Barind Medical College Journal
Abbreviated Key Title: BMCJ
ISSN: 2518-3249 (Print)
https://bmcj.org/index.php/bmcj
Volume-10 | Issue-2 | July-Dec, 2024 | DOI: https://doi.org/10.70818/bmcj.2024.v010i02.018

OPEN ACCESS

Original Research Article

Association between Deviated Nasal Septum and Otitis Media with Effusion in Adult

Muhammad Mahmudul Haque[a*], Khaled Shahrear[b], Ashik Ikbal[c]

[a]Associate Professor, Department of ENT & Head-Neck Surgery, Rajshahi Medical College, Rajshahi, Bangladesh
[b]Assistant Professor, Department of ENT & Head-Neck Surgery, Rajshahi Medical College, Rajshahi, Bangladesh
[c]Assistant Professor, Department of ENT & Head-Neck Surgery, Rajshahi Medical College, Rajshahi, Bangladesh

***Correspondence to:**
Dr. Muhammad Mahmudul Haque
Email: dranikent@gmail.com

Article History
Received: 07.10.2024
Accepted: 05.11.2024
Published: 31.12.2024

Abstract: ***Background*:** Deviated Nasal Septum (DNS) is a common anatomical variation that can disrupt normal nasal airflow and lead to complications, including Eustachian tube dysfunction. Otitis Media with Effusion (OME), characterized by the accumulation of fluid in the middle ear without signs of acute infection, often arises from impaired Eustachian tube function. ***Methods:*** This study was a cross-sectional observational study conducted at Rajshahi Medical College, Rajshahi, over 1 year; July 2020 to June 2021. The primary objective was to evaluate the association between Deviated Nasal Septum (DNS) and Otitis Media with Effusion (OME) in adult patients. A total of 80 participants were included in the study. Data were analysed using SPSS software version 20.0. ***Result:*** This study analyzed 80 participants, with 55% males and the majority (40%) in the 18–30 age group. DNS was most frequently mild (43.75%), followed by moderate (40%) and severe (16.25%). OME was present in 30% of participants. No statistically significant associations were observed between DNS severity and OME presence (p=0.733), or between OME and demographic factors such as age (p=0.637) and gender. Mild DNS was more common among younger participants, and severe DNS showed a slightly higher prevalence in females. ***Conclusion:*** This study highlights the intricate relationship between DNS severity, age, gender, and the presence of OME. While DNS, particularly in its moderate to severe forms, has been associated with Eustachian tube dysfunction and subsequent OME, no statistically significant association was observed between DNS severity and OME in this cohort. Similarly, age and gender, though influential in the distribution of DNS and OME, did not demonstrate a significant correlation with OME presence.

Keywords: Deviated Nasal Septum, Otitis Media with Effusion, Eustachian tube, Middle Ear.

Cite this as: Haque MM, Shahrear K, Ikbal A. Association between Deviated Nasal Septum and Otitis Media with Effusion in Adult. BMCJ. 2024;10(2):54-59.

Introduction

Deviated nasal septum (DNS) and otitis media with effusion (OME) are two commonly encountered conditions in otolaryngology. DNS refers to the displacement of the nasal septum, often resulting in nasal obstruction and impaired airflow. It is one of the most frequently diagnosed structural abnormalities of the nasal cavity and can lead to a variety of respiratory and sinus-related issues. OME, on the other hand, is the presence of fluid in the middle ear without signs of acute infection, and it is commonly seen in both pediatric and adult

populations. This condition can cause hearing loss, a sensation of fullness in the ear, and other associated symptoms. The relationship between DNS and OME has long been a subject of investigation, particularly as both conditions can co-exist and influence each other's pathophysiology.[1] The anatomical and physiological interplay between DNS and OME is complex. DNS may obstruct the nasal passageways, leading to impaired ventilation of the paranasal sinuses and the Eustachian tube. The Eustachian tube is crucial for equalizing air pressure in the middle ear and draining secretions. When DNS causes nasal blockage, it may impair the normal functioning of the Eustachian tube, leading to fluid retention in the middle ear.[2, 3]

