

Understanding the Cervical Spine Disorder: A Cross-Sectional Survey Study

Poonam^{1*}, Nchang Fondah Awamofo²

Abstract

Cervical spine disorders encompass a spectrum of conditions including degenerative spondylosis, disc herniation, traumatic injuries, and myelopathy that impair quality of life through chronic pain, neurological deficits, and functional limitations. Globally, neck pain affects over 200 million individuals, with an age-standardized prevalence of 2666 per 100000 population and an incidence of 816 per 100000 person-years, contributing to significant years lived with disability (YLDs). Economic analyses estimate annual direct healthcare costs exceeding \$30 billion and indirect costs from lost productivity and disability amounting to over \$60 billion worldwide. Rising trends correlate with aging demographics, sedentary occupations, and —tech-neck— from prolonged device use, particularly among individuals aged 45–54 and women, who exhibit a 20% higher burden. This review synthesizes current knowledge on epidemiology, pathophysiology, clinical presentation, diagnostic modalities, conservative and surgical management strategies, and preventive measures. It integrates survey-based insights from a cohort of 25 pharmacy students highlighting awareness gaps, symptom prevalence, and health-seeking behaviors and underscores the pivotal role of pharmacists in multidisciplinary care. Finally, we provide evidence-based recommendations for education, research, and policy to mitigate the growing impact of cervical spine disorders.

Keywords: Cervical spondylosis Radiculopathy Myelopathy Ergonomics Pharmacist role Survey insights: Cervical spondylosis Radiculopathy Myelopathy Ergonomics Pharmacist role Survey insights

INTRODUCTION

The cervical spine (C1–C7) is a highly specialized segment of the vertebral column, supporting the 4–5 kg weight of the head and enabling an exceptional range of motion including flexion, extension, lateral bending, and rotation while concurrently safeguarding the spinal cord and nerve roots that innervate the upper limbs and diaphragm [1]. Structurally, it consists of seven vertebrae characterized by small bodies, large vertebral foramina, and transverse foramina for vertebral arteries; the atlas (C1) and axis (C2) articulate to permit nodding and rotation [2]. Intervertebral discs, comprising one-third of segmental height, provide shock absorption but undergo age-related desiccation starting in the third decade, leading to height loss of up to 20% by age 60 [3]. Ligaments including the anterior longitudinal, posterior longitudinal, and ligamentum flavum—and an array of deep and superficial muscles (e.g., sternocleidomastoid, trapezius) maintain stability and posture [4]. Biomechanically, resting head posture imparts a load of 10–14 kg on cervical structures, which can escalate to approximately 20 kg even with a 15° forward tilt, and daily cyclic loading estimated at 30,000–40,000 cycles/day promotes microtrauma, proteoglycan loss, fissure formation, and osteophyte growth [5, 6]. Epidemiologically, neck pain prevalence has risen by 15% over the past two decades in parallel with increased smartphone use and sedentary occupations, showing peak

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incidence between ages 45–54 and a 20% higher prevalence in women; global direct healthcare spending on neck pain exceeded \$30 billion in 2022, with indirect costs roughly doubling this figure [7–9]. Emerging risk factors include the —tech-neckl phenomenon where forward head posture during device use increases cervical disc stress by 3–5× [10] prolonged static occupational postures and repetitive overhead tasks that elevate neck pain risk by 1.5–2× [11], as well as lifestyle contributors such as smoking, obesity (BMI > 30), and psychological stress [12].

EPIDEMIOLOGY AND BURDEN

Neck pain affects over 200 million people globally and ranks among the top five causes of years lived with disability (YLDs), with an age-standardized prevalence of 2666 per 100 000 population in 2020 [4]. The global incidence rate is estimated at 816 per 100 000 person-years, demonstrating a 12% increase over the last decade [13]. Age-specific data indicate peak prevalence between ages 45–54, while individuals over 70 still exhibit high rates (~22%) due to cumulative degenerative changes [8]. Women consistently report higher prevalence than men (25% vs. 20%), potentially related to hormonal influences and occupational exposures [8–14]. Regionally, South Asia and Oceania have the highest burden, with age-standardized YLDs of 740 and 712 per 100 000 respectively, whereas sub-Saharan Africa reports lower but rising rates [15]. Urbanization and sedentary lifestyles, particularly in high-income regions, correlate with increased case counts: office workers show a 1.8× higher risk compared to manual laborers [11]. In China, ~13.8 % of adults report symptomatic cervical spondylosis, and MRI studies reveal >85 % degenerative changes in those over 60. Rural India surveys report ~6.5 % chronic neck pain prevalence, whereas urban —tech-neckl among adolescents is as high as 30% [5–16]. Economically, the U.S. spends over \$88 billion annually on direct healthcare costs for neck pain, with indirect costs—lost productivity and disability—adding another \$50–60 billion [6–17].

PATHOPHYSIOLOGY

- *Degenerative Pathways:* Disc degeneration (proteoglycan loss, fissures) and osteophyte formation narrow the canal or foramina; inflammatory cytokines (TNF- α , IL-6) exacerbate nerve irritation [1–7].
- *Traumatic Mechanisms:* Whiplash induces ligamentous microtears; fractures (e.g., C2 pars interarticularis) may require surgical stabilization [18].
- *Inflammatory/Autoimmune Contributions:* Rheumatoid arthritis targets the atlantoaxial joint; emerging evidence implicates gut dysbiosis in systemic inflammation and accelerated degeneration [7].

CLINICAL PRESENTATION AND DIAGNOSIS

Symptoms range from chronic axial neck pain and stiffness to radicular arm pain, sensory deficits, and upper motor neuron signs (hyperreflexia, Babinski sign) [19]. Myelopathy manifests as gait instability, hand clumsiness, and autonomic dysfunction (bladder/bowel disturbances).

DIAGNOSTIC WORKUP

- *Clinical Exam:* Spurling’s test for radiculopathy; Lhermitte’s sign for cord involvement.
- *Imaging:* MRI (gold standard for soft tissues, cord compression), CT (bony detail), X-rays (alignment, disc height) [11].
- *Electrophysiology:* EMG/NCS to confirm radiculopathy; evoked potentials in myelopathy.

