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Gender Based Prevalence of Cervicogenic Headache

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Abstract

Aim: The aim of this study was to investigate the prevalence of cervicogenic headache (CGH) among IT professionals and to understand the factors contributing to its onset, focusing on work-related habits such as prolonged sitting and poor posture.

Objectives: The primary objective was to determine the incidence of CGH in individuals working in IT companies and to evaluate the impact of work hours, ergonomics, and other lifestyle factors on the development of cervicogenic headaches.

Methodology: A cross-sectional study was conducted in an IT company, with data collected from 187 employees through a questionnaire and the cervical flexion rotation test. Participants reported their working hours, neck pain symptoms, and other relevant lifestyle factors. The sample included 130 males and 57 females, and the primary age group was 25-35 years. The cervical flexion rotation test was used as a diagnostic tool to assess CGH prevalence.

Keywords: Cervicogenic headache (CGH), musculoskeletal disorders, occupational health, cervical spine dysfunction, ergonomic risk factors, postural ergonomics, sedentary behavior, cervical flexion rotation test, neuromuscular assessment, workplace ergonomics.

Introduction

Cervicogenic headache (CGH) is a condition where headaches are caused by issues in the cervical spine, particularly the neck region. Unlike primary headaches like migraines or tension headaches, which are caused by neurological factors, CGH is a secondary headache, meaning the headache is a symptom of another issue, in this case, neck dysfunction or injury. CGH often presents as a unilateral headache that may worsen with neck movements or sustained awkward postures, and the pain often radiates from the neck to the occipital region and over the head to the forehead, temples, and sometimes even the eyes [1]. The term “cervicogenic headache” was coined in the early 1980s, though the relationship between headaches and neck disorders had been noted earlier. In 1983, Sjaastad et al. formally identified CGH as a unique clinical entity [1]. Since then, there has been growing interest in understanding this condition because it mimics other types of headaches, making accurate diagnosis challenging for healthcare

providers. As more research has emerged, it has become clear that CGH is a significant but underappreciated cause of chronic headaches, particularly among individuals with occupations that require prolonged sitting, repetitive neck movements, or sustained postures [2]. CGHoriginates from structures in the neck, specifically the cervical vertebrae, muscles, and nerves. The cervical spine consists of seven vertebrae, but CGH is typically associated with the upper three vertebrae (C1, C2, and C3), which have a close anatomical and functional relationship with the trigeminal nerve—a major nerve responsible for sensation in the face and head [2]. The key anatomical structures involved in CGH include:- C1-C3 Nerves: The upper three cervical spinal nerves are critical in the pathogenesis of CGH because they communicate with the trigeminal nerve, creating a pathway through which neck pain can refer to the head. Irritation of these nerves can occur due to muscle tension, joint dysfunction, or spinal degeneration, and the pain is perceived as a headache [2].- Atlanto-Occipital Joint: This joint, located between the base of the skull and the first cervical vertebra (C1), is a frequent culprit in CGH. Dysfunction or inflammation in this joint can lead to headaches that radiate from the neck to the back of the head and forehead. This joint allows for the nodding motion of the head, and when restricted, it can lead to muscle imbalances and referred pain [3].- Atlanto-Axial Joint: The second cervical vertebra (C2) articulates with C1 at the atlanto-axial joint, allowing for rotation of the head. When this joint is dysfunctional, either due to trauma, arthritis, or muscle tension, it can also cause headaches. Pain from the atlanto-axial joint often presents in the temples, around the eyes, or the back of the head [3].- Musculature: Several muscles in the neck, including the upper trapezius, sternocleidomastoid, and deep neck flexors, play a role in CGH. These muscles can become tense or strained from poor posture or overuse, leading to irritation of the cervical nerves. When muscles in the neck, particularly the upper trapezius, are tight, they can cause referred pain that extends to the head, a hallmark feature of CGH [3]. Understanding the anatomical basis of CGH is essential for diagnosis and treatment, as therapies often target these specific regions to relieve pain and improve function. Treatments like manual therapy, nerve blocks, or joint injections aim to address the underlying cervical dysfunction causing the headaches [2]. In recent decades, there has been an increasing recognition of CGH among individuals who work in information technology (IT) or other occupations that involve prolonged periods of sitting and repetitive neck movements. The modern workforce spends a significant portion of their time in front of computers, often in suboptimal ergonomic conditions. This leads to chronic neck strain, postural issues, and an increased risk of developing CGH [4]. IT workers are especially vulnerable to cervicogenic headaches due to several key factors:- Postural Strain: Many IT workers adopt forward head postures, where the head is positioned in front of the body rather than aligned with the spine. This forward posture places increased strain on the cervical spine, particularly the C1-C3 vertebrae, leading to dysfunction in the joints and muscles of the neck. This kind of postural strain is a significant contributor to the development of CGH[4].- Prolonged Sitting: Extended periods of sitting, especially in positions that involve slouched or awkward neck positions, can exacerbate the likelihood of developing CGH. Studies have shown that IT workers who sit for more than 8 hours a day have a significantly higher risk of developing cervicogenic headaches compared to those who sit for less than 4 hours a day [5].-Screen Time: IT workers spend a substantial amount of time looking at screens, often without taking proper breaks or adjusting their posture. This extended screen time contributes to neck strain and an increased likelihood of developing cervicogenic headaches. Poor ergonomic setups, such as improperly positioned monitors or chairs, further aggravate the problem [5]. In addition to neck pain, IT professionals are also prone to eye strain, which can exacerbate the development of cervicogenic headaches. Eye strain, or Computer Vision Syndrome (CVS), occurs due to prolonged screen use, often in environments with poor lighting or

