52.89±16.33	53.57 (14.29-89.29)	<0.001 ^b
Symptoms	58.02±19.50	55.00 (15.00-95.00)	50.91±16.24	50.00 (10.00-90.00)	44.32±15.88	45.00 (10.00-75.00)	<0.001 ^b
Sleep Disorder	76.89±17.79	81.25 (37.50-100.00)	67.38±20.58	65.63 (18.75-100.00)	54.88±21.66	56.25 (12.50-93.75)	<0.001 ^b
Activity Pain	64.98±15.84	65.63 (18.75-93.75)	57.17±17.54	59.38 (15.63-96.88)	46.19±16.62	43.75 (9.38-90.63)	<0.001 ^b
Participation	73.25±18.14	75.00 (15.00-100.00)	65.38±18.01	67.50 (25.00-97.50)	54.11±17.82	57.50 (10.00-95.00)	<0.001 ^b
NDI	10.51±6.87	10.00 (0.00-28.00)	11.99±6.17	11.00 (2.00-33.00)	16.00±6.44	16.00 (3.00-36.00)	<0.001 ^b
Sf Physical Function	83.21±19.61	90.00 (20.00-100.00)	78.54±17.49	82.50 (35.00-100.00)	66.92±19.82	70.00 (15.00-100.00)	<0.001 ^b
Sf Role Difficulty	67.29±38.46	75.00 (0.00-100.00)	60.06±35.97	62.50 (0.00-100.00)	42.81±38.30	25.00 (0.00-100.00)	0.001 ^b
Sf Emotional	62.25±42.89	100.00 (0.00-100.00)	57.28±37.14	66.60 (0.00-100.00)	43.95±42.13	33.30 (0.00-100.00)	0.027 ^b
Sf Energy Vitality	58.05±16.27	60.00 (20.00-90.00)	52.71±18.49	50.00 (10.00-100.00)	39.32±21.37	40.00 (0.00-85.00)	<0.001 ^b
Sf Mental Health	68.43±14.54	68.00 (28.00-96.00)	60.93±17.71	64.00 (24.00-96.00)	54.04±19.29	52.00 (8.00-88.00)	<0.001 ^b
Sf Social Functionality	77.22±15.64	75.00 (50.00-100.00)	71.55±20.13	75.00 (25.00-100.00)	59.52±22.96	62.50 (0.00-100.00)	<0.001 ^b
Sf Pain	69.72±16.44	67.50 (35.00-100.00)	55.70±18.48	57.50 (22.00-100.00)	43.42±18.75	45.00 (0.00-80.00)	<0.001 ^b
Sf General Health	64.81±16.70	65.00 (25.00-100.00)	56.95±19.89	60.00 (10.00-100.00)	48.88±18.45	45.00 (15.00-100.00)	<0.001 ^b

a: One-Way ANOVA test, b: Kruskal Wallis H test

DISCUSSION

We investigated pain characteristics effect on quality of life and disability among individuals with non-specific neck pain in this study. This study showed that as the pain localizations spreaded out, the pain scores of the individuals were higher and the general health scores such as activity, participation and quality of life were lower. In addition, individuals with chronic pain had higher pain scores, while general health scores such as mobility, sleep disturbance, social functionality and quality of life were found to be lower.

Concerning the effect of acute or chronic pain on quality of life and pain intensities, the participants experiencing neck pain for longer durations were found to have lower physical function, sleep quality and quality of life. The study carried out by Farina et al. which observed that chronic pain abnormalized the sensory process and caused detectable changes in motor control and pain experience in the data processing of central nervous system coincides with our study [14]. This pain experienced for longer durations may cause an individual to stop working or exercising [15].

While a significant increase in pain intensity and limitations was observed as pain localization expanded, a decrease was found in functionality, participation and quality of life in our study. The study performed by Vogt et al. reinforces the findings of our study. In their study, the participants with neck or shoulder pain reported more functional difficulties in all considered activities in and it was stated that both grip strength and finger tap speed were reduced in the presence of pain. A quite high correlation was found between the presences of neck and shoulder pain [16]. In another study conducted in Finland, chronic neck pain was found to be related to pain in multiple joint areas [17]. To explain this situation with a few reasons, upper extremity is mechanically added to neck via brachial plexus extending from neck to upper extremity. Movements in the upper extremity cause in sliding or elongation of neural

structures throughout the brachial plexus including the neck. Elongation of inflammatory and sensitive neural structures in neck may cause a neck pain reaction resulting in unwillingness to use upper limbs [18].

Consequently, if patients restrict the functional use of their upper extremities due to direct mechanical pain response, this may lead to decreased cardiovascular capacity and physical deconstruction which may cause loss of strength and endurance of muscles [19]. Hence, accurate definition of classification of pain will be valuable to deciding more effective treatments.

CONCLUSION

Parameters such as pain duration and localization, affect quality of life and functionality among individuals with neck pain. Quality of life is lower among people with wider localization and longer periods of neck pain.

Financial Support: This research received no grant from any funding agency/sector.

Conflicts of Interest: The authors declared that there is no conflict of interest.