MANAGEMENT STRATEGIES

Conservative Care

- *Pharmacological:* NSAIDs and acetaminophen for mild-to-moderate pain; short-course corticosteroids for acute radiculopathy; muscle relaxants (e.g., baclofen) and neuropathic agents (pregabalin, gabapentin) for radicular pain; opioids reserved for refractory cases [20].
- *Interventional:* Cervical epidural steroid or nerve-root blocks offer modest short-term relief.
- *Physical Therapy:* Isometric exercises, traction, postural correction, and manual therapy improve function and reduce recurrences.

Surgical Interventions

Reserved for intractable pain or progressive neurologic deficits:

- ACDF (Anterior Cervical Discectomy and Fusion).
- Cervical Disc Arthroplasty.
- Posterior Decompression.

Surgical decompression yields superior short-term recovery in myelopathy; radiculopathy surgery offers faster pain relief, though long-term outcomes may align with conservative care [21].

SURVEY INSIGHTS

A cross-sectional survey (n=25) of pharmacy students (84% aged 18–25) explored knowledge, attitudes, and practices (KAP) around cervical spine health (Figure 1).

Age Group

- 84% of respondents are 18–25, and 16% are 26–35.
 - *Discussion:* The overwhelming majority falls within the typical undergraduate/early-postgraduate bracket. This is ideal for a cervical health awareness study in university settings, as it captures the age group at risk for HPV infection and early cervical changes.

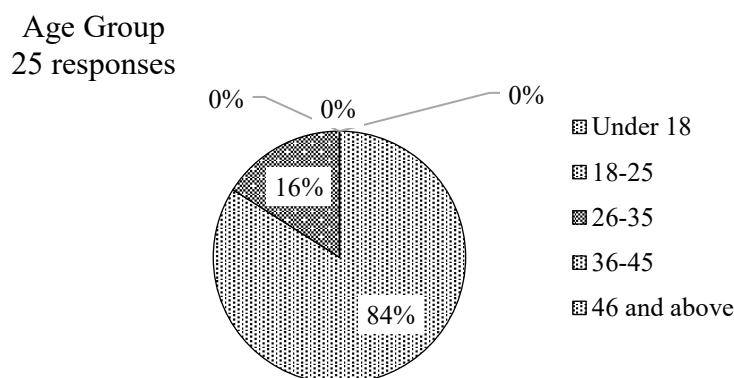


Figure 1. Age Group Distribution of Respondents.

Gender

- 60% Male, 40% Female.
 - *Discussion:* Although cervical problems pertain directly to females, including males is important for community-wide awareness and HPV transmission knowledge. A 40% female response rate gives a reasonable sample for drawing conclusions on women's awareness (Figure 2).

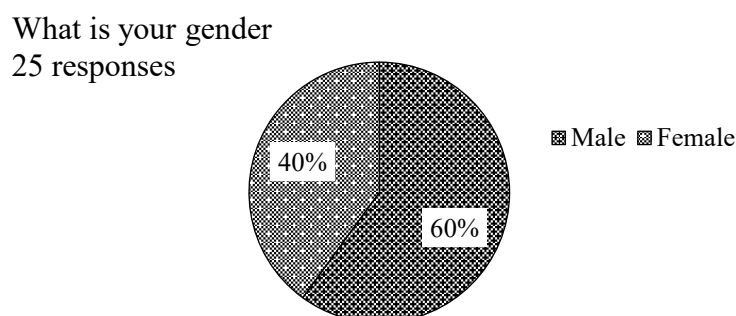


Figure 2. Gender-wise Distribution of Participants.

Occupation

- 92% Students, 4% Teachers, 4% Nil/Other.
 - *Discussion:* As most participants are students, their level of curriculum exposure and peer influence likely shaped their answers. The small teacher group might reflect faculty awareness versus student gaps (Figure 3).

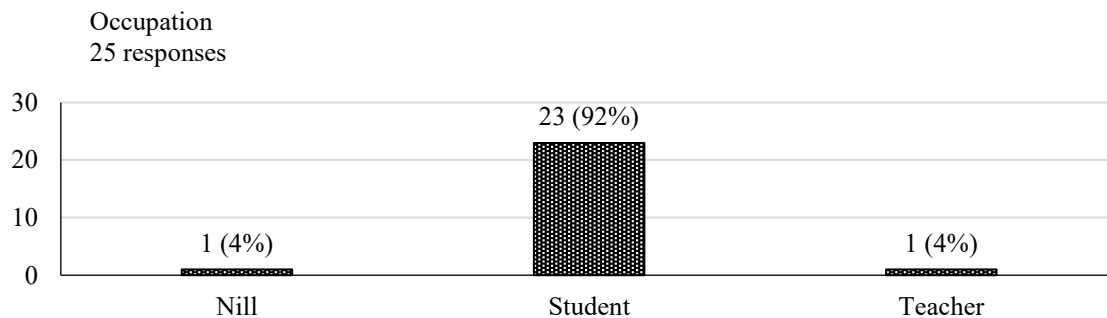


Figure 3. Occupational Status of Participants.

Educational Background

- 68% Undergraduate, 20% Postgraduate, 8% Professional degree (Pharmacy, Medicine), 4% High school or below.
 - *Discussion:* The dominant undergraduate pool suggests general (non- specialized) health education stages. Only 8% with professional health degrees indicates a potential link between professional training and deeper cervical health knowledge (Figure 4).

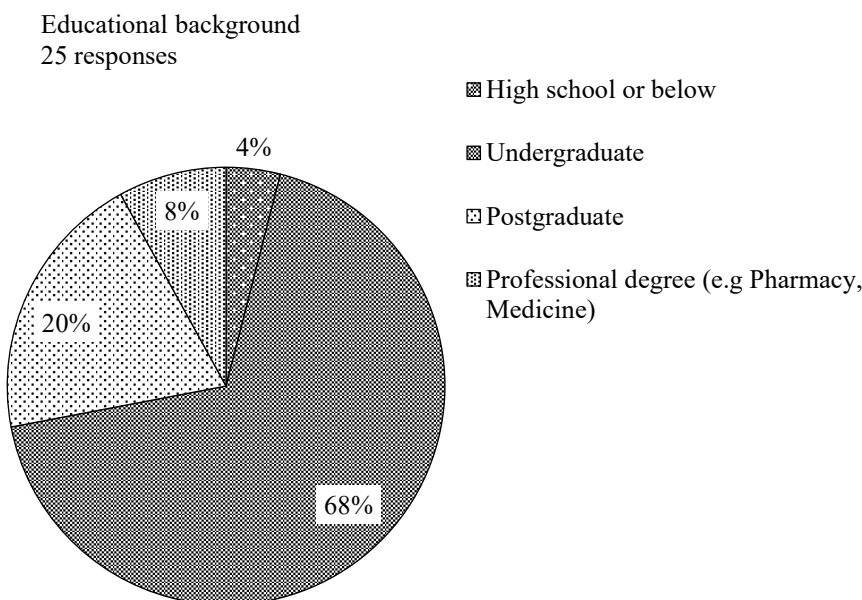


Figure 4. Educational Background of Respondents.