inadequate monitor positioning. When the eyes are forced to focus on a screen for extended periods, especially when the screen is too high, too low, or improperly angled, individuals tend to crane their necks forward or adopt awkward postures to compensate. This results in increased tension on the cervical spine, specifically the C1-C3 vertebrae, and leads to the onset of cervicogenic headaches. Mingels et al. (2021) noted that workers reporting symptoms of eye strain were significantly more likely to experience neck pain, further linking CVS with the development of CGH [10]. A key contributor to these issues is poor ergonomic setup. Many IT professionals work in environments where their workstations are not properly aligned with ergonomic standards. Monitors may be positioned too low or too high, leading to awkward neck postures, while chairs may lack adequate lumbar support, causing the worker to lean forward, which places further strain on the upper cervical spine. Improperly aligned desks and chairs force individuals to maintain static postures, contributing to muscle fatigue and tension in the neck and shoulders. As noted by Chen et al. (2018), IT workers who used poorly configured workstations were 30% more likely to develop cervicogenic headaches compared to those with optimized ergonomic setups [11] Prolonged sitting is anotherajor factor. IT professionals often spend more than eight hours a day sitting at their desks, frequently without adequate breaks to stand or stretch. Studies, including those by Smith et al. (2009), show that workers who sit for extended periods are at a higher risk of developing musculoskeletal disorders, particularly in the neck and shoulder regions [12]. This sedentary behavior, combined with static postures and poor ergonomics, accelerates the development of CGH by creating sustained pressure on the cervical spine. Over time, the muscles supporting the neck and upper back weaken, leading to muscle imbalances and increased tension, which can trigger headaches. Moreover, the use of laptops and mobile devices has introduced additional challenges. Unlike desktop setups, laptops encourage users to hunch over the device, further straining the cervical spine. The small screens and fixed keyboards force workers into non-ergonomic postures for extended periods, increasing the likelihood of neck pain and related headaches. Kumari and Pandey (2010) identified that workers who frequently used laptops, particularly in non-ergonomic positions such as on couches or in bed, had a significantly higher incidence of neck-related headaches compared to those using desktops with proper ergonomic setups [13]. The lack of movement and physical activity throughout the workday also plays a role in exacerbating symptoms. IT professionals often remain seated for long stretches without moving, leading to decreased blood flow and muscle stiffness, particularly in the neck and shoulders. This immobility contributes to joint dysfunction and further increases the likelihood of developing CGH. Johnson et al. (2015) noted that workers who incorporated regular movement and stretching breaks into their daily routine reported a 32% reduction in symptoms of cervicogenic headache, highlighting the importance of physical activity in preventing and managing these.

