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Review Article

Radio-Anatomical Evaluation of Nasal Septal Deviation Amongst Nigerians Using Computed Tomography Scan

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Abstract: ***Background:*** The nasal cavity forms the upper aspect of the respiratory tract, divided into two by a nasal septum. The nasal septum provides support for the nasal cavity and is composed of a bony and cartilaginous parts. According to side, Nasal septal deviation (NSD) can be classified as right-sided, left-sided or S-shaped variants (Cellina, *et al., 2020).* ***Aim:*** To evaluate the nasal septal angle deviation amongst Nigerians. ***Materials and Method:*** This study was a descriptive cross sectional retrospective study conducted in the Radiology department of the Rivers State University Teaching Hospital (RSUTH), Nigeria between 2022-2024. The measurement of the nasal septal angle was done by measuring the angle between two lines. The first line runs from the maxillary crest (point A) to the junction point of the perpendicular and cribriform plate of ethmoid bone (point B). The second line was drawn to connect the junction point of the perpendicular and cribriform plate and the most prominent point of the deviated nasal septum (point C), Gisma *et al*., 2022. Data were analyzed using SPSS version 22.0 and were represented in charts, frequencies and percentages. ***Results:*** In this study, males were observed to have more deviated nasal septum. This was similar to previous study done by Gisma, *et al*., 2022, Madani *et al*., 2022. This was in contrast to the results of Smith *et al*, (2010), who revealed that NSD was more prevalent in females. Furthermore, Bora *et al*., (2021), and Shrestha *et al*., (2019) found that there was no statistical difference between frequencies of septal deviation in both genders. Moreso, varying prevalence of NSD have been reported amongst different population, this may be due to dissimilarities in the criteria used to assess nasal septum deviation and also the population of study. ***Conclusion:*** Information as regards the presence of nasal septal deviation is very essential because it will help surgeons especially E.N.T surgeon carry out safe and efficient surgical procedures with minimal or no complications. Therefore, pre-operative evaluation of the nasal septum is important in surgical planning, reconstruction, and overall cosmetic outcomes in patient.

Keywords: Nasal septum, septal angle deviation, computed Tomography scan, Nigerians.

BACKGROUND

The nasal cavity forms the upper part of the respiratory tract. It is divided into two by a nasal septum. The septum constitutes superiorly perpendicular plate of the ethmoidal bone and inferiorly vomer, palatine bone and crest of maxilla along with septal cartilages. It is a relevant anatomical midline structure and forms a vital supportive foundation for the nasal cavity. When there is a deviation of the nasal septum, it produces alteration in the air flow which distorts the mucociliary clearance into the nasal cavity. The nasal septum provides support for the nasal cavity and is composed of a bony and cartilaginous parts. Though a perfectly straight nasal septum is very rare, some degree of deviation may be clinically noted. A higher percentage of nasal septal deviation (NSD) is a strong risk factor for nasal cavity obstruction and sinusitis (Hsia, *et. al*., 2014). Moreso, a significant nasal septal deviation can produce compensatory hypertrophy of inferior turbinate and concha bullosa of the middle turbinate at the contralateral side, exasperating the obstruction, or additionally causing hypoplasia of the ipsilateral turbinates.

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According to side, NSD can be classified as right-sided, left-sided or S-shaped variants (Cellina, *et. al*., 2020). The incidence of nasal septal deviation may vary across different population, nasal septal deviation plays an important role in the congestion of the nasal cavity which may result in a disease process. Therefore, evaluation of the nasal septum angle is important for pre-surgical planning, reconstruction, and overall cosmetic results. The aim of this study was to evaluate the nasal septal angle amongst Nigerians.

MATERIALS AND METHODS

This study was a descriptive cross sectional retrospective study conducted in the Radiology department of the Rivers State University Teaching Hospital (RSUTH), Nigeria between 2022-2024. Ethical approval was obtained from the ethical committee of the Rivers State University Teaching Hospital, 339 adult, non contrast computed tomographic films were used for this study. Images were studied and measurements taken (twice for validity) using the digital imaging and communications in medicine viewer for medical images (radiant dicom software) version 23 (Haak *et. al*., 2016). CT of the paranasal sinuses and patients who presented with stroke were included in this study. Children and adults with poor quality images were excluded from the study. The measurement of the nasal septal angle was done by measuring the angle between two lines. The first line runs from the maxillary crest (point A) to the junction point of the perpendicular and cribriform plate of ethmoid bone (point B). The second line was drawn to connect the junction point of the perpendicular and cribriform plate and the most prominent point of the deviated nasal septum (point C), Gisma *et. al*., 2022. Data were analyzed using SPSS version 22.0 and were represented in charts, frequencies and percentages.

