ISSN: 3068-7527
Open Access Journal of Medicine and Healthcare
Review Article
OPENPUB GLOBAL PUBLISHERS
Volume 2 | Issue 3

Prevalence of Nasal Septal Deviation in South East Nigeria a Three-Year Ct-Based Review

Catherine N Obasikene[1], Samuel Udobi[1], Michael E. Aronua[1], Chinekwu S. Nwosu[1], Adaeze C Obi[1], Godwin Obasikene[2], Eric Ihekwoba*[3]

[1]Department of Radiology, Nnamdi Azikiwe University, Awka, Nigeria.

[2]Department of Otorynolaryngology, Nnamdi Azikiwe University, Awka, Nigeria

[3]Department of Surgery, Nnamdi Azikiwe University, Awka, Nigeria.

***Corresponding author:** Eric Ihekwoba, Department of Surgery, Nnamdi Azikiwe University Awka, Nigeria.

Citation: Obasikene CN, Udobi S, Aronua ME, Nwosu CS, Obi AC. et.al. (2026). Prevalence of Nasal Septal Deviation in South East Nigeria a Three-Year Ct-Based Review. Open Access J. Med. Healthc. 2(2): 1-6.

Received: 05-04-2026 **Accepted:** 28-04-2026 **Published:** 05-05-2026

Absract

Background and Aim

Nasal septal deviation (NSD) are a cause of nasal obstruction which causes reduced air entry through the nose and can predispose to difficulty in breathing as well as sinusitis. The type and severity of symptoms associated with nasal septal deviation can vary based on the type of nasal septal deviation. This study investigated the prevalence of NSD and its relation to age, and history of trauma using computed tomography scan (CT).

Subjects and Methods

This cross-sectional study was performed on the data from CT examinations of 399 patients referred to radio diagnostic center in Nnewi from December 2023 to December 2025. The presence of NSD and its type according to the Mladina's classification were evaluated. The effect of age, and history of trauma on the prevalence of NSD was statistically analyzed.

Results

The prevalence of nasal septal deviation in this study is 77.7%. The result from the study shows that type III deviation was the commonest occurring in 41.6%, followed by type II (27.1%), and type 11(18.5%) while types IV to VII has the prevalence of 5.6%, 5.3%, 1.7%, and0.3% respectively. Pearson correlation analysis demonstrated a significant negative correlation between age and angle of nasal septal deviation (r=0.182, p= 0.003) indicating that younger age group were more prone to increased angle of deviation

Conclusion

This study showed that the frequency of NSD was 77.7%, with type III being the most common type. NSD showed no association with trauma and the increase in age decreases the chance of NSD.

Keywords: Computed Tomography; Modified Mladina's Classification; Nasal Septal Deviation

Introduction

The nasal cavity extends from the nares anteriorly to the nasopharynx posteriorly. The nasal septum is a mucosa covered structure usually centrally located, dividing the nasal cavity into left and right cavities. The nasal septum contributes to the physical appearance and functions of the nose. Nasal septal deviation occurs when there is displacement of the septum away from the midline to either left or right. Mild septal displacement is often considered a normal anatomical variant [1].

Nasal septal deviation is known to be one of the causes of nasal obstruction with medical attention sought when it is significantly symptomatic. Septal Anatomy: The nasal septum is formed anteriorly by the anterior cartilaginous component (the quadrangular cartilage) and posteriorly by a bony component, formed by the following-the vomer, the perpendicular plate of ethmoid and the maxillary crest which has contributions from the maxillary and palatine bones [2].

The perpendicular plate of ethmoid forms the upper half of the bony nasal septum and is continuous superiorly with the cribriform plate. It articulates with the vomer posterior-inferiorly and with the septal cartilage anterior-inferiorly. The vomer is the posterior inferior portion of the septum. It articulates anteriorly with the septal cartilage of the nose. The inferior borders of both the vomer and the septal cartilage articulate with the palatine process of maxilla and the nasal crest of the palatine bone which are midline bony projections that also contributes the nasal septum. The mucoperichondium and the mucoperiosteum covering the lateral surfaces of the septal cartilage and bones respectively contain the blood supply and innervation of the nasal septum. The blood supply is from the anterior and posterior ethmoidal arteries, sphenopalatine arteries, the greater palatine arteries and the labial arteries. The confluence of these vessels at the anterior aspect of the nasal septum - the Kiesselbach's plexus is the little's area (the source of most nose bleeds).