Background in Pharmacy or Health Care

- 64% Yes, 36% No.
 - *Discussion:* Two-thirds have some healthcare exposure, which should correlate with higher correct-response rates on HPV and cervical symptom questions. The 36% without background represent a key target for basic awareness campaigns (Figure 5).

Do you have background in pharmacy or Health care?
 25 responses

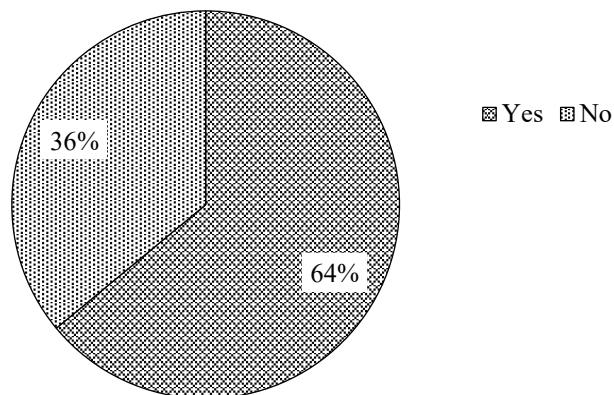


Figure 5. Background in Pharmacy or Health Care.

Heard of “Cervical Problem”

- 80% Yes, 20% No.
 - *Discussion:* A solid majority have at least heard the term —cervical problem, indicating good baseline awareness. The 20% who haven’t suggest room for introductory educational interventions (Figure 6).

Have you heard of cervical problem
 25 responses

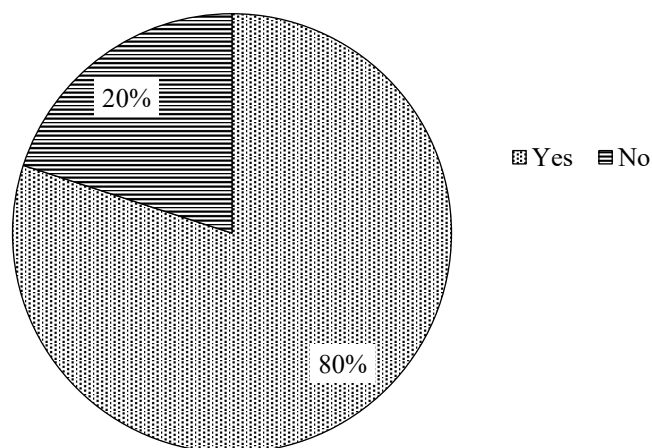


Figure 6. Awareness of the Term "Cervical Problem.

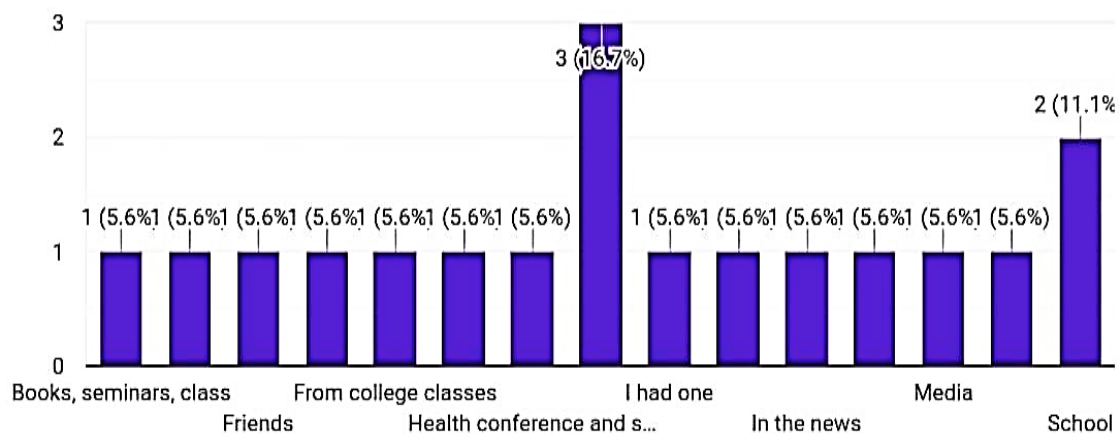
If Yes, Where Did You Hear About It?

- “I had one” (i.e., personal experience): 3 (16.7%).
- School: 2 (11.1%).
- Books/Seminars/Classes, Friends, College Classes, Health Conferences/Seminars, In the News, Media: each 1 (5.6%).
 - *Discussion:* Personal experience is the top source—emphasizing the impact of lived experience on awareness. Formal education channels (school, college classes, seminars) collectively account for ~22%, underlining the importance of integrating cervical health into curricula. Informal channels (friends, media) also contribute but at lower levels (Figure 7).

If yes, where did you hear about them

 Copy chart

18 responses



(n=18 respondents).

Figure 7. Source of Information About Cervical Problems.

Perceived Cause of Cervical Problems

- 56% Human Papillomavirus (HPV)
- 16% Genetic factors
- 28% Don't know
 - *Discussion:* Just over half correctly identified HPV as the main etiological agent—a positive but improvable figure. The 28% —don't know and 16% attributing genetics reveal misconceptions; educational focus should stress HPV's viral nature and the limited role of hereditary factors (Figure 8).

What do you think is the course of cervical problems?

