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Causes and Management of Neck Pain in Primary Care, Review Article

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Neck pain is a prevalent ailment that affects many people around the world. Neck pain is linked to a high level of disability and is usually regarded as a serious public health issue. Pain between the superior nuchal line and the spinous process of the first thoracic vertebra is referred to as neck

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pain. The pain in the neck might refer to the head, trunk, and upper limbs in some cases. This article seeks to offer a summary of the existing evidence on the prevalence, costs, diagnosis, prognosis, risk factors, prevention, and management of neck pain patients.

Keywords: Neck Pain; nuchal; spinous process; ENT.

1. INTRODUCTION

Neck pain ranks fourth globally in terms of years lived with disability, according to the Global Burden of Disease 2016 Study [1]. The lifetime prevalence of neck pain is predicted to be as high as 48 percent [2], with a point prevalence of 8 percent, a 1-month prevalence of 23 percent, a 1-year prevalence of 37 percent, and a lifetime prevalence of up to 48 percent [2]. Across all age groups, ladies had a higher overall prevalence of neck pain than males [3]. Neck pain is most common in males aged 45–49 years (about nine per 100,000 inhabitants) and females aged 45–54 years (roughly 13 per 100,000 inhabitants) [3]. Prevalence rates are higher in high-income nations than in low- and middle-income countries [3]. One probable explanation is that high-income countries have a higher proportion of aged, obese, and sedentary people [3].

Neck pain has also been reported to be more common in the working population, with those in sedentary office-based jobs being at a larger risk than the general population [4]. Neck pain can cause activity limits such as restricted neck range of motion, sitting tolerance, sleep disturbance, and decreased quality of life (QoL), as well as being linked to work absenteeism [5]. It has a huge economic impact because of healthcare costs, lost productivity or time off work, and work insurance costs [6].

1.1 Classification of Neck Pain

Neck pain is divided into several categories. The duration of symptoms, the pain pattern, and the pain mechanism can all be used to classify neck pain [7]. The length of symptoms is categorized as acute (up to 6 weeks), subacute (between 6 and 12 weeks), and chronic (>12 weeks) [7], similar to other musculoskeletal diseases. A single episode (i.e., no history of pain and full recovery after the episode), recurrent (i.e., two or more episodes with full recovery between them), and persistent (i.e., no periods of full recovery) are the three types of neck pain patterns [8]. Finally, the pain mechanism is classified as specific (when there is an identifiable pathoanatomical cause of pain), neuropathic (when pain is caused by compression or lesion of the peripheral nervous system, such as cervical radicular syndrome [9], or nonspecific (when pain is not caused by tissue damage or specific pathology) [8].

Neck pain has been classified as traumatic and nontraumatic by several authors Whiplash is a phrase that is often used to describe the acute injury process that causes neck pain. Whiplash is a sudden acceleration-deceleration energy transfer to the neck that can occur because of a car accident, sports falls, or other physical trauma [10]. Whiplash-associated diseases (WADs) refers to injuries to the bones or soft tissues that arise because of trauma. In this complex illness, many authors and professional practice recommendations use the term WAD to describe people with neck pain. WADs are diagnosed by describing a specific mechanism of injury, and the pathophysiology behind the disorder is currently unknown. Neck pain, headaches, dizziness, and visual and auditory disturbances are all symptoms associated with WADs. As a result, the Quebec Task Force grading system is most generally used to classify WADs depending on the severity of the presenting signs and symptoms:

Grade 1: neck stiffness or tenderness with no physical signs.

Grade 2: neck stiffness or tenderness with musculoskeletal signs such as decreased range of motion and point tenderness.

Grade 3: neck stiffness or tenderness with neurologic signs such as sensory deficits, decreased or absent deep tendon reflexes, and muscle weakness.

Grade 4: neck stiffness or tenderness with fracture or dislocation

The International Statistical Classification of Diseases and Related Health Problems (ICD)-11 and the linked International Classification of Functioning, Disability, and Health (ICF) [11] are two other classifications used in the field of neck pain. ICD and ICF are classification systems that

use letters and numbers to code various ailments. Different sorts of presenting neck pain are coded differently in the ICD-11. The ME84 code, which stands for 'cervical spine pain' or 'cervicalgia,' is the most common. Other codes include NA23.41, which stands for "WAD with complaint of neck pain and musculoskeletal signs," and FB1Y, which stands for "other specified disorders associated with the spine," which includes "cervicobrachial syndrome." Body functions, activities and involvement, environmental circumstances, and body structures are the four categories on which the ICF classification is based. B2803 denotes 'radiating pain in a dermatome,' whereas B2810 denotes 'pain in the head and neck.' Neck pain classifications based on clinical data are also widely utilized field.