The lateral wall of the nasal cavity has nasal conchae or turbinate's which are divided into three parts, superior, middle and inferior which allow for humidification, warming and filtration of the inspired air [3].

Nasal Septal Deviation Could Be Traumatic or Congenital

There are different classifications of nasal septal deviation. Nasal septal deviation can vary based on the severity of deviation – mild, moderate or sever Nasal septal deviation can be classified according to extent of the nasal deviation on the inferior turbinate. This classification has three degrees, degree I comprises a septal deviation without reaching the inferior turbinate, degree II represents a deviation reaching the inferior turbinate, and degree III involves a septal deviation reaching and compressing the inferior turbinate [5].

Shape of the deviation, into c shape, s shape, Caudal septal deviation and the septal spur. The modified mladina's classification where the side of vertical deviation and the horizontal spur is put into consideration i.e., whether deviation to the left or to the right is used for the purpose of this study.

CT -adapted (Coronal CT images) Mladina's classification system classify the nasal septal deviation according to the characteristics of the nasal septum seen horizontally and vertically [6].

The Seven Types of Mladina's System Classification of Nasal Septum Deviation Is Modified as Follows

- Type i-mild vertical deviation
- Type ii – significant vertical deviation to the right
- Type iii - significant the vertical deviation to the left side
- Type iv – s deviation
- Type v- horizontal spur to the right
- Vi- horizontal spur with deep groove on the opposite side
- Vii- represent as a combination of multiple types [6,7].

Nasal septal deviation is of clinical significance because it is a cause nasal obstruction and reduce air entry through the nose. the type and severity of symptoms associated with nasal septal deviation can vary based on the type of nasal septal deviation. The sphenoid sinus can get pneumatized into the posterior superior portion of the nasal septum which when extensive can predispose to nasal blockage as well as sinus pathology through impaired drainage of the paranasal sinuses [8,9].

Generally, nasal septal deviation can present with the following symptoms: sleep apnoea snoring repetitive sneezing, difficulty with breathing mild to severe loss of ability to smell nose bleed, headache ad neck pain The prevalence of nasal septal deviation varies between different population. Previous studies documented varying prevalence rates from as high as 92.7% on a CT analysis in Brazilian population to about 40.7% in South Nigeria deviation [10,11].

Computed tomography due to it easy availability and high spatial resolution is the imaging modality of choice in evaluation of nasal septal pathology and in evaluation of the sino nasal region [12].

Objectives

To determine the prevalence of Nasal septal deviation in South East Nigeria using CT scan To determine the angle and the severity of deviation of nasal septum and relationship with age

Methodology

This is a cross sectional retrospective study of prevalence of Nasal septal deviation performed on the data extracted from CT scan of the paranasal sinuses of patients referred for CT scan in radio diagnostic centre in the Nnewi town from December 2023 to December 2025.

After the procedure was explained to the subjects, Subjects were well positioned on the CT gantry by the radiographer and then immobilized using straps to steady the head and the trunk. Images were obtained using a GE four slice scanner Bright speed series 4 slice Ct scanner (General electrical company, USA), Hongwei Medical Systems Company Limited Beijing China. Scan gram was obtained and 5 mm serial non-contrast axial cuts were taken from the base of the skull to the vertex. Reformatted images of 2.5mm were viewed in bone and brain window. Multiplanar sagittal and coronal reconstructions were done and coronal images were used to measure and document NSD.