Ethical Statement: This study was approved by Gazi University ethical committee (#77082166-604.01.04-70153).

REFERENCES

1. Côté, P., Cassidy, J. D., & Carroll, L. The factors associated with neck pain and its related disability in the Saskatchewan population. *Spine* 2000; 25(9), 1109-1117.
2. Guzman, J., Hurwitz, E.L., Carroll, L.J., Haldeman, S., Côté, P., Carragee, E.J., Peloso, P.M., van der Velde, G., Holm, L.W., Hogg-Johnson, S., Nordin, M. and Cassidy, J.D. A new conceptual model of neck pain: linking onset, course, and care: the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *Journal of manipulative and physiological therapeutics* 2009; 32(2), 17-28.
3. Childs, J. D., Cleland, J. A., Elliott, J. M., Teyhen, D. S., Wainner, R. S., Whitman, J. M., & Dyrwi, G. M. Neck pain: clinical practice guidelines linked to the International

- Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association. *Journal of Orthopaedic & Sports Physical Therapy* 2008; 38(9):A1-A34.
4. Haldeman, Scott, Linda Carroll, and J. David Cassidy. "Findings from the bone and joint decade 2000 to 2010 task force on neck pain and its associated disorders." *Journal of occupational and environmental medicine* 2010; 52.4 : 424-427.
 5. Lee, H., Nicholson, L. L., & Adams, R. D. Neck muscle endurance, self-report, and range of motion data from subjects with treated and untreated neck pain. *Journal of manipulative and physiological therapeutics*, 2005; 28(1), 25-32.
 6. Ylinen, J., Salo, P., Nykänen, M., Kautiainen, H., & Häkkinen, A. Decreased isometric neck strength in women with chronic neck pain and the repeatability of neck strength measurements. *Archives of physical medicine and rehabilitation* 2004; 85(8), 1303-1308.
 7. Hush, J. M., Lin, C. C., Michaleff, Z. A., Verhagen, A., & Refshauge, K. M. Prognosis of acute idiopathic neck pain is poor: a systematic review and meta-analysis. *Archives of physical medicine and rehabilitation* 2011; 92(5), 824-829.
 8. Vernon, H. and Mior, S. The Neck Disability Index: a study of reliability and validity. *Journal of Manipulative and Physiological Therapeutics* 1991; 14(7), 409-415.
 9. Ware JE. SF-36 health survey update. *Spine (Phila Pa 1976)* 2000; 25: 3130e9.
 10. Juul, T., Søgaard, K., Roos, E.M. and Aileen, M. Development of a patient-reported outcome: The Neck Outcome Score (NOOS)-Content and construct validity. *Journal of Rehabilitation Medicine* 2015; 47(9), 844-853.
 11. Candeniz, S. Çitaker, S., Bakırarar, B., Meray, J. Turkish version of the Neck Outcome Score .2017. Available from: <http://www.koos.nu/>
 12. Koçyiğit, H., Aydemir, O., Fisek, G. ve Memiş, A. Form-36 (KF-36)'nın Türkçe versiyonunun güvenilirliği ve geçerliliği. *İlaç ve Tedavi Dergisi* 1999; 12(1), 102- 106.
 13. Telci, E.A., Karaduman, A., Yakut, Y., Aras, B., Simsek, İ.E. ve Yagli, N. The cultural adaptation, reliability, and validity of neck disability index in patients with neck pain: a Turkish version study. *Spine* 2009; 34(16), 1732-1735.
 14. Farina, S., Tinazzi, M., Le Pera, D., & Valeriani, M. (2003). Pain-related modulation of the human motor cortex. *Neurological research* 2003; 25(2), 130-142.
 15. Cunha, A. C. V., Burke, T. N., França, F. J. R., & Marques, A. P. (2008). Effect of global posture reeducation and of static stretching on pain, range of motion, and quality of life in women with chronic neck pain: a randomized clinical trial. *Clinics*, 63(6), 763-770.
 16. Vogt, M. T., Simonsick, E. M., Harris, T. B., Nevitt, M. C., Kang, J. D., Rubin, S. M., ... & Newman, A. B. Neck and shoulder pain in 70-to 79-year-old men and women: findings from the Health, Aging and Body Composition Study. *The Spine Journal* 2003; 3(6), 435-441.
 17. Mäkela, M., Heliövaara, M., Sievers, K., Impivaara, O., Knekt, P., & Aromaa, A. Prevalence, determinants, and consequences of chronic neck pain in Finland. *American journal of epidemiology* 1991; 134(11), 1356-1367.
 18. McLean, S. M., Moffett, J. K., Sharp, D. M., & Gardiner, E. An investigation to determine the association between neck pain and upper limb disability for patients with non-specific neck pain: a secondary analysis. *Manual therapy* 2011; 16(5), 434-439.
 19. Smeets, R. J., Wade, D., Hidding, A., Van Leeuwen, P. J., Vlaeyen, J. W., & Knottnerus, J. A. The association of physical deconditioning and chronic low back pain: a hypothesis-oriented systematic review. *Disability and rehabilitation* 2006; 28(11), 673-693.