25 responses

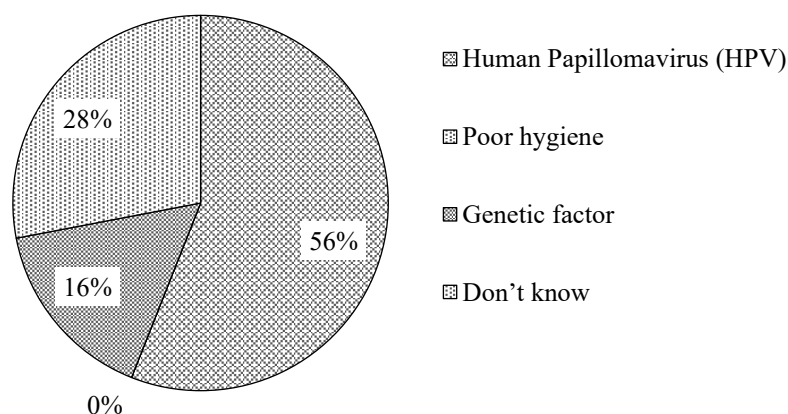


Figure 8. Perceived Causes of Cervical Problems.

Awareness of Symptoms of Cervical Spine Disorder

- 76% Yes, 24% No.

- *Discussion:* A strong majority claim awareness of cervical spine (neck) disorder symptoms. However, self-reported awareness doesn't always equal accurate knowledge cross-referencing with Question 10 will clarify depth of understanding (Figure 9).

Are you aware of symptoms of cervical spine disorder?
 25 responses

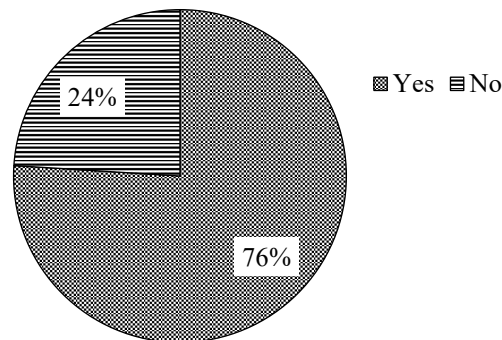


Figure 9. Awareness of Cervical Spine Disorder Symptoms.

Knowledge of Specific Symptoms

- 56% —All of the above (stiffness, headaches, neck pain, weakness in arms/legs).
- 32% Stiffness in the neck.
- 4% Headaches.
- 4% Neck pain.
- 4% Weakness in arms/legs.
- *Discussion:* Over half recognize the full spectrum of cervical spine problem symptoms—a very encouraging sign of comprehensive awareness. The remaining 44% fragmented into isolated symptoms indicates that roughly one- third understand only specific signs (e.g., stiffness) and a small fraction miss key symptoms like neurological weakness. This underscores the need for reinforcing the multi-system impact of cervical spine disorders in training modules (Figure 10).

Which of the following are symptoms of cervical spine problems?
 25 responses

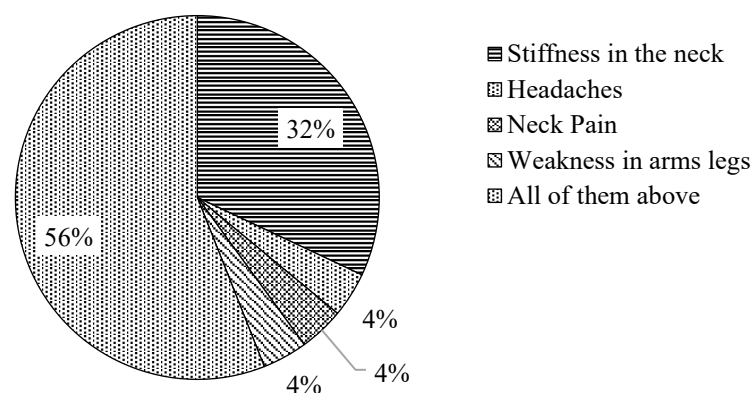


Figure 10. Knowledge of Specific Cervical Spine Symptoms.

Have you experienced any of the following symptoms?

- *Neck pains and stiffness / No symptoms (48% each; 12/25 respondents)*: Nearly half of participants report neck pain or stiffness, while an equal proportion report no symptoms at all. This bimodal distribution suggests two distinct subgroups—those who are currently asymptomatic and those already experiencing musculoskeletal discomfort (Figure 11).
- *Frequent headaches (24%; 6/25)*: Headaches are the next most common complaint, likely reflecting cervical muscle tension or referred pain from upper-cervical dysfunction.
- *Difficulties in maintaining balance (20%; 5/25)*: Balance disturbances may indicate proprioceptive deficits from cervical joint mechanoreceptors, warranting further vestibular or neurological assessment.
- *Radiating pain in arms or shoulders (16%; 4/25)*: This finding suggests possible nerve root irritation or cervical radiculopathy in a minority of respondents.
 - *Discussion*: While a substantial fraction remains symptom-free, nearly half of students already exhibit early signs of cervical strain, underscoring the need for preventive ergonomic and exercise interventions.

