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Association of Deviated Nasal Septum with Chronic Otitis Media in Western Regional Hospital

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ABSTRACT

Background

Chronic otitis media (COM) is a persistent inflammation of the middle ear and mastoid cavity characterized by recurrent otorrhea through a perforated tympanic membrane and/or tympanic membrane retraction. Eustachian tube dysfunction (ETD), often resulting from chronic nasal disease, has been implicated in the pathogenesis of COM. Deviated nasal septum (DNS), one of the most common nasal abnormalities, may contribute to ETD by altering middle ear pressure. However, this association remains underrecognized in clinical practice due to inadequate evaluation. This study aimed to assess the association between DNS and COM.

Methods

A hospital-based cross-sectional study was conducted among 122 patients diagnosed with COM who attended the ENT outpatient department of Pokhara Academy of Health Sciences from June 2025 to May 2026. Diagnosis was established by trained ENT surgeons based on clinical history and otoscopic findings, including tympanic membrane perforation, cholesteatoma, and/or retraction pocket. Patients meeting the inclusion and exclusion criteria underwent anterior rhinoscopy, with local decongestant when required, to assess the presence, side, and type of DNS. Data were analysed to determine the association between COM and DNS.

Results

Among the 122 patients, 102 (83.6%) had DNS. Statistical analysis demonstrated a significant association between COM and DNS.

Conclusions

A significant association was observed between COM and DNS, suggesting that DNS may contribute to the persistence of COM through Eustachian tube dysfunction. Routine evaluation and appropriate management of DNS before ear surgery may improve treatment outcomes in patients with chronic otitis media.

Keywords: Chronic otitis media; Deviated nasal septum ; Otoscopy.

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INTRODUCTION

A deviated nasal septum is a condition in which the nasal septum that divides the nasal cavity in half, is significantly off center making breathing difficult.¹ Septal deviations were classified with slight modification of septal deviation classification by Mladina as per experience to make it user friendly and easy to apply as: Type I: Midline septum or mild deviations in vertical or horizontal plane, which do not extend throughout the vertical length of the septum. Type II: Anterior vertical deviation. Type III: Posterior vertical deviation (deviation over OM and middle turbinate area). Type IV: 'S' septum-posterior to one side and anterior to other side. Type V: Horizontal spur on one side with or without high deviation to the opposite side. The side of the deviation is marked Left or Right. In type IV whichever side is anterior deviation is marked L or R.² It is advocated that nasal, paranasal, and nasopharyngeal pathologies affect the eustachian tube functions, and nasal obstruction causes an impairment in the Eustachian Tube functions.³ Patients with deviated nasal septum may have associated middle ear disorders, especially particularly in the ear ipsilateral to the obstructed nasal passage.⁴ Some authors suggested that ear surgery should be performed months after septoplasty.⁵ Chronic Otitis Media (COM) is a multifactorial disease with a complex nature of occurrence. It is defined as a permanent abnormality of the pars tensa or pars flaccida, most likely resulting from earlier acute otitis media, negative middle ear pressure, or otitis media with effusion. Upper airway infections, recurrent otitis media, dysfunction of the Eustachian tube (ET) and nasopharynx, ciliary dysfunction, and allergy are among the investigated probable risk factors. Eustachian tube helps drain the middle ear during opening and closing by pumping secretions from the middle ear.⁶ This study aimed to assess the association between DNS and COM

METHODS

Study Design

A hospital-based analytical cross-sectional study was conducted in the Department of Otorhinolaryngology

(ENT), Pokhara Academy of Health Sciences, Nepal, during 2025–2026 to assess the association between deviated nasal septum (DNS) and chronic otitis media (COM).

Study Setting/Area

The study was carried out in the Department of ENT at Pokhara Academy of Health Sciences, a tertiary care teaching hospital in Pokhara, Nepal. Patients attending the ENT outpatient department with ear-related symptoms during the study period were screened for eligibility.

Study Population

The study population comprised patients aged 5–60 years presenting with ear symptoms to the ENT outpatient department. Patients who fulfilled the predefined inclusion and exclusion criteria were enrolled in the study.

Sample Size

The sample consisted of all eligible patients meeting the inclusion criteria during the study period who consented to participate. The required sample was obtained using a convenience sampling technique.

Sampling Technique

A convenience sampling method was employed. Consecutive eligible patients presenting with ear symptoms to the ENT outpatient department during the study period were recruited until the desired sample size was achieved.

Data Collection Tools and Technique

Data were collected using a structured proforma. All participants underwent a detailed ENT history followed by a comprehensive clinical examination performed by trained ENT surgeons. The diagnosis of chronic otitis media was established based on otoscopic findings, including tympanic membrane perforation, cholesteatoma, and/or a retraction pocket. Anterior rhinoscopy was subsequently performed to evaluate the nasal cavity. In cases requiring better visualization, the nasal cavity was decongested before examination. When a deviated

nasal septum was identified, the side of deviation was recorded.

