

Clinicoetiological Patterns of Deep Neck Space Infections: A Prospective Observational Study from a Tertiary Care Centre in South India¹Dr. Dilsha P. S, Department of ENT, Kodagu Institute of Medical Sciences, Madikeri - 571202²Dr. Raghavendra Prasad K. U, Department of ENT, Hassan Institute of Medical Sciences, Hassan - 573201, India³Dr. Sapthami Satish, Department of ENT & HNS, BMCH and RI, Chitradurga, India**Corresponding Author:** Dr. Dilsha P. S, Department of ENT, Kodagu Institute of Medical Sciences, Madikeri - 571202**How to citation this article:** Dr. Dilsha P. S, Dr. Raghavendra Prasad K. U, Dr. Sapthami Satish, “Clinicoetiological Patterns of Deep Neck Space Infections: A Prospective Observational Study from a Tertiary Care Centre in South India”, IJMACR– August – 2026, Volume – 9, Issue –4, P. No. 453 – 457.**Open Access Article:** © 2026 Dr. Dilsha P. S, et al. This is an open access journal and article distributed under the terms of the creative common’s attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non- commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Abstract**

Deep neck space infections (DNSIs) remain a critical and potentially life-threatening condition in otolaryngology due to complex cervical anatomy, rapid spread across fascial planes, and risk of severe complications like airway compromise and descending mediastinitis. A prospective descriptive study was conducted over an 18-month period (August 2022 to January 2024) including 89 admitted patients with diagnosed DNSIs. Detailed clinical history, physical examination, laboratory investigations, and contrast-enhanced imaging (X-rays/CT scans) were documented. Treatment strategies included culture-sensitive intravenous antibiotics, needle aspiration, surgical incision and drainage (I&D), or airway intervention (tracheostomy) when indicated. Of 89 patients, 57% (n=51) were male and 43% (n=38) female (M:F ratio 1.3:1). The majority of cases occurred in the age group

of 21-50 years (70%). Peritonsillar abscess (PTA) was the most frequent site involved (44%), followed by Ludwig’s angina (23.5%), buccal space abscess (12.5%), parapharyngeal abscess (9%), retropharyngeal abscess (5.5%), and parotid abscess (5.5%). The primary etiologies were acute pharyngotonsillitis (43.8%) and odontogenic infections (36%). Diabetes mellitus was present as a major comorbidity in 43.8% of patients. Microorganism cultures revealed Streptococcus species as the predominant isolates (42%), followed by Staphylococcus aureus (19%) and Klebsiella species (14.5%). Overall, 77% of cases required surgical I&D alongside intravenous antibiotic therapy, while 23% were managed conservatively. Pharyngotonsillitis and odontogenic infections remain the leading causes of DNSIs. Early recognition, glycemic control, appropriate empiric antibiotic regimens covering Streptococci and anaerobes, along with timely surgical drainage, are

essential to achieve successful outcomes and avoid life-threatening complications.

Keywords: Deep Neck Space Infections, Peritonsillar Abscess, Ludwig's Angina, Pharyngotonsillitis, Odontogenic Infection

Introduction

Deep neck space infections (DNSIs) involve the potential fascial spaces and compartments of the head and neck region. Despite widespread availability of broad-spectrum antibiotics and improved dental healthcare, DNSIs continue to represent a severe clinical challenge. The complex surgical anatomy of deep neck fascial layers facilitates the rapid propagation of purulent material between interconnected spaces, occasionally tracking down into the superior and posterior mediastinum.

The clinical presentation varies according to the anatomical space involved, ranging from localized cervical pain and sore throat to trismus, dysphagia, dyspnea, and overt stridor signaling imminent airway compromise. These infections are typically polymicrobial, arising from normal flora overgrowth of the upper respiratory or oral tracts. While odontogenic sources have traditionally been identified as the leading cause of DNSIs in adults, evolving lifestyle factors, systemic comorbidities like diabetes mellitus, and post-viral immune alterations have shifted regional clinical patterns.

This study aims to delineate the clinical profiles, etiological spectrum, microbiological trends, antibiotic sensitivities, and treatment modalities among patients presenting with DNSIs to a tertiary care hospital in South India.

Materials and Methods

Study Design and Setting: This prospective descriptive study was conducted in the Department of Otorhinolaryngology at Hassan Institute of Medical Sciences (HIMS), Hassan, Karnataka, India, between August 2022 and January 2024 (18 months).