The Neck Pain Task Force's clinical practice guidelines [6] recommend categorizing neck pain into four categories: no signs or symptoms suggestive of major structural pathologies and minor interference in daily activities; no signs or symptoms suggestive of major structural pathologies and major interference in daily activities; no signs or symptoms suggestive of major structural pathologies but presence of neurological signs, such as decreased reflexes and paralysis; no signs or symptoms suggestive of major structural pathologies but presence of neurological signs, such as decreased Neck pain with mobility deficit, neck pain with movement coordination dysfunction (includes WAD), neck pain with headache (cervicogenic headache), and neck pain with radiating pain, according to a clinical practice guideline developed by Blanpied *et al*. in 2017 for physical therapists [7] suggests a slightly different classification but still into four categories: neck pain with mobility deficit, neck pain with movement coordination dysfunction (includes WAD), neck pain with headache (cervicogenic headache), and neck pain with radiant (neurological signs) [7].

2. ASSESSMENT AND DIAGNOSIS

2.1 Diagnostic Triage

Obtaining a complete history of the presenting complaint and performing a physical examination should be the first steps in assessing a person with neck pain (musculoskeletal and neurological examination). The clinical history would gather information on the symptoms, such as pain radiation or other symptoms like weakness, dizziness, pain patterns, development of symptoms (description of the mechanism of injury), aggravating and easing variables, and red flags like trauma.

2.2 Neck Pain following Trauma

If a person has neck pain after a trauma, they should be evaluated further to make sure they haven't suffered a major cervical spine injury, such as a cervical spine fracture, dislocation, or ligamentous instability, which would necessitate specific treatment, such as surgery. The Canadian cervical spine rule is a clinical prediction rule designed to assist clinicians in making clinical decisions in low-risk patients (alert [Glasgow scale = 15], stable, and under 65 years old) who appear after blunt trauma [12]. This clinical prediction rule determines if imaging is required to rule out serious neck spine injuries [13]. In high-risk patients (Glasgow14) [13] and polytrauma patients [14], computed tomography is the first-choice exam for severe neck trauma. Nuclear magnetic resonance aids in the differential diagnosis of soft tissue injuries and neck spinal cord injuries in the latter patients [14].

2.3 Screening for Red Flags

We can also recognize red flags in the clinical evaluation that may indicate the presence of serious pathologies [15], such as fractures, vertebral dislocation, vertebral artery dissection, spinal cord injury, cervicalmyelopathy, infection, neoplasia, and systemic diseases like inflammatory arthropathies. Neck pain sufferers can exhibit specific characteristics, signs, and symptoms that are frequently mistaken for a serious pathology. These characteristics include [6,15]: age under 20, age over 50 with concomitant vascular disease, signs of neurological deficits, altered laboratory tests (erythrocyte sedimentation rate, level of reactive protein C, and white blood cells), trauma, previous neck surgery, history of intravenous drug use, signs and symptoms of fever, neck stiffness, pain that does not improve despite treatment, nausea or vomiting, unexplained weight loss, and excessive sensitivity to palpation of the neck.

The diagnostic accuracy of red flags in individuals with neck pain in identifying serious disorders has yet to be validated [15]. Some writers even claim that red flags are rarely related with significant neck conditions [15]. As a result, individuals with one or more red flags

should be closely monitored for changes / worsening of symptoms or the appearance of new symptoms such muscle weakness. Additional testing, such as a neurological examination (if there are any neurological abnormalities), a fever (if there is a suspected infection), and trauma may be necessary (due to the possibility of major structural injuries).

In some cases, supplementary imaging studies may be recommended if the reason of neck pain is not a trauma, and it is getting worse [16]. Nuclear magnetic resonance with or without contrast is recommended in patients with a suspected infection (due to the presence of fever and changes in laboratory test results), patients with a known malignancy, and patients who have had previous surgeries, primarily anterior cervical discectomy and fusion (due to the suspicion of pseudoarthrosis or problems with internal fixators). In these individuals having anteriorcervical discectomy and fusion, neckradiography and neck computed tomography without contrast are also recommended. Imaging detection of serious diseases or injuries to the neck and spine is critical for medical practise.