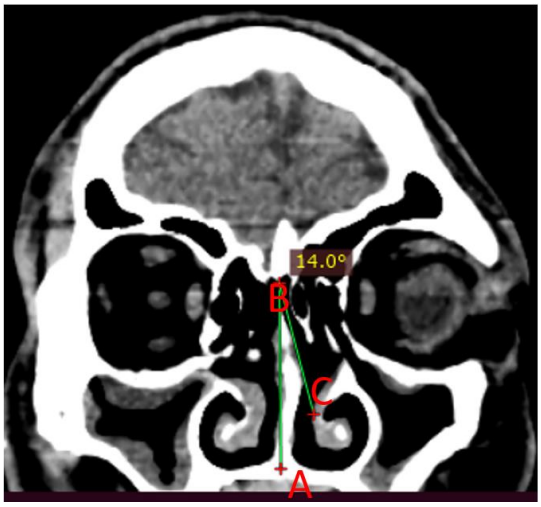

Fig. 1: Coronal Image Showing the Measurement of the Nasal Septal Angle Deviation

Point A is the maxillary crest, point B is the junction point of the perpendicular and cribriform plate of ethmoid bone. Point C is the most prominent point of deviated nasal septum.

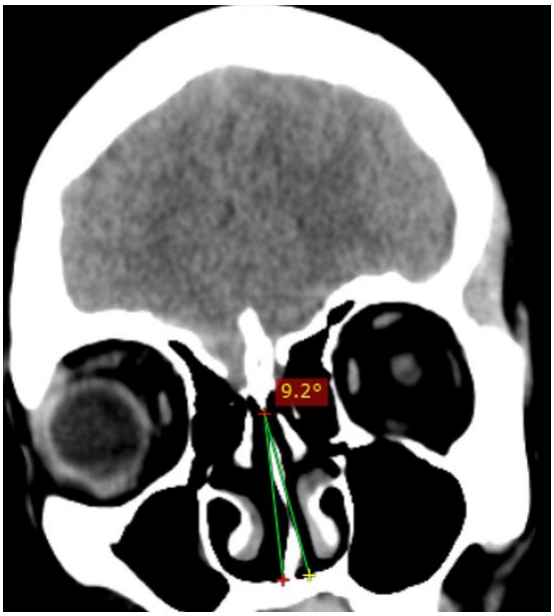

Fig. 2: Coronal Image Showing Left Nasal Septal Deviation

RESULTS

Research and Analysis

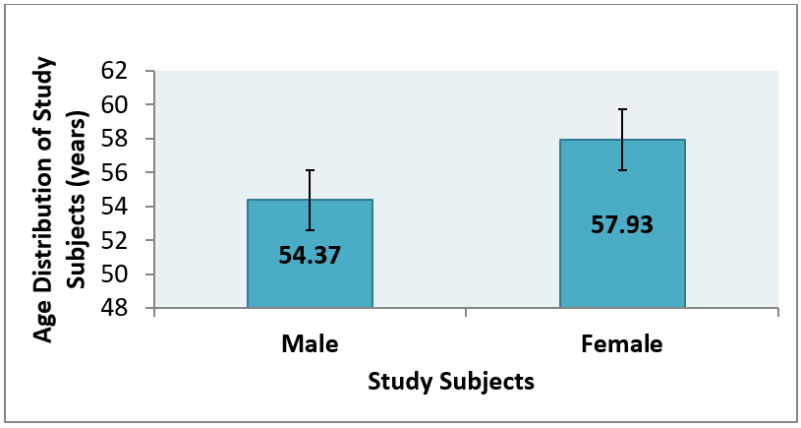

Fig. 3: Age Distribution of Study Subjects

The data on Figure 4.1 represents the age distribution of the study subjects.

The male subjects had a mean age of 54.37 ± 14.46 years while their female counterparts were 57.93 ± 18.21 years.