Patient Selection

Inclusion Criteria: All patients of any age diagnosed with deep neck space infections admitted to the ENT department or referred from internal medicine, general surgery, or dentistry.

Exclusion Criteria: Patients with superficial neck skin infections, benign/malignant neck masses without deep space infection, or active infections involving other body spaces.

Sample Size Calculation: Based on prior epidemiological prevalence ($P = 34\%$) and precision ($d = 10\%$), the sample size was determined using the standard epidemiological formula $N = 4PQ / d^2$:

$$N = (4 \times 34 \times 66) / 10^2 \approx 89 \quad (1)$$

A total of 89 consecutive patients meeting inclusion criteria were enrolled after obtaining written informed consent.

Data Collection and Diagnostic Protocol

All subjects underwent comprehensive clinical evaluation, baseline laboratory investigations, and microbiological processing. Radiographic evaluations included:

- 1- **Plain Radiography:** Lateral and anteroposterior soft tissue neck X-rays.
- 2- **Computed Tomography (CT) / Ultrasonography:** Contrast-enhanced CT scans of the neck and upper mediastinum were performed in complex cases involving multiple spaces, retropharyngeal, or

parapharyngeal infections, and to evaluate impending airway distress.

Pus samples collected via diagnostic needle aspiration or intraoperative incision and drainage (I&D) were sent immediately for Gram staining, aerobic, and anaerobic culture and sensitivity testing.

Results And Discussion

Demographic Distribution

Out of 89 patients, 51 (57.3%) were male and 38 (42.7%) were female, giving a male-to-female ratio of 1.32:1. The age ranged from 2 to 70 years, with the highest concentration of cases in the 21–50 age bracket (70%).

Table 1: Distribution of Deep Neck Space Infections Across Age Groups (N = 89).

Age Group (Yrs)	PTA (n)	PPA (n)	LA (n)	RPA (n)	PA (n)	BA (n)	Total (n)	Percentage (%)
0 – 10	0	0	0	1	0	0	1	1.1%
11 – 20	3	0	1	0	0	0	4	4.5%
21 – 30	9	0	1	0	0	0	10	11.2%
31 – 40	21	1	0	0	0	0	22	24.7%
41 – 50	7	3	11	1	0	0	23	25.8%
51 – 60	1	3	7	3	0	0	15	16.9%
61 – 70	0	1	1	0	0	0	2	2.2%
> 70	0	0	0	0	0	0	0	0.0%
Total	39	8	21	5	5	11	89	100%

PTA: Peritonsillar Abscess; PPA: Parapharyngeal Abscess; LA: Ludwig's Angina; RPA: Retropharyngeal Abscess; PA: Parotid Abscess; BA: Buccal Space Abscess.

Distribution of Infection Sites and Etiology

Peritonsillar abscess was the single most common presentation (43.8%), followed by Ludwig's angina (23.6%) and buccal space abscess (12.4%).

Etiological Factors: Acute pharyngotonsillitis was the predominant primary cause (43.8%, n = 39), primarily responsible for peritonsillar infections. Odontogenic origin was the second leading primary cause (36%, n = 32), accounting for the majority of Ludwig's angina and buccal abscess cases. Foreign body ingestion was linked to retropharyngeal and parapharyngeal space infections (6.7%, n = 6).

Comorbidities: Diabetes mellitus was present in 39 patients (43.8%), proving to be a major predisposing factor for Ludwig's angina and parapharyngeal

involvement. Severe anemia was identified in 11 cases (12.4%).

Microbiological and Antibiotic Sensitivity Profiles

Culture growth was positive in 78 cases (87.6%), while 11 cases (12.4%) showed no bacterial growth (likely due to prior outpatient antibiotic exposure).

Microbiology Breakdown (N = 89):

Streptococcus viridans: 21.3% (n = 19)

Staphylococcus aureus: 19.1% (n = 17)

Klebsiella species: 14.6% (n = 13)

Streptococcus pyogenes: 12.4% (n = 11)

Beta-hemolytic Strep.: 9.0% (n = 8)

Mixed Flora: 7.9% (n = 7)

Anaerobic isolates: 4.5% (n = 4)

No Growth: 12.4% (n = 11)

Antibiotic Sensitivity: Microbial isolates showed high susceptibility to broad-spectrum combination therapy. The highest sensitivity rates were observed with Linezolid, Piperacillin-Tazobactam, Amikacin, Ceftriaxone, Metronidazole, and Ciprofloxacin.