Have you experienced any of the following symptoms?
25responses

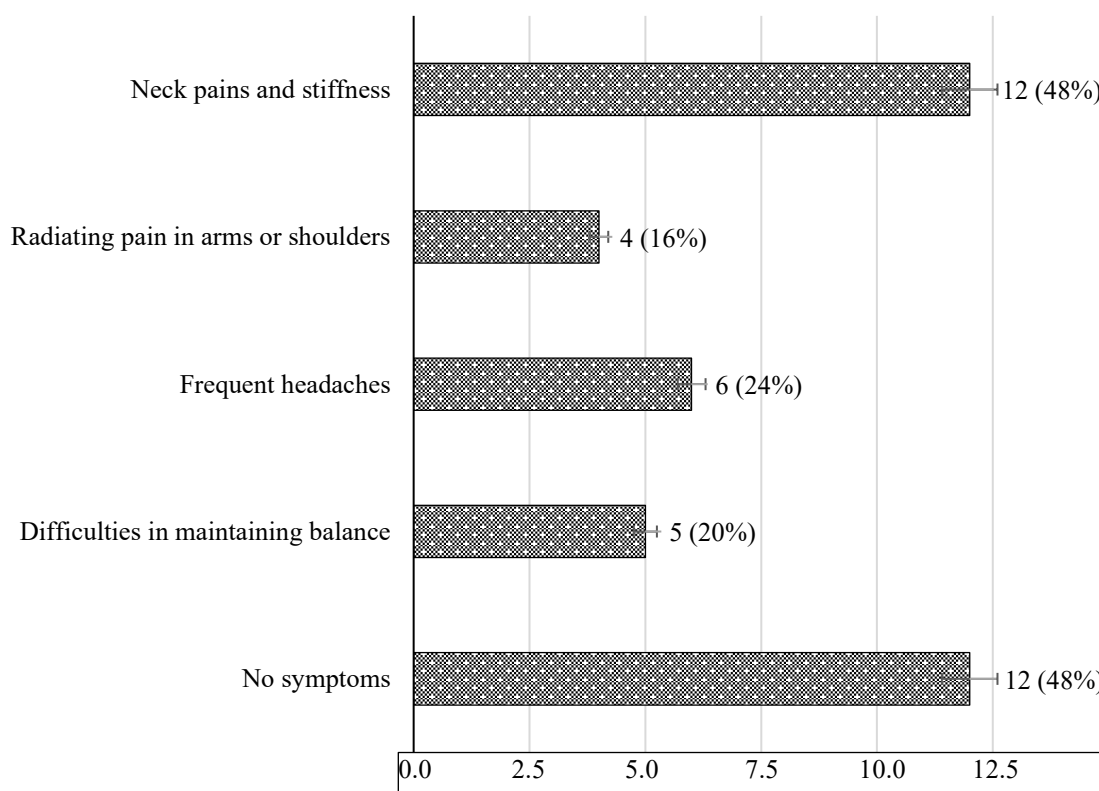


Figure 11. Self-Reported Cervical Symptoms Among Respondents.

How these symptoms start? (15 qualitative responses)

- *Insidious onset* (“Longer stay,” “Unexpectedly”): Many describe a gradual, poorly localized emergence of neck discomfort after prolonged static postures.
- *Mechanical trigger* (“You get some sharp pain from your neck,” “Via neck pains”): Respondents frequently attribute onset directly to neck strain or sudden movements.

- *Systemic factors* (“*high fever*,” “*thoracic region pain*”): A few mention coincident illness, hinting at inflammatory or infectious contributors.
 - *Discussion*: There is variability in perceived onset, but a common thread is the link to prolonged immobilization or awkward postures. Future questionnaires should standardize descriptors (e.g., —gradual vs. sudden onset!) to improve data consistency (Figure 12).

How this symptoms starts ?

15 responses

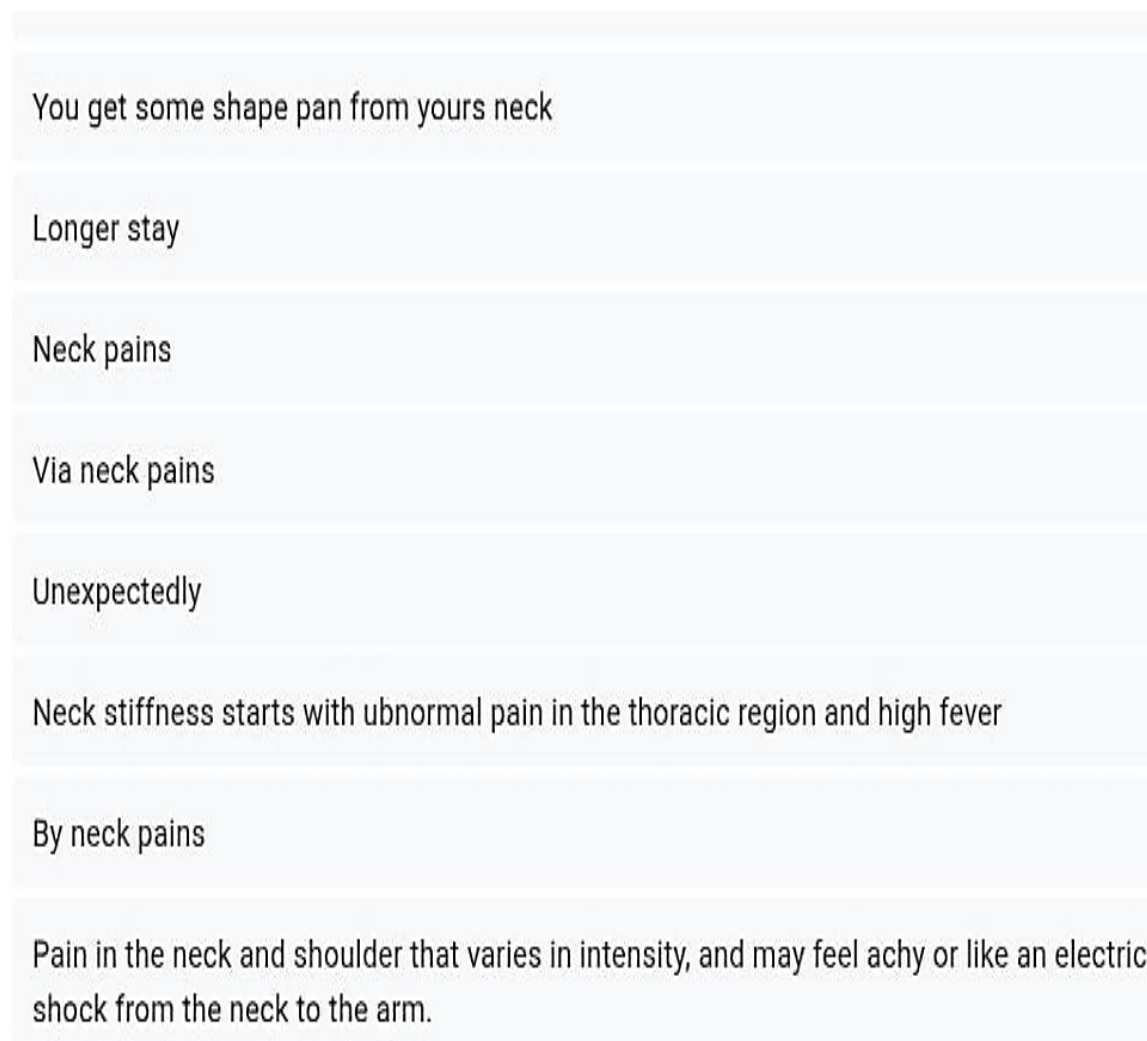


Figure 12. Perceived onset of symptoms.

How did these symptoms appear? (14 responses)

Each of the following accounted for one response (7.1%), except —Swollen neck! which had two (14.3%):

- After sleeping without a pillow.
- As the discs dehydrate and shrink (degenerative change).
- Nil (no clear trigger).
- None (no symptoms).
- Pain (unspecified).