2.4 Outcome Measures

There is currently no approved core set of outcomes for assessing persons with neck pain. Clinicians should assess pain severity, physical function, and psychological elements of pain (e.g., anxiety, sadness, and catastrophization) according to a recent clinical practise guideline [7]. People with neck pain can be assessed using health-related QoL, employment status, and pain interference [17].

The numeric pain rating scale (NPRS), which ranges from 0 (no pain) to 10 (worst agony), is often used to assess pain intensity. The NPRS lowest clinically important difference is a 2 point (30 percent) drop. The NPRS has moderate reliability for nonspecific neck pain (ICC: 0.67 percent CI: 0.27–0.84]) [18] and neuropathic neck pain (ICC: 0.58; 95 percent CI: 0.14–0.79) [19], and excellent reliability for cervicogenic headache (ICC: 0.92; 95 percent CI: 0.46–0.97) [20]. The NPRS has excellent reliability for cervicogenic headache (ICC: 0.92; 95 percent CI: 0.46 The neck disability index (NDI) [21] is the most widely used and recommended outcome metric for disability. The NDI scores range from 0 to 50, with the minimum detectable chance being 5 points, or 10% of the total points. Each of the 10 inquiries is in charge of a distinct domain, such as pain severity, personal care, lifting, reading, headaches, attention, work, driving, sleeping, and recreation. The NDI shows great reliability for a 1-week test-retest interval (ICC: 0.92; 95 percent CI: 0.85–0.96), according to a systematic study published in 2019 [22,23].

2.5 Risk Factors

General risk factors for an episode of neck pain.

A systematic review published in 2018 integrated information on the risk variables associated with the onset of a neck pain episode [24]. The risk factors were classified according to the strength of the association, with little association (risk ratio [RR] or odds ratio [OR] between 1.0 and 1.5), moderate association (RR or OR between 1.5 and 2.0), and high association (RRor OR>2.0) in the systematic review, which included ten longitudinal studies (n = 19,055 participants). Individual, physical, and psychological risk variables were found to have a moderate to high level of association [24]. Strong BMI (>30 kg/m2) (OR: 2.21; 95 percent CI:1.32–3.70), a history of neck pain (OR: 2.24; 95 percent CI: 1.39–3.06), and a high perception of muscle strain (RR: 4.04; 95 percent CI: 1.99–8.17) were all found to be risk factors for a neck pain episode. The authors discovered that having a good leadership profile (OR: 0.32; 95 percent CI: 0.16–0.67), a pleasant social environment (OR: 0.45; 95 percent CI: 0.25–0.83), leisure physical activity (OR: 0.6; 95 percent CI: 0.4–0.9), and good extensor muscle resistance (OR: 0.92; 95 percent CI: 0.87–0.97) were all protective factors. The authors conclude that the majority of the characteristics studied are changeable, and this finding could potentially have a social impact. People who have sustained an acute neck injury as a result of a vehicular collision have a higher chance of experiencing future neck pain (RR: 2.3; 95 percent CI: 1.8–3.1) between 1 and 17 years after the trauma, according to a 2019 systematic analysis (eight studies, n = 3345) [25].

Some research has been done to identify risk factors for neck pain in young adults. The risk factors for nonspecific neck pain in young adults were explored in a systematic study published in 2020 [26]. Six studies (n = 8856 people) were included in this systematic review, which found a total of 56 risk factors in young adults aged 18–29. The authors discovered that all ICF components were covered by 56 risk factors, including 24 risk factors for body functions and

structures, 15 risk factors for activities and participation, ten risk factors for environmental factors, ten risk factors for personal factors, and female sex, BMI, perceived stress, daily computer and physical activity duration. Perceived stress (OR: 1.7; 95 percent CI: 1.1–2.6), using a computer for at least 2–4 hours without a break (OR: 1.8; 95 percent CI: 1.2–2.9), computer screen not adjusted at eye level (OR: 1.6; 95 percent CI: 1.1–2.4), keyboard positioned too high (OR: 2.2; 95 percent CI: 1.2–3.9), and 2nd year students (versus 1st year) (OR: 1.9 High BMI, physical activity level, and using a computer for more than 3 h per day were not associated with developing a first episode of neck pain in three studies, and high BMI, physical activity level, and using a computer for neither 3nor>3 h per day were not associated with developing a first episode of neck pain. The authors of this systematic review emphasize the need for more high-quality studies, as well as the large number of studies analyzing potential risk variables that yielded false results.