The values thus obtained were tabulated by statistical analysis using Statistical Package for Social sciences (SPSS) Software version 21 (IBM Corp., Armonk, NY) and Microsoft Office Excel Software. The data was analyzed with Chi square test and Pearson's Correlation coefficient test. Categorical variables were compared using Student's *t*-test and statistically significance was set to P value < 0.05.

Inclusion Criteria

- patients referred for CT scan of the paranasal sinus

Exclusion Criteria

- Patients with previous history of nose surgery
- Patients with Congenital syndromes such as cleft palate
- Patients with sino nasal masses that erodes the nasal septum

Results

A total of 399 subjects were used in the study with male to female ratio of 1.4:1 as shown in table 1.

Table 1: Sex distribution

Sex	Frequency	Percentage
Male	230	57.6
Female	169	42.4
Total	399	100

The age range of the participant is 3years to 97years with a mean age of 42.31 +_ 18.09years, median age of 41 and modal age of 40. The age group 31-45years with percentage of 30.1% was the highest age group followed by 46-60years-23.8% and 1-15years, Table 2.

Table 2: Age Distribution

Age (years)	Frequency	Percentage
1-15	89	22.3
16-30	27	6.8
31-45	120	30.1
46-60	95	23.8
61-75	53	13.3
76-90	14	3.5
91 and above	1	0.3
Total	399	100

The prevalence of nasal septal deviation in this study is 77.7% while that of the other variables including osteo meatal complex (OMC) obstruction are as shown in table 3.

Table 3: Frequency of various variables

Variable	Present (%)	Absent (%)	Total (%)
NSD	77.7	22.3	100
Concha bullosa	34.8	65.2	100
Sinusitis	65.7	34.3	100
Engorged turbinate's	85.2	14.8	100
OMC obstruction	44.1	55.9	100
Hx of trauma	1.8	98.2	100

The result from the study shows that type 111 deviation was the commonest occurring in 41.6%, followed by type 11(27.1%) and type 1 (18.5%) while types 1V to V11 has the prevalence of 5.6%,5.3%,1.7%, and 0.3% respectively as shown in Table 4.

Table 4: Percentage of type or severity of NSD

Severity of NSD	Percentage
I	18.5
II	27.1
III	41.6
IV	5.6
V	5.3
VI	1.7
VII	0.3

Pearson correlation analysis demonstrated a significant negative correlation between age and angle of nasal septal deviation (r=0.182, p=003) indicating that younger age group were more prone to increased angle of deviation (Table 5).

Table 5: Pearson correlation test between age and angle of deviation

Pair of variables	Correlation coefficient	p-value
Age vs Angle of NSD	-0.182	0.003*

*=significant p-value (≤ 0.05)

In table 6,

Table 6: Chi Square tests for NSD associations

Pair of variables	X	p-value
NSD vs Concha bullosa	1.300	0.254
NSD vs Sinusitis	3.552	0.059
NSD vs Engorged Turbinate	2.651	0.103
NSD vs OMC obstruction	7.435	0.006*
NSD vs Trauma	2.046	0.153

*=significant p-value (≤ 0.05)

The association between nasal septal deviation and other variable in this study showed a significant association with obstruction of osteomeatal complex (p=0.006), while there is no significant association between concha bullosa (p=0254), sinusitis (p=0.059) and turbinate hypertrophy (p=0.103).

Independent t-test for difference in means of age among subjects with nasal septal deviation and engorged turbinate's is statistically significant (p-value of < 0.002) with younger individuals more affected. Table 7.

Table 7: Independent samples t-test for difference in means of age among subjects with NSD

Variables	Study group (Mean ± SD)		t-value	p-value
	Present	Absent		
Cbullosa	43.83± 20.09	42.08± 16.95	0.625	0.532
Sinusitis	42.36± 16.84	42.31± 18.71	0.020	0.984
Engorged Turbinate's	40.85± 17.20	49.80± 16.99	-3.071	0.002*
OMC obstruction	41.05± 16.76	43.52± 17.99	-1.251	0.212
Trauma	30.14± 19.13	42.62± 17.32	-1.881	0.061

Notes: Values reported are means (M) ± standard deviations (S.D.).