- When overloaded or stressed.
- Swollen neck (14.3%).
 - *Discussion:* Mechanical factors—poor pillow support and tissue dehydration—are perceived as common triggers. Swelling may reflect local inflammation. The diversity of answers underlines the multifactorial nature of cervical complaints (Figure 13).

How did this symptoms appear?

 Copy chart

14 responses

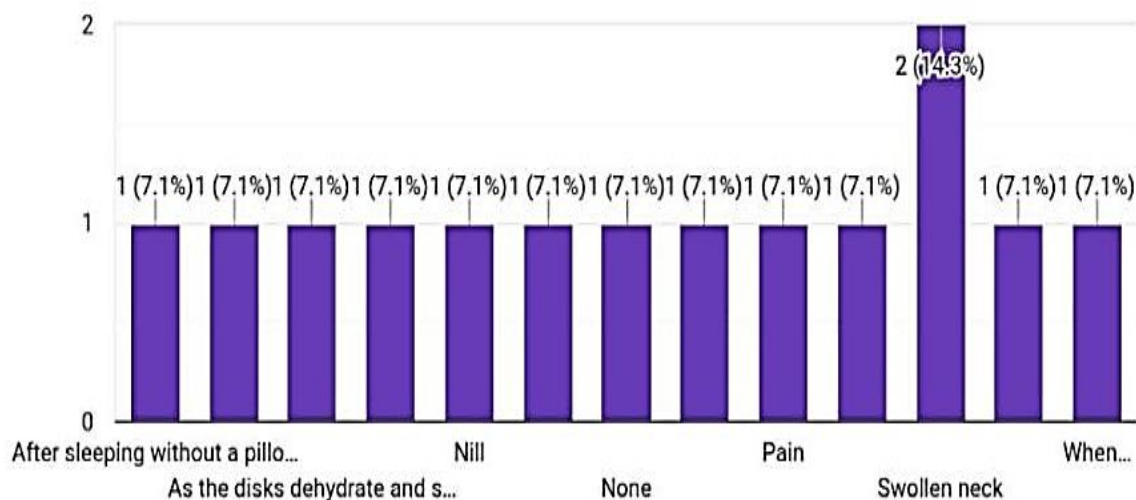


Figure 13. Reported triggers or appearance of symptoms.

Do you think poor posture and prolonged screen time contribute to cervical problems?

- Yes: 96% (24/25).
- No: 4% (1/25).
 - *Discussion:* Overwhelming agreement aligns with established ergonomic research linking—tech neck to cervical strain. This consensus supports implementing targeted educational programs on posture correction and screen-use breaks (Figure 14).

Do you think poor posture and prolonged screen time contribute to cervical problems?

25 responses

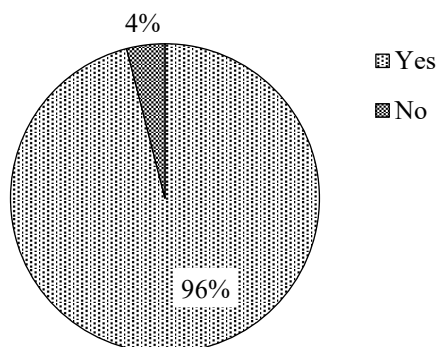


Figure 14. Perception of screen time and posture as risk factors.

Do you have any history of

- *None of the above:* 88% (22/25).
- *Sedentary lifestyle:* 8% (2/25).
- *Neck injuries:* 4% (1/25).
- *Smoking:* 0%.
 - *Discussion:* Most students report no pre-existing risk factors, indicating that current behaviors (e.g., posture, device use) likely drive new-onset cervical issues rather than past injuries or lifestyle habits (Figure 15).

Do you have any history of
25 responses

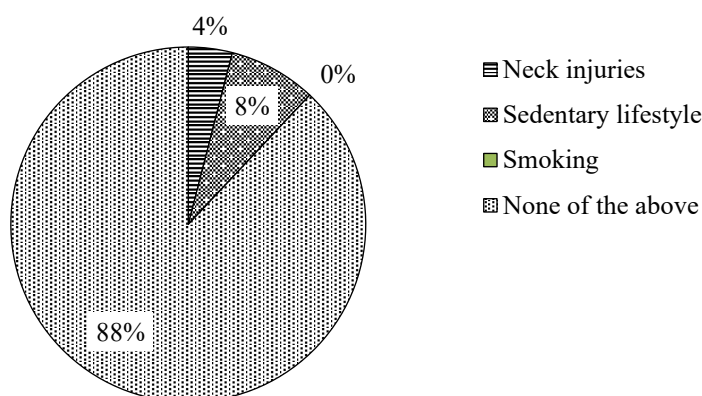


Figure 15. History of risk factors.

Have you consulted a doctor for cervical-related issues?

- *No:* 72% (18/25)
- *Yes:* 28% (7/25)
 - *Discussion:* Despite high symptom prevalence, the majority have not sought professional evaluation, revealing a potential gap in healthcare engagement and awareness of when medical advice is warranted (Figure 16).

Have you consulted a doctor for cervical-related issues
25 responses

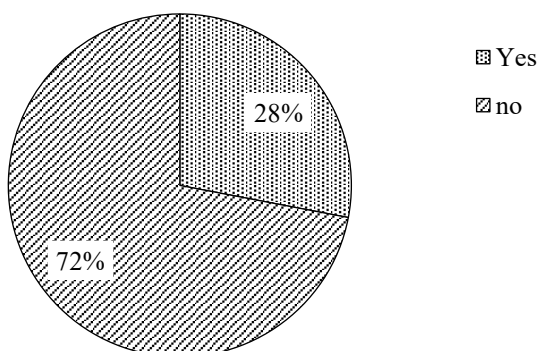
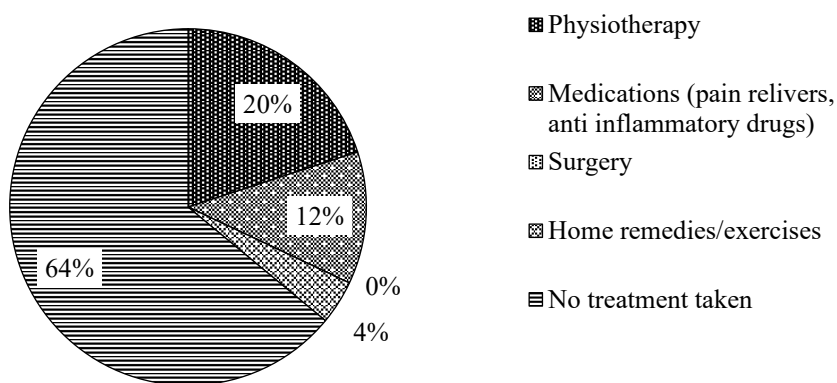


Figure 16. Consultation history for cervical issues.