Management Strategies and Hospital Stay

Treatment was tailored based on patient stability, airway involvement, and imaging findings:

- **Surgical Intervention:** 68 patients (76.4%) underwent surgical Incision and Drainage (I&D) along with parenteral antibiotics.
- **Conservative Management:** 20 patients (22.5%) were successfully managed non-operatively using culture-directed IV antibiotics.
- **Airway Control:** 1 patient (1.1%) with impending upper airway compromise required emergency tracheostomy prior to surgical drainage.

Length of Stay: Patients with uncomplicated peritonsillar abscesses averaged 3–5 days of hospitalization. Conversely, patients with Ludwig's angina, parapharyngeal space involvement, and poorly controlled diabetes mellitus required significantly prolonged stay (>7 days; maximum 20 days).

Discussion

Deep neck space infections represent complex emergencies due to their subtle presentation and potential for rapid deterioration. In our series of 89 patients, males predominated (57%), aligning with earlier findings by Kataria et al. (55.2%) and Almutairi et al. (88.7%). The most vulnerable age group was 21–50 years, representing the active working population. While several studies (e.g., Bakir et al., Farjana et al.) report odontogenic infections as the predominant cause of DNSIs, our cohort demonstrated a higher prevalence of pharyngotonsillar infections (43.8%) leading to

peritonsillar abscesses (43.8%). This pattern may reflect regional variations in primary healthcare utilization, delays in seeking treatment for acute tonsillitis, and post-viral immune alterations. Odontogenic sources remained the primary driver for Ludwig's angina and buccal space collections.

Systemic comorbidities particularly diabetes mellitus significantly influence disease severity and hospital course. In our study, 43.8% of patients were diabetic. Uncontrolled hyperglycemia impairs cell-mediated immunity and phagocytosis, facilitating multi-space involvement and lengthening the hospital stay up to 20 days.

Microbiologically, *Streptococcus viridans* (21.3%) and *Staphylococcus aureus* (19.1%) were the predominant isolates, followed by *Klebsiella* (14.6%). This distribution supports empirical therapy regimens that cover Gram-positive cocci, Gram-negative bacilli, and anaerobes. Empirical administration of a third-generation cephalosporin (e.g., Ceftriaxone) combined with Metronidazole and an Aminoglycoside or Beta-lactamase inhibitor (Piperacillin-Tazobactam) yielded excellent clinical resolution in our cohort.

Surgical drainage remains the **cornerstone** of definitive treatment once fluid collection/abscess is radiologically identified. Over 76% of our study population required I&D. Securing the airway is the top clinical priority; CT imaging is indispensable when assessing deep space extension, airway narrowing, or danger space communication.

Conclusions

Deep neck space infections remain a major cause of hospital admission among adults aged 20–50 years, with a notable male predominance. Pharyngotonsillitis and dental infections are the principal etiological drivers.

Uncontrolled diabetes mellitus significantly increases morbidity and hospital stay. Early diagnosis through clinical suspicion and contrast-enhanced CT, combined with prompt empiric parenteral antimicrobial therapy and timely surgical drainage, is essential for minimizing complications and achieving optimal recovery.

Ethics approval and consent to participate

The study protocol was approved by the Institutional Ethics Committee of Hassan Institute of Medical Sciences. Written informed consent was obtained from all patients (or their legal guardians in case of minors) participating in the study prior to enrollment.

List of abbreviations

BA: Buccal Space Abscess; CT: Computed Tomography; DNSI: Deep Neck Space Infection; ENT: Ear, Nose, Throat; HNS: Head and Neck Surgery; I&D: Incision and Drainage; LA: Ludwig's Angina; PA: Parotid Abscess; PPA: Parapharyngeal Abscess; PTA: Peritonsillar Abscess; RPA: Retropharyngeal Abscess.

Data Availability

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

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Authors' contributions

DPS conceived, designed, and executed the study, collected patient data, and drafted the manuscript. RPKU provided clinical supervision, performed surgical procedures, and critically revised the manuscript. SS assisted in data collection, literature search, and drafting of the manuscript. All authors read and approved the final manuscript.

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Supplementary Materials; Not applicable.

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