*=significant p-value (≤ 0.05)

Discussion

The prevalence of nasal septal deviation in this study is high (77.7%) This is consistent with findings in study of Smith et al 77.6% in Nebraska, 85.5% in Indian in study of Saumya Verma et al and Moshfeghi *et al* study in Iran in 2020 recorded an incidence of 87%.[13,14 15.] A study done in south south Nigeria recorded a prevalence of about 40.7% [10] while the study of Onwuchekwa et al documented a low prevalence of 20.91% in River state Nigeria and a study performed in Korea, the general prevalence was 22.38% [16,17]. This disparity may be due to variations in geographical location and in study population.

The improved detection of subtle nasal septal deviation using CT scan (an advanced imaging technique) may account for the detected higher prevalence. The mean age of 42.31 years with peak occurrence between third to fifth decade seen in this study reflects the age group most likely to seek medical advice for paranasal sinuses diseases. Stalman et al reported similar age distribution [18].

Nasal septal deviation to the left -type III was higher in our study (41.6%) followed by deviation to the right type II (27.1%) which is similar in a study by Ominde et al which recorded deviation to the left with prevalence (52.9%) and to the right (47.1%) though with slightly higher incidence[10].However a study by Ismail et al recorded that deviation to the right was more common than deviation to the left [19].

The wide range of age group studied in this research may contribute to the significant negative correlation between angle of deviation and age with deviation seen more in younger age group (p=0.003). A study in Indonesia documented increase in prevalence of nasal septal deviation with age reaching 72% in children aged 3-14yers [20]. This may reflect developmental or birth related origin with possible remodeling occurring over time.

Nasal septal deviation showed statistically significant association with osteomeatal complex obstruction and mastoid opacity, which further strengthens the effect of nasal septal deviation in causing nasal obstruction.

Though the prevalence of sinusitis is relatively high in this study, there is no significant statistical correlation between nasal septal deviation and sinusitis(p=0.059). More so there is no statistical relationship between nasal septal deviation and concha bullosa. These findings are similar to the study of Smith et al which documented that there is no statistically significant relationship between the presence of concha bullosa or nasal septal deviation and maxillary sinusitis [13]. The study of Fahad S Alghamdi et al also documented no statistical relationship between nasal septal deviation, sinusitis and concha bullosa[21]. Turbinate hypertrophy was relatively common in the study population (85.2%) The independent t-test for difference in means of age for nasal septal deviation and engorged turbinate's show statistical significance (p-0.002). This shows that engorged turbinate's are more strongly associated with nasal septal deviation in younger age group.

Trauma to the nose can cause nasal septum deviation, but in this present study, only about 1.8% cases of trauma were recorded and there was no statistical significance(P=0.061) between nasal septal deviation and trauma. Given the low trauma prevalence, developmental factors may play a larger role in NSD in this population.

Conclusion

This study found in a high prevalence of nasal septal deviation (77.7%) in South-East Nigeria with type III deviation being the most common. NSD was significantly associated with osteomeatal complex obstruction but not with trauma or sinusitis. These findings emphasize the importance of pre-operative CT evaluation in patients prior to surgical intervention.

References

1. Alsheri A, Abdullah A (2022) Prevalence and clinical features of deviated nasal septum in the pediatric age group in Najran Region, Saudi Arabia. Saudi J Otolaryngol Head Neck Surg 24:1–5.
2. Standring S, Anand T, Tunstall R (2021) Gray's anatomy: the anatomical basis of clinical practice. 42nd ed. Elsevier
3. Cellina M, Gibelli D, Cappella A, Martinenghi C, Belloni E, et.al. (2020). Nasal cavities and the nasal septum: Anatomical variants and assessment of features with computed tomography. Neuroradiol J. 33:340–7. doi:10.1177/1971400920913763.
4. Friedman O, Gunel C (2017) Facial plastic surgery clinics of North America. Facial Plast Surg Clin North Am.
5. Vidigal TA, Haddad FLM, Gregório LC, Poyares D, Bittencourt LRA (2013) Subjective, anatomical, and functional nasal evaluation of patients with obstructive sleep apnea syndrome. Sleep Breath 17:427–33. doi:10.1007/s11325-012-0667-5.
6. Mladina R, Cujić E, Subarić M, Vuković K (2008) Nasal septal deformities in ear, nose, and throat patients: an international study. Am J Otolaryngol 29:75–82. doi:

10.1016/j.amjoto.2007.02.002.
7. Prasad S, Varshney S, Bist SS, Mishra S, Kabdwal N (2013) Correlation study between nasal septal deviation and rhinosinusitis. Indian J Otolaryngol Head Neck Surg 65:363–6. doi:10.1007/s12070-013-0665-3.
8. Shokri A, Faradmal MJ, Hekmat B (2019) Correlations between anatomical variations of the nasal cavity and ethmoidal sinuses on cone-beam computed tomography scans. Imaging Sci Dent 49(2):103–13.
9. Alshaikh N, Aldhurais A (2018) Anatomic variations of the nose and paranasal sinuses in Saudi population: computed tomography scan analysis. Egypt J Otolaryngol 34(4):234–41.
10. Ominde BS, Ikubor J, Igbigbi PS, Okoloigbo N (2023) Variations of nasal septum in adult Nigerians: Computed tomography study. Int Arch Otorhinolaryngol 27(2).
11. Janovic N, Janovic A, Milicic B, Djuric M (2022) Relationship between nasal septal morphology and nasal obstruction symptoms severity in computed tomography study. Braz J Otorhinolaryngol 88(5):663–8.
12. Mohammed OA, Yousefl M, Abukonnal A, Alghamdi SS, Abdelaziz I, et.al. (2019) Computed tomographic evaluation of anatomical variations of paranasal sinuses region in rhinosinusitis. Merit Res J Med Sci 7(12):489–97.
13. Smith KD, Edwards PC, Saini TS, Norton NS (2010) The prevalence of concha bullosa and nasal septal deviation and their relationship to maxillary sinusitis by volumetric tomography. Int J Dent 404982.
14. Verma S, Koppula SK, Shalini K, Hazra S (2025) Aprajita. Prevalence of deviated nasal septum and concha bullosa in Northeast Indian population: A retrospective CBCT study. J Pharm Bioallied Sci 17(Suppl 2): S1325–7. doi: 10.4103/jpbs.jpbs_1703_2.
15. Moshfeghi M, Abedian B, Ghazizadeh AM, Tajdini F (2020) Prevalence of nasal septum deviation using cone-beam computed tomography: A cross-sectional study. Contemp Clin Dent 11(3):223–8.
16. Min YG, Jung HW, Kim CS (1995) Prevalence study of nasal septal deformities in Korea: Results of a nation-wide survey. Rhinology 33:61–5.
17. Onwuchekwa RC, Alazigha N. Computed tomography anatomy of the paranasal sinuses and anatomical variants of clinical relevance in Nigerian adults. Egypt J Ear Nose Throat Allied Sci 18(1):31–8.
18. Stalman JS, Lobo JN, Som PM (2004) The incidence of concha bullosa and its relationship to nasal septal deviation and paranasal sinus disease. AJNR Am J Neuroradiol 25(9):1613–8.
19. Seifoglu I, Liker OZ, Damar M, Buyukuysal MC, Tosu A, et.al. (2017). Relationship between the degree and direction of nasal septum deviation and nasal bone morphology. Head Face Med 13:3. doi:10.1186/s13005-017-0136-2.
20. Panjatan VCM, Imanto M (2024) Relationship between nasal septum and degree of nasal obstruction based on nose score. Med Prof J Lampung 14(1).
21. Alghamdi FS, Albogami D, Alsurayhi AS, Alshibely AY, Alkaabi TH, et.al. (2022). Nasal septal deviation: A comprehensive narrative review. Cureus 14(11): e31317. doi:10.7759/cureus.31317.