If yes, what treatment was recommended?

- *No treatment taken*: 64%.
- *Physiotherapy*: 20%.
- *Medications (analgesics/anti-inflammatories)*: 12%.
- *Home remedies/exercises*: 4%.
- *Surgery*: 0%.
- *Discussion*: Even among those who saw a doctor, two-thirds declined formal treatment—an alarming finding that may reflect perceived mildness of symptoms, cost barriers, or skepticism toward interventions. Increasing student access to on-campus physiotherapy and pharmacological guidance could improve uptake of evidence-based therapies (Figure 17).

If yes, what treatment was recommended?
25 responses



($N = 7$ physician-consulted respondents, but chart shows full $N = 25$ —interpret percentages with caution.)

Figure 17. Treatment recommendations received.

Do you practice any prevention measures for cervical problems?

- *None*: 32%
- *Maintaining good posture*: 32%
- *Regular neck exercises*: 16%
- *Avoiding prolonged screen exposure*: 16%
- *Using ergonomic furniture*: 4%
 - *Discussion*: Only two-thirds employ any preventive strategy, and very few use ergonomic aids. Integrating structured exercise routines and promoting campus ergonomic resources could bolster prevention (Figure 18).

Do you practice any prevention measures for cervical problems?
 25 responses

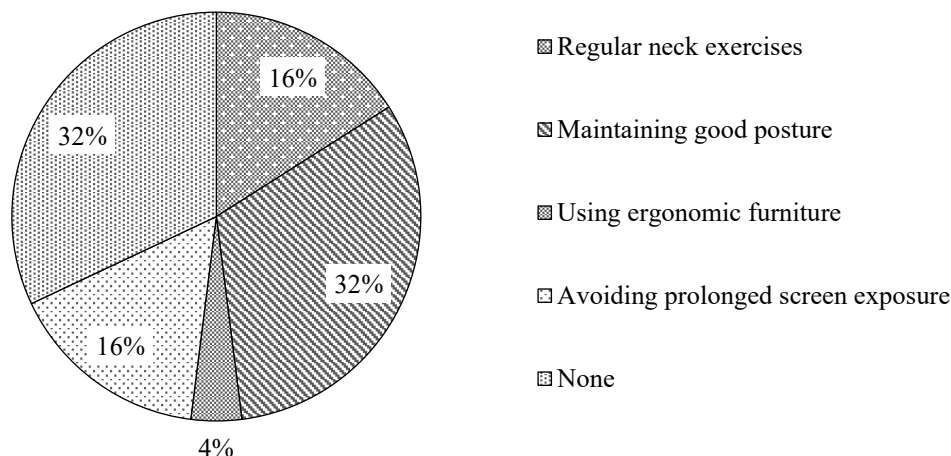


Figure 18. Preventive practices for cervical problems.

Have you heard about cervical cancer and its causes? ($n = 22$)

- Yes: 59.1% (13/22)
- No: 40.9% (9/22)
 - *Discussion:* Although this survey focuses on cervical spine issues, awareness of cervical (uterine) cancer among respondents is moderate. As Pharmacy students, reinforcing education on oncogenic HPV and screening guidelines remains important (Figure 19).

Have you heard about cervical cancer and its causes?
 22 responses

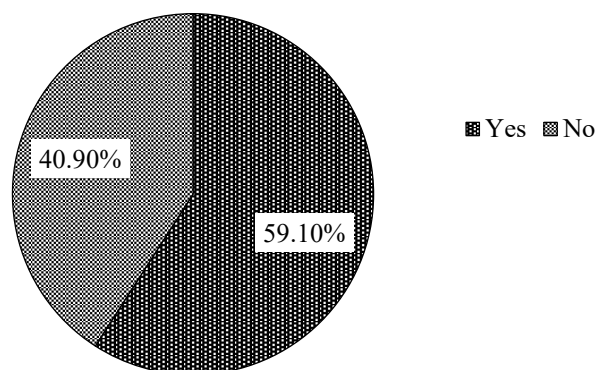


Figure 19. Awareness of cervical cancer and its causes.

How often do you go for medical checkups? ($n = 21$)

- Annually: 52.4% (11/21)
- Every 3 years: 14.3% (3/21)
- Never: 33.3% (7/21)
 - *Discussion:* One third of participants never undergo routine checkups, potentially delaying diagnosis of both musculoskeletal and systemic conditions. Encouraging regular health assessments should form part of a comprehensive wellness program for students (Figure 20).

How often do you go for medical checkups
21 responses

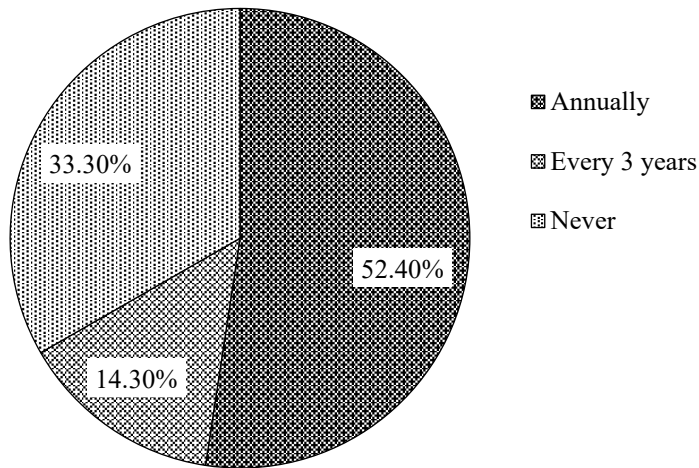


Figure 20. Frequency of medical checkups.

Public Awareness of Cervical Problems

- *Yes (16%):* Only 4 out of 25 respondents feel awareness is adequate. This small fraction suggests that even among a presumably health-literate group, few believe current efforts suffice.
- *No (60%):* 15 respondents perceive a clear deficit in public knowledge about cervical health—highlighting a significant gap in community education, outreach, and screening uptake.
- *Maybe (24%):* 6 respondents are uncertain, signaling mixed messaging or uneven access to reliable information.
 - *Implications:* As future pharmacists, we should view ourselves as accessible educators—offering brief consultations, distributing educational leaflets on HPV vaccination and Pap smears, and collaborating with local clinics to host mini-seminars (Figure 21).