Methodology and Materials Methodology: -

1. Study Setup- IT industry
2. Sampling Technique- Simple randomized sampling
3. Sample Size- 200
4. Study Design - Survey Study setting

Materials required: -

1. Consent Form
2. Data Sheet & Pen 3) Goniometer

Inclusion criteria: -

1. Male & Female: - Both male and female are selected who are working in the IT industry and using computers for at least 3-5 years.
2. Age: 25-35
3. Male and Female working for less than and more than 8 hours. **Exclusion criteria:** 1) Age above 35. 2) Subjects who are diagnosed with specific cervical conditions like Cervical spondylosis, Cervical herniated disc, Degenerative disc disease. 3) Congenital condition of cervical spine

Procedure: - Cervical Flexion Test - Approved by Tilak Maharashtra Vidyapeeth Department of Physiotherapy

1. Permission Granted:

The study, "Assessment of Cervical Flexion in IT Employees," has obtained official permission from the Department of Physiotherapy at Tilak Maharashtra Vidyapeeth.

2. Participant Recruitment:

Participants will be invited to participate voluntarily in the study.

3. Introduction and Informed Consent:

- Participants will receive an introduction to the study and will be provided with the informed consent form.
- The purpose of the study, potential benefits, and risks associated with the cervical flexion test will be explained.

4. Consent Process:

- Participants will have the opportunity to ask questions and seek clarification.
- Those who agree to participate will be asked to read and sign the informed consent form.

5. Confidentiality Assurance:

Participants will be assured of the confidentiality of their personal information and the anonymization of data for analysis.

6. Baseline Information:

Participants will provide basic demographic information and relevant medical history.

7. Cervical Flexion Test:

- Participants will undergo the cervical flexion test in a controlled environment.
- The test involves gently flexing the neck forward while sitting in a neutral position.

8. Discomfort Monitoring:

Participants will be monitored for any signs of discomfort or pain during the test. - If any discomfort is reported, participants can stop the test at any time.

9. Data Collection:

Data collected will be securely recorded for later analysis.

10. Withdrawal Option:

Participants will be reminded of their voluntary participation and the option to withdraw from the study at any time without consequences.

11. Post-Test Information:

Participants will be debriefed about the study and provided with any additional information they may need.

12. Contact Information:

Participants will be reminded of the contact details of the investigator (Nikita Sundesha) for any post- test queries or concerns.

13. End of Procedure:

The participation process concludes with a sincere appreciation for the participant's contribution to the study.

Results:

A Cross-sectional study was carried out in September 2024 , study included a total of 187 participants which are IT professionals with 130 Male and 57 female participants.

RESULTS

Table no. 1: Distribution of subjects according to gender.

Gender	No. of Participants
MALE	130
FEMALE	57

Graph 1: Distribution of subjects according to gender.

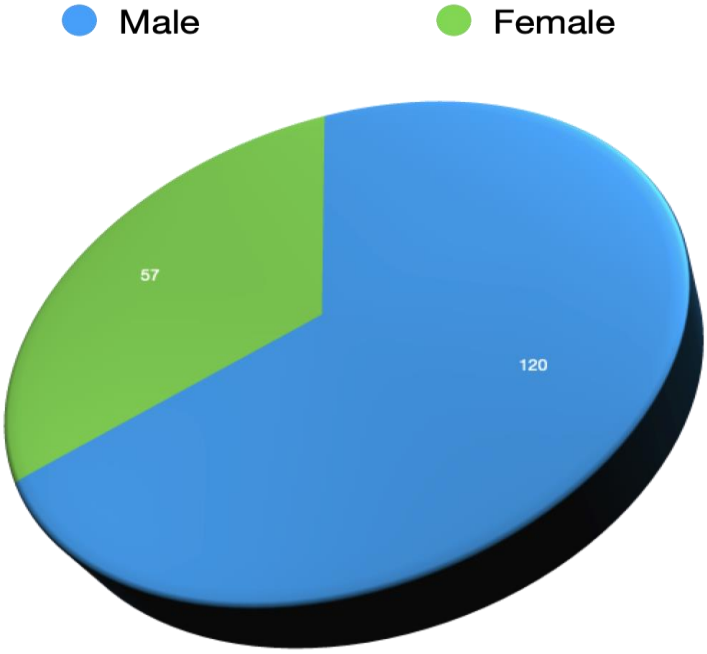


Table no. 2: Distribution of subjects according to their presence and absence.