Variables/Measurements

The primary outcome variable was the presence of chronic otitis media, diagnosed clinically through otoscopic examination. The primary explanatory variable was the presence and type of deviated nasal septum. DNS was classified according to the Mladina classification as follows: Type I (midline septum or mild deviation), Type II (anterior vertical deviation), Type III (posterior vertical deviation), Type IV (S-shaped septum with anterior and posterior deviations on opposite sides), and Type V (horizontal septal spur with or without a high deviation on the opposite side). The side of deviation was recorded as left (L) or right (R); for Type IV, the side of the anterior deviation was documented. Demographic variables, including age and sex, were also recorded.

Statistical Analysis Used

The collected data were checked for completeness, coded, and entered into Microsoft Excel for data management. Statistical analysis was performed using JASP software. Descriptive statistics were used to summarize the study variables, while appropriate inferential statistical tests were applied to assess the association between deviated nasal septum and chronic otitis media. A p-value of less than 0.05 was considered statistically significant.

Ethical Consideration

Ethical approval was obtained from the Institutional Review Committee of Pokhara Academy of Health Sciences before commencement of the study. Written informed consent was obtained from all adult participants, while assent and parental/guardian consent were obtained for participants younger than 18 years. Participant confidentiality and privacy were maintained throughout the study, and all collected information was used solely for research purposes.

RESULTS

This study was conducted among 122 patients with

chronic otitis media were involved in the study. With regard to the gender distribution male patients 66 (55%) outnumbered female patients 56 (45%) in the study. The age of the studied population ranged from 5 to 60 years. The number of patients found in the age group 5-15 was 28, which was (22 %). Patients in other age groups 16 -30 was 52(42%) and age group 31 and above was 42((36%). The most common complain was ear discharge, in 80% of the study population followed by ear ache, hearing loss and tinnitus. Among the cases studied the most common otoscopic finding was tympanic membrane perforation, which was present in 110 (90.6%) of the patients. This was followed by retraction pockets, which was present in 7 patients which was 5.7 % of the study population which was followed by marginal perforation and cholesteatoma. Regarding the laterality of ear involved the most common side involved was left ear which was seen in 58 patients (47.54%) followed by right ear in 53 patients (43.44%). In 11 patients (9.02%) both ears were involved. (Table 1)

Table 1. Laterality of Ear Involved	
Side of Ear Involved	Percentage of study population
Left	47.54
Right	43.44
Both	9.02

Deviated Nasal septum was present in 102 patients (83.61%) whereas 20 patients with Chronic otitis media didn't have deviated nasal septum.(Figure 1)

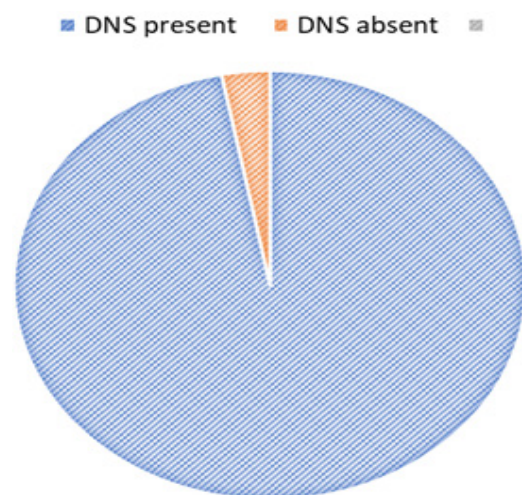


Figure 1. Pie Chart Showing Presence of DNS In Com

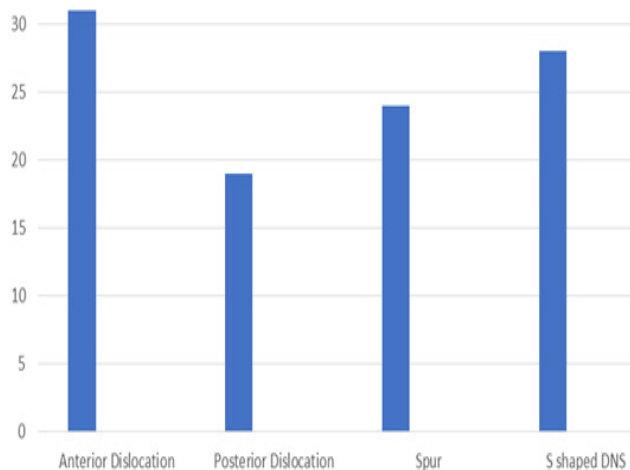


Figure 2. Type of DNS in COM

Association of DNS with COM was present in 102 patients, i.e. 83.61%. Strong ipsilateral association was observed between DNS and COM, there was ipsilateral association in 78 cases (76%). (Figure 3) This association was more particularly on right side i.e. out of 39 patients with right COM, right DNS was seen in 35 cases i.e. (89.74%). In left side of 60 patients with left COM, 43 had left DNS.