Moreover, chronic nasal obstruction caused by DNS can result in an inflammatory response that further compromises the function of the Eustachian tube, exacerbating the risk of OME development.[4] OME is a common cause of hearing loss in adults and is often associated with a variety of upper respiratory conditions, including DNS. The persistence of OME in adult patients can lead to long-term complications such as chronic otitis media, tympanic membrane perforation, and significant hearing impairment. Previous studies have suggested that DNS may predispose individuals to OME, although the exact mechanisms underlying this association remain unclear. Some researchers hypothesize that DNS may impair the mucociliary clearance of the nasal and sinus secretions, thereby facilitating the accumulation of fluid in the middle ear.[5, 6] Others suggest that DNS may cause altered nasal airflow, which can lead to negative pressure in the nasopharynx and disrupt normal Eustachian tube function, leading to the development of OME.[7]

The importance of understanding the association between DNS and OME lies in the potential for more effective treatment strategies. By addressing the underlying DNS, clinicians may improve Eustachian tube function and alleviate the symptoms of OME. The management of OME typically involves medical therapies such as decongestants and nasal steroids, as well as surgical interventions like myringotomy or tympanostomy tube placement in more persistent cases. However, for patients with co-existing DNS, correcting the structural abnormality may further improve outcomes. Surgical interventions such as septoplasty may not only provide relief from nasal obstruction but may also reduce the incidence and severity of OME in patients suffering from both conditions.[8] Studies evaluating the relationship between DNS and OME have yielded varying results. Some studies have found a significant association between DNS and the increased prevalence of OME, while others have failed to establish a clear link. For example, a study found that patients with DNS were more likely to develop chronic otitis media and OME due to impaired Eustachian tube function and reduced ventilation of the middle ear.[9]

Recent advances in diagnostic imaging techniques, such as nasal endoscopy and high-resolution CT scans, have provided better insight into the anatomical changes associated with DNS and its potential effects on Eustachian tube function. These technologies have facilitated a more accurate assessment of the relationship between DNS and OME, allowing clinicians to identify subclinical cases of OME and determine the appropriate course of treatment.[10] Additionally, studies using audiometric evaluations have shown that patients with DNS often present with hearing impairment, further supporting the potential link between DNS and OME.[11] This study aimed to evaluate the association between deviated nasal septum and otitis media with effusion in adults.

Methods

This study was a cross-sectional observational study conducted at Rajshahi Medical College, Rajshahi, over 1 year; from July 2020 to June 2021. The primary objective was to evaluate the association between Deviated Nasal Septum (DNS) and Otitis Media with Effusion (OME) in adult patients. Ethical approval for the study was obtained from the institutional ethics committee, and all participants provided written informed consent before inclusion. The study included adult patients attending the outpatient department with complaints suggestive of DNS or related nasal obstruction. Patients with a clinical diagnosis of DNS were recruited based on inclusion and exclusion criteria.

Inclusion Criteria

Adults aged 18–60 years.

Clinically diagnosed DNS was confirmed through anterior rhinoscopy and nasal endoscopy.

Patients willing to participate and provide informed consent.

Exclusion Criteria

History of prior nasal or otological surgery.

Active upper respiratory tract infection within the last four weeks.

Known systemic conditions or syndromes affecting the ear or nasal structures.

Use of medications influencing Eustachian tube function or middle ear status.

Patients with other structural anomalies of the nasal cavity or sinuses.

A total of 80 participants were included in the study. The sample size was determined based on the expected prevalence of DNS and OME in the adult population, ensuring adequate power for statistical analysis. Participants were assessed through detailed history-taking, clinical examination, and diagnostic investigations, age, gender, and presenting symptoms were recorded, DNS severity was graded as mild, moderate, or severe based on clinical examination findings and nasal endoscopy using the Mladina classification system, OME was diagnosed based on clinical signs, tympanic membrane examination findings, and tympanometry. Diagnostic criteria included the presence of middle ear effusion, retraction of the tympanic membrane, or altered tympanometry results. Data were analyzed using SPSS software version 20.0. Descriptive statistics, including frequencies and percentages, were used to summarize demographic and clinical data. The association between DNS severity and OME presence, as well as age and gender distributions, was analyzed using the chi-square test. A p-value of <0.05 was considered statistically significant. The primary outcome measure was the presence or absence of OME among participants with varying severities of DNS. Secondary outcomes included the distribution of DNS severity across different age groups and genders, and the combined analysis of DNS severity, age, and OME presence.