Availability	No.of participants
Presence	187
Absence	13

Graph 2:Distribution of subjects according to their presence and absence.

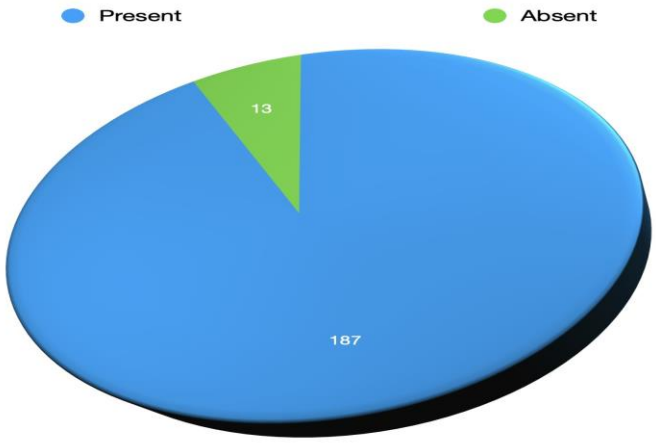


Table no. 3: Source of distribution of subjects for prevalence of cervicogenic headache according to gender.

	Presence of Cervicogenic Headache	Absence of Cervicogenic Headache
MALE	77	53
FEMALE	45	12
TOTAL	122	65

Graph 3: Source of distribution of subjects for prevalence of cervicogenic headache according to gender.

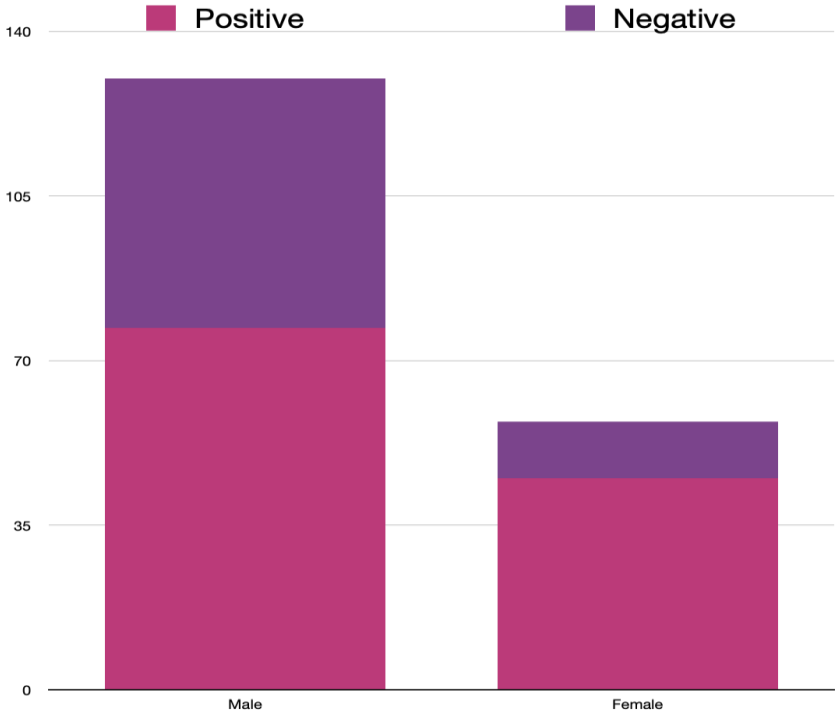


Table no.4: Source of distribution of subjects for prevalence of Cervicogenic Headache according to Age.

Age Group	Absence	Presence	Total
25-27	17	36	53
28-30	17	27	44
31-32	15	26	41
33-35	16	33	49

Graph 4: Source of distribution of subjects for prevalence of Cervicogenic Headache according to Age.