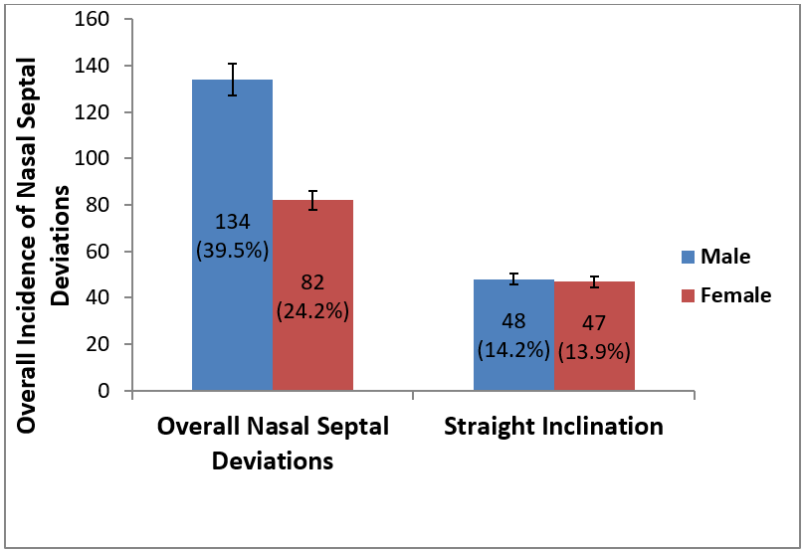

Fig. 4: Overall Incidence of Nasal Septal Deviations

Figure 4.2 shows the outcome on the overall incidence of Nasal Septal Deviations (NSD).

Amongst the male subjects, 39.5% presented with NSD while only 24.2% of the female subjects indicated NSD. For straight inclinations, 14.2% of the males and 13.9% of the female subjects indicated the straight inclination.

Table 1: Incidence of Gender Variation in Nasal Septal Deviation (NSD)

Categories of Nasal Septal Deviation (NSD)	**Nasal Septal Deviation (NSD)**					
	Deviation to Left		**Deviation to Right**		**Straight Inclination**	
	Males [Frequency (Percentage (%)]	**Females** [Frequency (Percentage (%)]	**Males** [Frequency (Percentage (%)]	**Females** [Frequency (Percentage (%)]	**Males** [Frequency (Percentage (%)]	**Females** [Frequency (Percentage (%)]
Normal-NSD (<5º)	6(1.8)	7(2.1)	2(0.6)	2(0.6)	48(14.2)	47(13.9)
Mild-NSD (5º -10 º)	38(11.2)	38(11.2)	14(4.1)	15(4.4)		
Moderate-NSD (11º -50 º)	34(10.0)	25(7.4)	24(7.1)	12(3.5)		

Severe-NSD (Above 15º)	10(2.9)	4(1.2)	6(1.8)	7(2.1)		

Table 1 shows the outcome on incidence of gender variation in nasal septal deviation (NSD).

Normal and mild NSD to the left were seen to be similar in both male and female subjects. The male subjects had more moderate and severe NSDs to the left when compared to those of their female counterparts. The result on NSD to the right indicated similar incidences for normal, mild and severe deviations in both male and female subjects; but this was different for the moderate deviations, as more of the male subjects presented with I than the females.

The incidence of straight inclination was similar for both male and female subjects.

Table 2: Relationship of Nasal Septal Deviation (NSD) between Male and Female Subjects

Spearman's rho	Correlation Coefficient	Level of Significance (2-sided)
Left Nasal Septal Deviation (NSD)	0.958**	0.000
Right Nasal Septal Deviation (NSD)	0.896**	0.000

The data on Table 2 indicate the outcome of the Spearman's rank order correlation analyses of nasal septal deviation (NSD) between male and female subjects.

The incidence of NSD to the left was found to be significant ($p<0.01$) and strongly correlated (with a correlation coefficient of 0.958) between the male and the female subjects.

Similarly, the incidence of NSD to the right was also seen to be significant ($p<0.01$) and strongly correlated (with a correlation coefficient of 0.896) between the male and the female subjects.

DISCUSSION

In this present study, coronal CT of 339 subjects were used to evaluate the angle of nasal septal deviation amongst Nigerians. Males were observed to have more deviated nasal septum. This was similar to previous study done by Gisma, *et. al*., 2022, Madani *et. al*. 2022. This is in contrast to the results of Smith *et al*, (2010), who revealed that NSD was more prevalent in females. Furthermore, Bora *et al*., (2021), and Shrestha *et al*., (2019) found that there was no statistical difference between frequencies of septal deviation in both genders. Moreso, varying prevalence of NSD have been reported amongst different population, this may be due to dissimilarities in the criteria used to assess nasal septum deviation and also the population of study. It is imperative to note that not all forms of deviated nasal septum always result in the development of chronic rhinosinusitis. Only tremendously severe deviated nasal septum appears to contribute to the etiology of chronic rhinosinusitis (Malpani and Deshmukh, 2022). Deviated nasal septum may result in compromise of the osteomeatal complex, predisposing to obstruction and related complications. Nasal septum deviation is made of any deviation of the septal contour towards one side of the nasal cavity (Koo *et. al*., 2017), and is recognisable in >50% of patients (Beale, *et. al*., 2009). It can be termed as a right-sided, left-sided or S-shaped curvature.