Results

Table 1: Gender Distribution of Participants

Gender	Frequency	Percentage (%)
Male	44	55.0
Female	36	45.0

The gender distribution of participants in the study shows a predominance of males, with 44 individuals representing 55.0% of the total population. In contrast, females account for 36 participants, comprising 45.0% of the study group.

Table 2: Age Group Distribution of Participants

Age Group	Frequency	Percentage (%)
18-30	32	40.0
31-45	28	35.0
46-60	20	25.0

The age group distribution of participants reveals that the majority fall within the 18–30 age range, accounting for 32 individuals (40.0%). This is followed by the 31–45 age group, which includes 28 participants (35.0%), while the 46–60 age group comprises 20 individuals (25.0%).

Table 3: DNS Severity Distribution

DNS Severity	Frequency	Percentage (%)
Mild	35	43.75
Moderate	32	40.00
Severe	13	16.25

The distribution of DNS severity among participants indicates that mild cases are the most prevalent, with 35 individuals (43.75%). Moderate severity is observed in 32 participants (40.00%), while severe cases are less common, comprising 13 individuals (16.25%).

Table 4: OME Presence Distribution

OME Presence	Frequency	Percentage (%)
Absent	56	70.0
Present	24	30.0

The distribution of OME (Otitis Media with Effusion) presence among participants shows that the condition is absent in the majority, with 56 individuals (70.0%). In contrast, 24 participants (30.0%) exhibit the presence of OME.

Table 5: Association Between DNS Severity and OME Presence

DNS Severity	OME Present	OME Absent	Total	p-value
Mild	10	25	35	0.733
Moderate	10	22	32	
Severe	4	9	13	

The association between DNS severity and the presence of OME reveals that among participants with mild DNS, 10 have OME while 25 do not, totaling 35 individuals. Similarly, in the moderate DNS group, 10 participants have OME compared to 22 without it, making a total of 32. In the severe DNS category, 4 individuals exhibit OME, while 9 do not, with a total of 13. The p-value of 0.733 suggests no statistically significant association between DNS severity and OME presence in this study.

Table 6: Association Between Age Group and OME Presence

Age Group	OME Present	OME Absent	Total	p-value
18-30	9	23	32	0.637
31-45	9	19	28	
46-60	6	14	20	

The association between age group and the presence of OME shows that in the 18–30 age group, 9 participants have OME, while 23 do not, totaling 32 individuals. Similarly, in the 31–45 age group, 9 participants exhibit OME compared to 19 without it, making a total of 28. In the 46–60 age group, 6 individuals have OME, while 14 do not, totaling 20 participants. The p-value of 0.637 indicates no statistically significant association between age group and OME presence in this study.

Table 7: Combined Distribution of DNS Severity, Age Group, and OME Presence

DNS Severity	Age Group	OME Present	OME Absent	Total	Percentage (%)
Mild	18-30	4	8	12	15.0
Mild	31-45	3	9	12	15.0
Mild	46-60	3	8	11	13.75
Moderate	18-30	3	7	10	12.5
Moderate	31-45	4	9	13	16.25
Moderate	46-60	3	6	9	11.25
Severe	18-30	2	2	4	5.0
Severe	31-45	2	1	3	3.75
Severe	46-60	0	6	6	7.5

The combined distribution of DNS severity, age group, and OME presence reveals diverse patterns across categories. In cases of mild DNS, the 18–30 and 31–45 age groups each contribute 12 participants (15.0%), while the 46–60 group accounts for 11 individuals (13.75%). For moderate DNS, the highest representation is in the 31–45 age group with 13 participants (16.25%), followed by 10 individuals (12.5%) in the 18–30 age group and 9 (11.25%) in the 46–60 group. Among those with severe DNS, the 18–30 age group includes 4 participants (5.0%), the 31–45 group has 3 individuals (3.75%), and the 46–60 group has 6 participants (7.5%).