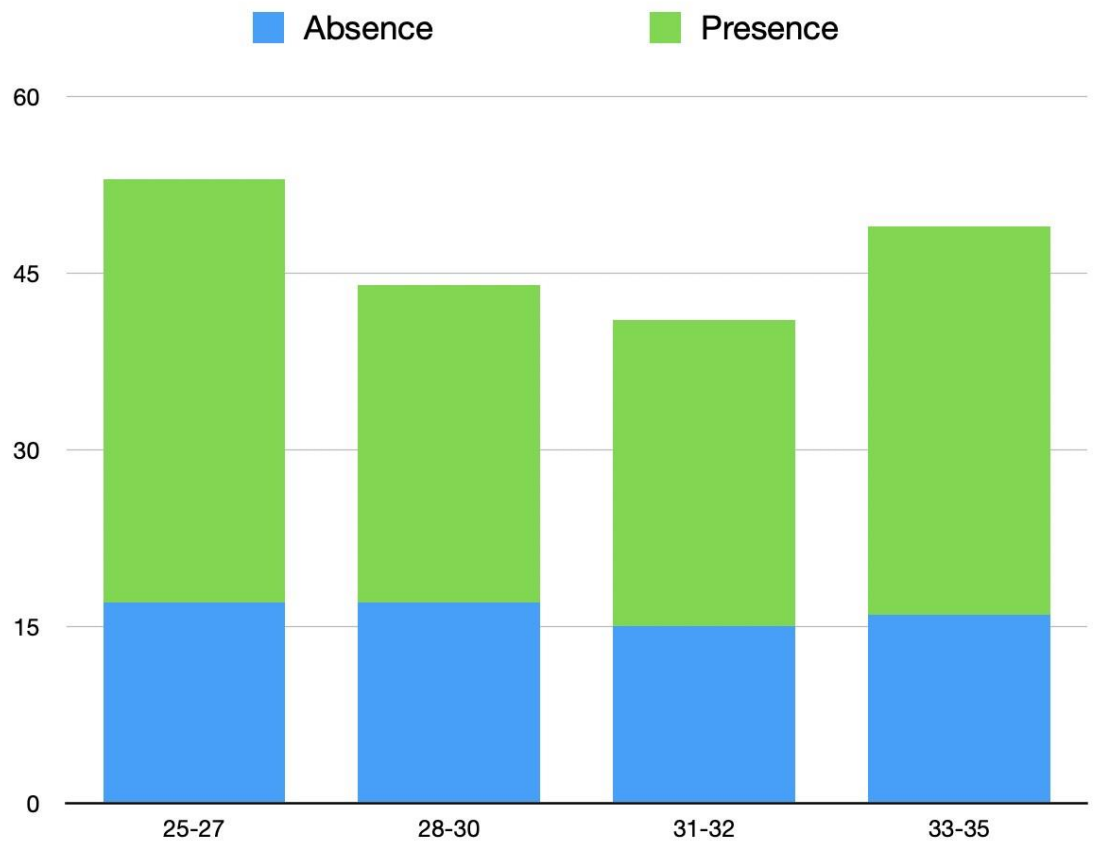
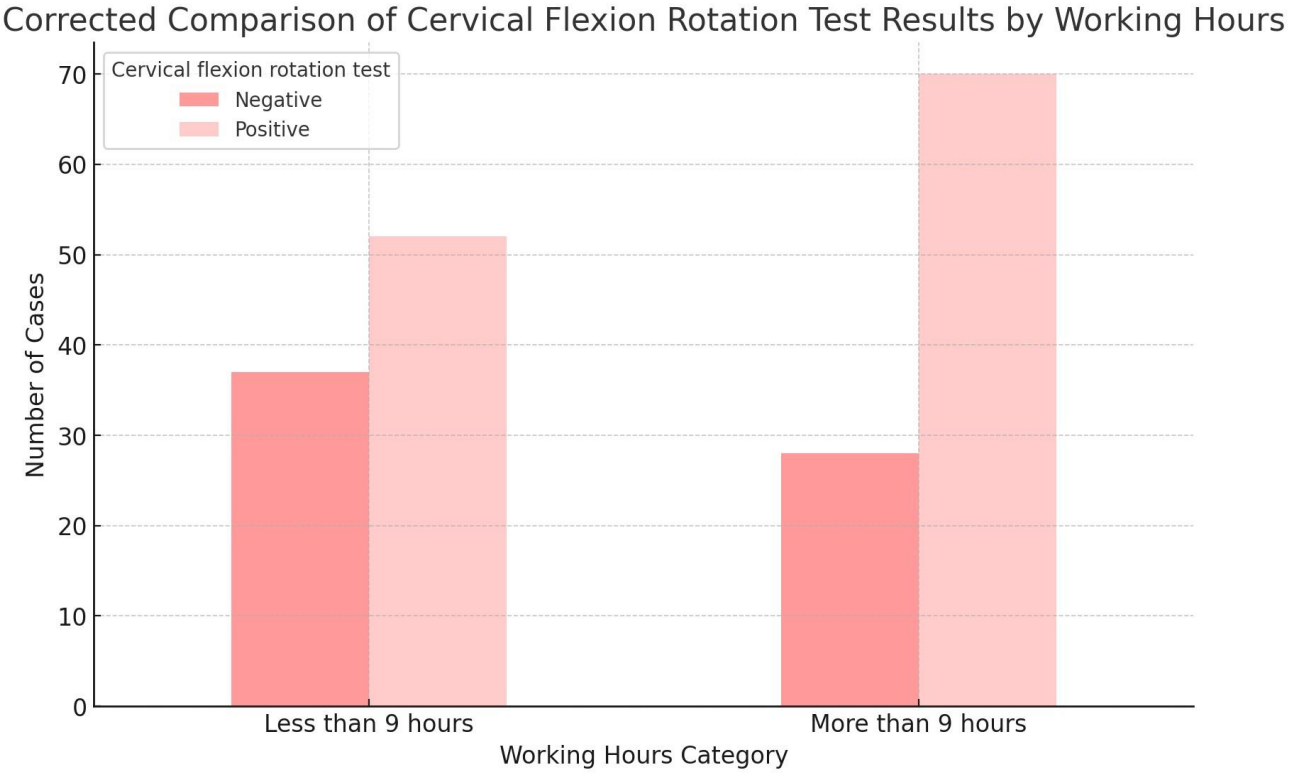