Do you think there is enough public awareness regarding cervical problems
25 responses

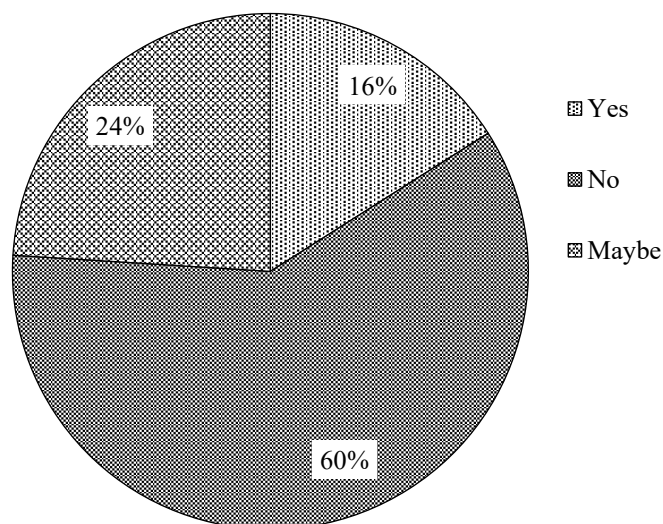


Figure 21. Perceived public awareness of cervical problems.

what measures should be taking to improve awareness and prevention

Strategy	Examples from responses
1. Educational Events	—Seminars and webinars should be organised more frequently ; —More workshops public awareness...
2.Social/Digital Campaigns	—Using social medias as well as posters to reach every individual ; —Information sharing on social medial
3.Healthcare-Community Link	—More education in hospital and in the communities ; —Platforms where we can have access to information
4.Free Screening	—Organizing free health camp[aigns] educate the people on causes, treatment and prevention

Strategy	Examples from responses
Camps	
5. Societal Education	—Education to the society ; broad calls for inclusion of schools, workplaces, and local groups (Figure 22).

what measures should be taking to improve awareness and prevention

25 responses

Seminars and webinars should be organised more frequently on this topic

More workshop, wibiners and public awareness regarding cervical problems

More education should be done In hospital and In the communities.

There should be platforms where we can have access to the information

Education to the society

Since the problem is not much common, most of people are unaware, hence the awareness can made by using the social medias as well as posters in both hospitals and societies in order to meet reach every individual in short duration.

Information sharing on social media

Organizing free health campange and cerminals to educate the people and Causes, treatment and prevention

Figure 22. Suggested measures for improving awareness and prevention.**Overall Recommendations**

1. *High Symptom Prevalence:* Nearly half of respondents experience neck pain or related symptoms, yet most do not seek care.
 2. *Ergonomics & Education:* Strong belief in posture's role should be leveraged to implement workshops on workstation ergonomics and micro-breaks.
 3. *Enhanced Access to Care:* Low engagement with professional treatment and prevention highlights an opportunity for campus health services to offer targeted physiotherapy clinics and pharmaceutical counseling.
 4. *Awareness Gaps:* Both for spinal health and cervical cancer screening, tailored informational campaigns could improve knowledge and proactive behaviors.
 5. *Future Research:* Larger, more refined surveys with standardized symptom definitions will yield clearer epidemiological insights and guide intervention design.
-
1. *Demographics & Background:* 84% aged 18–25; 60% male; 92% students; 64% prior healthcare exposure.
 2. *Awareness & Knowledge:* 80% had heard of cervical problems; 56% correctly identified HPV as a cause; 76% aware of core symptoms, but only 56% selected the full spectrum.
 3. *Symptom Prevalence:* Neck pain/stiffness (48%); headaches (24%); balance issues (20%); radiating arm pain (16%).
 4. *Health-Seeking Behaviors:* 28% sought medical evaluation; 20% underwent physiotherapy; 12% used medications; 4% tried home remedies.
 5. *Preventive Practices:* 68% engaged in ≥ 1 measure—posture correction (32%), neck exercises (16%), limited screen time (16%), ergonomic furniture (4%).
 6. *Wellness Behaviors & Perceptions:* 52.4% had annual check-ups; 59.1% aware of cervical cancer; 60% perceived public awareness of cervical health as inadequate.
 7. *Recommendations:* Seminars, social media campaigns, community programs, free screening camps, and workplace/school education [22].

PREVENTIVE STRATEGIES

Ergonomic workstation design (90° spine/back angle, monitor at eye level), regular micro-breaks, and neck/shoulder strengthening significantly reduce new neck-pain episodes (OR≈0.32) [23]. Lifestyle measures regular aerobic exercise, weight control, smoking cessation, and yoga further mitigate risk.

ROLE OF PHARMACISTS IN MULTIDISCIPLINARY CARE

Pharmacists can:

- Counsel on rational analgesic/anti-inflammatory use and monitor interactions.
- Educate on non-pharmacologic self-care (posture, exercises).
- Identify red-flag symptoms for referral. Integrating musculoskeletal health and ergonomics into pharmacy curricula will enhance early detection and collaborative care [23].

FUTURE DIRECTIONS AND RECOMMENDATIONS

- *Education & Outreach*: Public-professional campaigns and digital modules on cervical health and —tech-neck.
- *Curriculum Enhancement*: Incorporate cervical pathology, ergonomics, and pain management into pharmacy training.
- *Interdisciplinary Models*: Establish pharmacist-led clinics with physiotherapists and physicians.
- *Research Needs*: Large-scale Indian studies to refine prevalence estimates and evaluate long-term efficacy of interventions [5–23].

CONCLUSION

Cervical spine disorders pose a significant and growing challenge globally and in India, driven by demographic shifts and modern lifestyles. While conservative management is effective, prevention through ergonomics, education, and exercise is paramount. Survey insights underscore awareness gaps and suboptimal health-seeking behaviors among future healthcare professionals. Pharmacists, as accessible healthcare providers, can play a vital role in patient education, early detection, and interprofessional collaboration. A multifaceted strategy combining targeted education, optimized curricula, interdisciplinary care pathways, and focused research will be essential to reduce the burden of cervical spine disorders and improve patient outcomes.

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