Table 8: DNS Severity and Gender-Wise Distribution

DNS Severity	Gender	Frequency	Percentage (%)
Mild	Male	20	25.0
Mild	Female	15	18.75
Moderate	Male	18	22.5
Moderate	Female	14	17.5
Severe	Male	6	7.5
Severe	Female	7	8.75

The gender-wise distribution of DNS severity highlights variations between males and females. Among participants with mild DNS, males account for 20 individuals (25.0%), while females comprise 15 (18.75%). In moderate DNS cases, 18 males (22.5%) and 14 females (17.5%) are represented. For severe DNS, males make up 6 participants (7.5%), whereas females slightly surpass them with 7 individuals (8.75%).

Discussion

The occurrence of Otitis Media with Effusion (OME) and its relationship with various predisposing factors such as gender, age, and underlying health conditions have been topics of significant interest in otolaryngological research. Several studies have examined the gender and age distribution of DNS and OME. Gender differences in the prevalence of DNS are well documented, with males generally being more affected than females. This is consistent with the findings of numerous studies that have explored the incidence of nasal septal deviation concerning various demographic factors, suggesting that males are at a higher risk of developing conditions such as DNS that could contribute to OME.[12, 13] The age distribution of OME presents a different dynamic, with children being the most commonly affected group, although adults, particularly those with chronic nasal issues, are also at risk. The literature has demonstrated that OME is more common in younger children due to their anatomical and physiological predispositions, such as the horizontal position of the Eustachian tube, but it can affect adults with underlying conditions like DNS, which can alter the normal functioning of this structure.[14, 15] In terms of severity, DNS can be categorized into mild, moderate, and severe forms. Mild DNS typically presents with minor nasal obstruction, while moderate and severe forms may lead to significant nasal and sinus problems. The severity of DNS is thought to influence the risk of developing OME, with more severe cases potentially increasing the likelihood of Eustachian tube dysfunction and subsequent effusion.[16]

In previous studies, the severity of DNS has been shown to correlate with the severity of associated complications, including sinusitis and recurrent otitis media.[17] The impact of DNS severity on OME has been the subject of several investigations, with mixed results regarding the strength of this association. The prevalence of OME among individuals with DNS also appears to be affected by the age group. Younger patients, particularly those within the age range of 18–30 years, are more likely to experience mild forms of DNS, and they may be less likely to develop OME. However, as individuals age, the prevalence of moderate to severe DNS increases, potentially contributing to a higher incidence of OME in older populations. This relationship underscores the need for tailored management strategies based on the patient's age and the severity of their DNS, as treatment options may vary depending on the clinical presentation.[18] Gender-specific differences in the prevalence of DNS and OME have also been noted in several studies. Males are more likely to develop DNS, and some studies suggest that this may be related to anatomical differences in the nasal and cranial structures. These differences might also explain why males are more susceptible to conditions such as OME. However, females, especially those who have moderate to severe DNS, also show a higher prevalence of OME, indicating that the interaction between gender, DNS severity, and OME presence is complex and requires further investigation. The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

Conclusion

This study highlights the intricate relationship between DNS severity, age, gender, and the presence of OME. While DNS, particularly in its moderate to severe forms, has been associated with Eustachian tube dysfunction and subsequent OME, no statistically significant association was observed between DNS severity and OME in this cohort. Similarly, age and gender, though influential in the distribution of DNS and OME, did not demonstrate a significant correlation with OME presence. These findings underscore the multifactorial nature of OME and the need for a holistic approach to its management. Based on the findings, it is recommended that clinicians adopt a multidisciplinary approach when managing patients with DNS and OME, considering the potential interplay of age, gender, and DNS severity. Routine assessment of Eustachian tube function in patients with moderate to severe DNS may help identify those at risk of developing OME. Additionally, further longitudinal studies with larger and more diverse cohorts are encouraged to better understand these relationships and refine treatment protocols for improved patient outcomes.