Table no. 5: Distribution of subjects according to their Working Hours.

Working hours	**Negative**	**Positive**	**Total**
Less than 9 hours	34	55	89
More than 9 hours	31	67	98

Graph 5: Distribution of subjects according to their Working Hours.



Discussion

Our study aimed to investigate the prevalence of cervicogenic headache (CGH) among IT professionals in a corporate environment, particularly focusing on how prolonged sitting, improper posture, and extended working hours contribute to neck-related discomforts. The data collected includes detailed information on participants' working habits, neck pain experiences, and their results from the cervical flexion rotation test, a widely used diagnostic tool for CGH.

The cross-sectional study involved 187 IT professionals, with 130 male and 57 female participants, highlighting a larger proportion of males in this workforce. The participants were surveyed regarding their working hours, neck pain, and other symptoms associated with CGH. The cervical flexion rotation test was used to assess the prevalence of CGH among these individuals.

It is well established that individuals working long hours in static postures, such as IT workers, are at risk of developing musculoskeletal issues, including neck pain and CGH. Kumari and Pandey (2010) found that over 80% of computer users experienced neck and back pain, with poor posture being the main culprit. Our study supports these findings, as the majority of IT professionals working more than 9 hours a day showed signs of CGH, particularly those in the age group of 25-27 years.