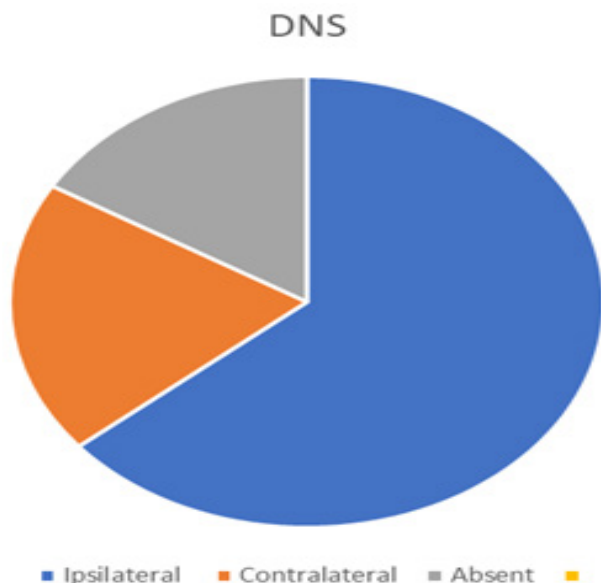


Figure 3. Correlation Between Laterality of DNS and COM

DISCUSSION

Deviated cause nasal obstruction, leading to alteration in airflow dynamics which further leads to impaired mucociliary clearance. This results

in negative middle ear pressure and consecutive development of COM.⁷ 122 patients with chronic otitis media were included in our study. With regard to the gender distribution, male patients 66 (55%) outnumbered female patients 56 (45%) in our study. This finding was similar to the finding by Manche and Jangla Madhavi et al who concluded that COM was more common in male population in Hyderabad India.⁸ Study by J Sade et al showed that male preponderance may be related to occupational and environmental exposure among male patients.⁹

The majority of patients in our study were between the age group 16 and 30, which was 42.6% of the study population. The demographic findings were consistent with findings in studies conducted by Varsney et al, but this finding may be due to more adult population presenting in our OPD as it is worldwide accepted that COM is a disease of childhood.¹⁰ The most common ear symptom in our study was ear discharge, and this finding was similar to the study conducted by Hanne H et al.¹¹

Our study showed the common otoscopic finding was tympanic membrane perforation, which was present in 110 (90.6%) of the patients. This was followed by retraction pockets, which was present in 7 patients, which was 5.7% of the study population, which was followed by marginal perforation and cholesteatoma. Thus we concluded that 90.6% of patients presented with COM mucosal and 9.6% presented with COM squamous disease. This was consistent with Asutosh N et al's findings.¹² Regarding the laterality of ear involved, the most common side involved was left ear, which was seen in 58 patients (47.54%), followed by right ear in 53 patients (43.44%). In 11 patients (9.02%), both ears were involved. This correlates with the finding by Damghani and Ali Barazin.¹³

Deviated Nasal septum was present in 102 patients (83.61%), whereas 20 patients with Chronic otitis media didn't have deviated nasal septum. This high prevalence suggests a strong link between DNS and COM. The association between DNS and COM was established using one sample Z test. This finding was consistent with similar study done by Sistani et

al ,which concluded there was relationship between nasal septum deviation and chronic otitis media.¹⁴ This suggests that deviated nasal septum contributes to impaired eustachian tube function causing middle ear ventilation defects which further leads to chronic otitis media. Other study done by Manjunath et al also suggests a relation between ipsilateral DNS with Ipsilateral COM.⁷ Septal displacement is associated mucosal edema. It is proposed that septal abnormalities may cause turbulent airflow causing the drying of mucus at the tubal orifice and impairing tubal opening. DNS is also linked to secondary mucosal edema, which may impair ET function.¹¹

Limitations

This single-center study with a relatively small sample size may limit the generalizability of the findings. Additionally, the cross-sectional design precludes establishing a causal relationship between deviated nasal septum and chronic otitis media.

CONCLUSIONS

Most of the patients with chronic otitis media who presented to ENT department were male with age group 16-30. The most common type of COM was COM mucosal. Among the study population majority had Deviated Nasal Septum ,thus we can conclude that COM is associated with DNS. Hence, this result will help us determine nasal pathology and correcting this pathology in patients with

COM prior to performing ear surgery will improve treatment outcomes of ear surgery.

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Formal analysis: Bonu Goudel.

Validation: Anup Chapagain.

Writing -original draft: Bonu Goudel.

Writing-review & editing: Lal Gurung.

Supervision: Lal Gurung.

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