Funding: No funding sources

Conflict of interest: None declared

References

1. Sistani SS, Dashipour A, Jafari L, Ghahderijani BH. The possible associations of nasal septal deviation with mastoid pneumatization and chronic otitis. Open access Macedonian Journal of Medical Sciences. 2019;7(15):2452.
2. Yazıcı H. Nasal Mucociliary Clearance in Adenoid Hypertrophy and Otitis Media with Effusion. Curr Allergy Asthma Rep. 2015 Dec;15(12):74.
3. Kaya M, Dağlı E, Kırat S. Does nasal septal deviation affect the eustachian tube function and middle ear ventilation? Turkish archives of otorhinolaryngology. 2018;56(2):102.
4. Iftikhar S, Jawad A, Riaz A, Umar MA, Ahmed F, Rabbani MZ. Screening of Children with Upper Respiratory Tract Infection for Otitis Media with Effusion. Annals of PIMS-Shaheed Zulfiqar Ali Bhutto Medical University. 2023;19(2):162–6.
5. Songu M, Islek A, Imre A, Aslan H, Aladag I, Pinar E, et al. Risk factors for otitis media with effusion in children with adenoid hypertrophy. Acta Otorhinolaryngologica Italica. 2020;40(2):133.
6. Khayat FJ, Dabbagh LS. Incidence of otitis media with effusion in children with adenoid hypertrophy. Zanco Journal of Medical Sciences (Zanco J Med Sci). 2011;15(2):57–63.
7. Ashwinirani SR, Suragimath G, Telrandhe S, Suragimath DG. Deviated Nasal Septum: A Comprehensive Review. Journal of Datta Meghe Institute of Medical Sciences University. 2024;19(3):406–11.
8. Lima AF, Moreira FC, Costa IE, Azevedo C, Mar F, Dias L. Nasal septum deviation and eustachian tube function: a prospective case-control study based on tympanometry, tubomanometry, and ETDQ-7. Acta otorrinolaringologica espanola. 2022;73(1):35–41.
9. Atila NE, Topal K, Bulut YE, Kaya Z, Arslan B. Effects of nasal and paranasal sinus variations on chronic otitis media development in pediatric patients. The Eurasian Journal of Medicine. 2021;53(3):231.
10. Singhal P, Sonkhya N, Mishra P, Srivastava SP. Impact of Anatomical and Radiological Findings for Consideration of Functional Endoscopic Sinus Surgery. Indian J Otolaryngol Head Neck Surg. 2012 Dec;64(4):382–5.
11. Fraser L, Kelly G. An evidence-based approach to the management of the adult with nasal obstruction. Clinical Otolaryngology. 2009 Apr;34(2):151–5.
12. Ahn JC, Kim JW, Lee CH, Rhee CS. Prevalence and risk factors of chronic rhinosinusitis, allergic rhinitis, and nasal septal deviation: results of the Korean National Health and Nutrition Survey 2008-2012. JAMA otolaryngology–head & neck surgery. 2016;142(2):162–7.
13. Valencia MP, Castillo M. Congenital and Acquired Lesions of the Nasal Septum: A Practical Guide for Differential Diagnosis. RadioGraphics. 2008 Jan;28(1):205–23.
14. Bluestone CD. Eustachian tube: structure, function, role in otitis media. PMPH-USA; 2005.
15. Vanneste P, Page C. Otitis media with effusion in children: Pathophysiology, diagnosis, and treatment. A review. Journal of otology. 2019;14(2):33–9.
16. Yasan H, Doğru H, Baykal B, Döner F, Tüz M. What is the Relationship Between Chronic Sinus Disease and Isolated Nasal Septal Deviation? Otolaryngol--head neck surg. 2005 Aug;133(2):190–3.
17. Alghamdi FS, Albogami D, Alsurayhi AS, Alshibely AY, Alkaabi TH, Alqurashi LM, et al. Nasal septal deviation: a comprehensive narrative review. Cureus. 2022 [cited 2025 Jan 1];14(11).
18. Yasmeen N, Shumon AM, Atikuzzaman K, Hoque F, Malakar M, Salam J. Prevalence of ENT Diseases in Medical College for Women and Hospital, Dhaka-Six Months Retrospective Study. Bangladesh Journal of Otorhinolaryngology. 2022;28(2):186–92.