2.6 Prognosis

There are few high-quality prognostic studies in neck pain patients [27]. The evidence relating to the prognosis of individuals with acute nonspecific neck pain was summarized in the most recent systematic reviews [27]. Three cohort studies and three randomized controlled trials (with a total of 283 individuals) were included in this review [27]. In the first six weeks after the onset of symptoms, the authors saw a considerable reduction in pain intensity and impairment. On a 0–100 scale, the mean reduction in pain intensity was 35 points (95 percent CI: 32–38) and the mean reduction in disability was 17 points (95 percent CI: 15–19) in the first 6 weeks.

Pain severity tends to grow from 6 to 52 weeks, and patients who do not recover are more likely to acquire chronic neck pain [27]. Furthermore, according to data from an initial cohort research, nearly half of the patients will totally recover within 12 months [27]. Between 1 and 5 years after the initial episode, 50 and 85 percent of patients have residual symptoms and recurrences, respectively [15]. Patients with neck pain have a positive initial clinical history, but there is a large burden on patients over time, according to current research on prognosis [27,28].

2.7 Interventions to Prevent Neck Pain

Few studies have looked into the effectiveness of prevention methods for nonspecific neck pain, and the results are mixed [29]. The evidence relating to the effectiveness of therapies aimed at preventing a new episode of neck pain was summarized in the most recent systematic review (five trials, n = 3852) [30]. The authors discovered that two main techniques to preventing a new episode of neck pain were used: ergonomic programs (e.g., workstation adjustments) and exercise programs (e.g., usual aerobic exercise). There is no difference between an ergonomic program and minimum or no intervention in preventing new neck pain episodes, according to very low-quality evidence (OR: 1.00; 95 percent CI: 0.74–1.35, n = 3 trials). However, there is moderate-quality evidence that an exercise program reduces the probability of a new episode of neck pain better than no intervention control (OR: 0.32; 95 percent CI: 0.12–0.86, n = 2 trials).

The authors noted that because these findings are based on a small number of trials, the majority of which were conducted with office workers, more high-quality trials are needed to support these conclusions. A recent randomized controlled trial [31] investigated a comprehensive intervention (i.e., participative ergonomics to tailed case management program) for the prevention of musculoskeletal pain in nursing staff since this systematic review was released. The authors discovered that a multimodal intervention was more successful than normal care in reducing the probability of nursing staff experiencing self-perceived neck, shoulder, and upper back pain (OR: 0.37; 95 percent CI: 0.14–0.96). In addition, Sitthipornvorakul et al. [32] looked at the benefits of a walking intervention versus no intervention in reducing the likelihood of a new episode of neck pain in office employees over a 6-month period. Walking intervention had a beneficial effect (OR: 0.22; 95 percent CI: 0.06–0.75), according to these researchers. To learn how to prevent neck pain occurrences, more research is needed.

Further research into the prevention of neck pain episodes is required. This evidence will enable for the prioritisation of resources to be allocated to prevention programs with proven effectiveness, which may have a significant influence on lowering treatment costs and

enhancing the quality of life and productivity of those who participate in the program.

2.8 Treatments

The goal of neck pain treatment is to decrease pain severity and disability over time. Different classification systems are used in clinical practice guidelines to assist the management of individuals with neck pain [7]. The most well-known are risk stratification-based systems, which divide patients into three groups based on their risk of chronic pain (low, medium, and high risk) [7,33]. Regardless of the method utilized, most patients who are assessed to be at low risk of chronicity in the acute phase should get counselling or instruction, according to guidelines [7,33]. This suggestion is consistent with the expected progression of pain and activity improvement, and it is unlikely that these patients would require additional treatments [33]. More sophisticated treatments combined with medicines may benefit patients with a medium or high risk of chronicity [7,33].