Table 3: Evaluation of deviation of the nasal septum in different countries

Author(s)	Country	Study population	Deviated Nasal septum
Earwaker, (1993)	Australia	88	44
Baradaranfar and Labibi, (2007)	Iran	120	45
Adeel *et al*. (2013)	Pakistan Asia	77	26
Al-Abri *et al*. (2014)	Oman	360	80
Shpilberg *et al*. (2015)	New York	192	98.4
Kaya *et al* (2017)	Turkey	350	89.7
Onwuchekwa *et al*. (2017)	Nigeria	110	20.91
Abhishek *et al*. (2017)	India	77	32
Simoes *et al* (2017)	Brazil	1005	80.7
Alshaikh *et al*. (2018)	Saudi	291	38.8
Yazici (2018)	Turkey	225	55.1
Hadi *et al*. (2018)	Iraq	75	72
Shokri *et al*. (2019)	Iran	250	90.4
Kantun *et al* (2019)	Mexico	110	38.2
Ominde *et. al*. (2023)	Nigeria	336	40.5
Current study	Nigeria	339	63.7

CONCLUSION

Knowledge of the presence of nasal septal deviation is very essential because it will help surgeons especially E.N.T surgeon carry out safe and efficient

surgical procedures with minimal or no complications. Therefore, pre-operative evaluation of the nasal septum is important in surgical planning, reconstruction, and overall cosmetic outcomes in patient.

Recommendation

Further researches should be done using comparing different ethnic and or races.

REFERENCES

1. Beale TJ, Madani G, Morley SJ. (2009). Imaging of the paranasal sinuses and nasal cavity: normal anatomy and clinically relevant anatomical variants. *Semin Ultrasound CT MR*, 30: 2–16.
2. Bora A, Koç M, Durmuş K, Altuntas EE. (2021). Evaluating the frequency of anatomical variations of the sinonasal region in pediatric and adult age groups according to gender: computed tomography findings of 1532 cases. *Egypt J Otolaryngol.* 37:58. doi: 10.1186/s43163-021-00122-9.e317ecc747c84039b8d29a52b8ac9cd3
3. Cellina M, Gibelli D, Cappella A, Martinenghi C, Belloni E, Oliva G., (2020). Nasal cavities and
4. Gisma Ahmed Madani, Wael Amin Nasr El-Din, Asmaa S. Essawy, Khamrunissa Hussain, and Islam Omar Abdel Fattah (2022). Nasal septal anatomical variations among Saudi population and their possible coincidence with sinusitis: a computed tomography scan study. *Anat Cell Biol.* 55(4): 423–432.
5. Gray LP. (1978). Deviated nasal septum. Incidence and etiology. *Ann Otol Rhinol Laryngol Suppl*, 87: 3–20.
6. Haak, D., Page C. E. & Deserno, T. M. (2016). The survey of Dicom Viewer software to integrate clinical research and Medical imaging. *J digital imaging*, 29(2): 206-215. Doi:10.1007/s10278-015-9833-1.
7. Koo SK, Kim JD, Moon JS, (2017). The incidence of concha bullosa, unusual anatomic variation and its relationship to nasal septal deviation: a retrospective radiologic study. *Auris Nasus Larynx*, 44: 561–570.
8. Madani, G. A., Badawi, K. E., Gouse, H. S. M., Gouse, S. M. (2021). Anatomical variations
   a. of the middle Turbinate among adult Sudanese Population -A Computed Tomographic Study. Bangladesh Journal of Medical Science Vol. 20
9. Malpani S N, Deshmukh P (2022). Deviated Nasal Septum a Risk Factor for the Occurrence of Chronic Rhinosinusitis. *Cureus* 14(10): e30261. doi:10.7759/cureus.30261.
   a. the Nasal Turbinates in Adult Nigerians. Eur J Rhinol Allergy 4(2):36-40
10. Periyasamy V, Bhat S, Sree Ram MN. Classification of naso septal deviation angle and its clinical implications: a CT scan imaging study of Palakkad population, India. Indian J Otolar yngol Head Neck Surg 2019;71(Suppl 3):2004-10.
11. Shrestha KK, Acharya K, Joshi R, Maharjan S, Adhikari D. (2019). Anatomical variations of the paranasal sinuses and the nasal cavity. *Nepal Med Coll J*. 21:7–11. doi: 10.3126/nmcj.v21i1.24837.
12. 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.* 2010:404982. doi: 10.1155/2010/404982.