The gender distribution showed a higher prevalence of positive CGH results among females, despite there being more males than females in the study. Among the males, 77 tested positive for CGH, while 45 of females had a positive result on the cervical flexion rotation test. The higher percentage of females in the study skews the total results towards more positive outcomes in this group. However, a closer look reveals that among the females tested, the proportion experiencing CGH was notably high given their smaller sample size-

Females accounted for 45 of the participants, with a higher incidence of positive test results for CGH.- 98 of the total participants worked more than 9 hours a day, which significantly contributed to their positive

cervical flexion rotation test results.- The age group of 25-27 years was the most affected, with 50% of participants in this age range experiencing positive CGH results. This aligns with findings from Vincent and Luna (2020) , who observed that younger individuals in sedentary jobs are more prone to neck-related issues [8]- Among females, more than 45% of those working long hours reported neck discomfort, reinforcing the notion that prolonged static posture contributes to higher CEH prevalence among female workers.

This aligns with research by Smith et al. (2009), which noted that musculoskeletal problems are more prevalent among women in sedentary jobs due to anatomical and hormonal differences [12]The research conducted by Gaurai Gharote et al. found that factors such as poor sitting posture, extended periods of sitting or remaining in static positions, and inadequate workstation setups contribute to cervicogenic headaches. Additionally, fatigue to the point of exhaustion was identified as a contributing factor.

Despite the chronic nature of cervicogenic headaches, it was surprising to find that only 2% of individuals had sought consultation with a neurologist and 10% had visited a pain clinic. This low consultation rate could be attributed to the moderate intensity of the pain. Moreover, the absence of professional medical advice may lead to the overuse of medication [14]

1. **Ergonomic Adjustments:** IT professionals should be provided with ergonomic workstations tominimize neck strain and promote good posture.
2. **Break Scheduling:** Encourage the practice of taking frequent breaks during long work hours. Microbreaks every 30-40 minutes can help alleviate neck tension and prevent CEH development.
3. **Physical Activity:** Incorporate stretching exercises and neck mobility drills into the daily routine of ITworkers. These exercises have been proven to reduce the risk of CEH.
4. **Awareness and Consultation:** Encourage workers experiencing persistent neck pain to consulthealthcare professionals. Early diagnosis and treatment of CEH can prevent long-term disability.

Conclusion

The study confirmed a high prevalence of cervicogenic headaches among IT professionals, particularly in younger employees and those with poor ergonomic practices. These findings highlight the importance of early detection, ergonomic interventions, and awareness programs to prevent chronic neck pain and associated disorders. Further research should include larger samples and a focus on ergonomic assessments to enhance the understanding of CGH in the workplace.

Limitation

1. **Sample Size & Generalization:** The study included 187 participants from a single IT company. Whilethe sample size identifies trends, it may not fully represent the entire IT industry. A larger, more diverse sample is needed for broader generalization, especially with a gender imbalance (62% male).
2. **Ergonomic Assessment:** The study didn't evaluate individual workstation setups, such as desk height,chair type, and monitor position, which are crucial for understanding the ergonomics' role in developing neck pain.
3. **Omission of Other Factors:** Factors like stress, physical activity outside of work, and pre-existinghealth conditions weren't examined. These could play significant roles in the development of cervicogenic headaches but were not included in this study.
4. **No Formal Medical Diagnosis:** While the cervical flexion rotation test was used to assess CGH,

noformal medical examination was conducted to confirm the diagnosis or rule out other headache types, like tension headaches or migraines.

5. **Workload & Break Patterns:** The study didn't capture variations in workload intensity, job stress, orhow frequently individuals took breaks, all of which are critical factors that can affect the development of neck pain in IT workers.

By considering these limitations, future studies could provide a more comprehensive understanding of cervicogenic headache in IT professionals, with improvements in sample diversity, ergonomic evaluations, and tracking over time.

Future scope

Ergonomic Solutions: Development of better workstation designs and tools, like adjustable chairs and screens, to reduce strain.

Preventive Programs: Implementation of workplace wellness programs focusing on posture, stretching, and regular break.

Female-Specific Focus:

1. Investigate hormonal influences on cervicogenic headache development in females.
2. Analyze the impact of pregnancy and menopause on cervicogenic headache risk in female IT professionals.
3. Examine the role of stress, anxiety, and depression in cervicogenic headache prevalence among female IT professionals.
4. Study the effects of ergonomic workstation design and workplace environment on cervicogenic headache risk.

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