Nonpharmacological methods (e.g., education, exercise, manual therapy, physical agents, or multimodal approach) are typically combined with psychological treatments (e.g., cognitive behavioral treatment) and pharmacological interventions (e.g., NSAIDs) [7,33]. As a result, all guidelines for neck pain patients (exception to known disease) focus predominantly on nonpharmacological therapies [7,33].

Pharmacological interventions: evidence acute / subacute / chronic.

Pharmacological therapy for refractory presentations should be used for a brief length of time and as an addition to other nonpharmacological treatments, according to guidelines. Nonopioid-based analgesics (e.g., NSAIDs) should be used with caution as first-line therapy [34]. These recommendations are based on a limited body of evidence and take into account the risks of opioid-based analgesics.

The following is the current evidence for pharmaceutical therapies. In patients with acute whiplash, there is moderate evidence that intravenousmethylprednisolone is more effective than placebo at lowering pain intensity after one week [17]. For patients with neck pain, there is moderate quality evidence that NSAIDs are beneficial in lowering pain intensity when compared to placebo in the short term [35]. For chronic neck pain, there is also modest evidence that injectable lidocaine and neck stretching are more helpful than neck stretches alone at 3 months [17]. On the other hand, there is high-quality evidence that botulinum toxin type A has similar effects in lowering pain intensity for chronic neck pain in the short term when compared to placebo [36]. The majority of studies in this field looked at the impact of nonpharmacological therapy on neck pain patients.

Nonpharmacological treatments: evidence acute / subacute / chronic.

In terms of physical therapy-based therapies, there is moderate-quality evidence that manipulation alone is helpful for lowering pain intensity and function for acute/subacute neck pain in the short term when compared to oral medication (e.g., NSAIDs and opioids) [37]. Exercises (stretching and strengthening) are more beneficial than a waiting list for individuals with acute radiculopathy in the near term, according to low-quality evidence [38]. Furthermore, there is low-quality evidence suggesting motor control exercises for patients with persistent neck pain have similar benefits on pain intensity reduction as other interventions [18].

For individuals with persistent neck pain, there is moderate-quality evidence that exercises (stabilisation and strengthening) are more beneficial than waiting lists controls at lowering pain and improving function [38]. For individuals with neck pain, treatment-based classification systems have similar impact on pain intensity reduction as alternative interventions [19]. Electrotherapy (electric muscle stimulation and transcutaneous electrical nerve stimulation) and other passive therapies had very little evidence of no difference from placebo interventions [39].

2.9 Psychological Treatments: Evidence Acute / Subacute / Chronic

In terms of psychological therapy, there is limited evidence that psychological therapies (e.g., cognitivebehavioral treatment) are more helpful than other interventions in lowering pain intensity in subacute neck pain [40]. Furthermore, there is low-quality evidence suggesting psychological therapies are beneficial for reducing pain intensity and improving function in subacute and chronic neck pain when compared to other

interventions or no treatment controls [29]. Self-management measures had similar impacts on improving function as stretching instructions, according to low-quality evidence [34].

2.10 Education: Evidence Acute / Subacute / Chronic

There is moderate-quality evidence that patient education (educational video instruction) is more effective than no treatment in reducing pain intensity in acute whiplash patients in the short term [34]. On the other hand, there is extremely low-quality evidence that patient education (self-care strategies) has a similar effect in acute to chronic mechanical pain patients over a short period of time as no treatment [41]. Patients with neck pain may find a multimodal strategy appealing when examining systematic reviews and guidelines for various neck pain diseases [20].

The relatively small number of research and their poor methodological quality limit our present understanding of the a etiology, prognosis, prevention, and management of neck pain. Research into the pain mechanisms involved in the development of nonspecific neck pain, study into the effectiveness of interventions aimed to prevent and treat neck pain, and research into the early identification of those at risk of poor prognosis or nonrecovery are all needed. An worldwide Delphi study was undertaken in 2019 to determine the current research agenda for neck pain. This led to the identification of five priority areas for neck pain research, including: determining the efficacy and cost–effectiveness of available treatments, translating research evidence into clinical settings, determining the effectiveness of education and self-care in prevention and treatment, identifying causative factors for neck pain development, and defining the natural course and prognostic factors for people with neck pain [42,43-45].

3. CONCLUSION

This new agenda can be used by researchers and funding agencies to focus research efforts on the most pressing topics in the field of neck pain. In the absence of strong evidence, physicians must rely on indirect or empirical evidence to make clinical choices.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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