DOI: 10.7860/JCDR/2026/84934.22424

Original Article

Anatomy Section

Determining Stature from Auricular Parameters in Adult Population of Garhwal Region of Uttarakhand, India: A Cross-sectional Study

NIYATI AIRAN[1], ANIL KUMAR DWIVEDI[2], VIYOM AGARWAL[3]

ABSTRACT

Introduction: Estimation of stature from different body parts is an essential component of forensic anthropology for the identification of unknown individuals. This becomes particularly important during mass disasters, when stature assessment becomes challenging due to the non availability of intact body parts. In such instances, the auricle can be used as an alternative for stature estimation, as reported in the literature.

Aim: To explore the relationship between stature and different auricular parameters in the adult population of the Garhwal Himalayas.

Materials and Methods: A cross-sectional study was conducted involving 208 healthy adult subjects aged 18-40 years of both genders from Garhwal, Uttarakhand, India. The study was carried out over a period of one year after obtaining approval from the Institutional Ethics Committee. Stature was measured using a metallic measuring tape, and auricular parameters (auricle, conchal, and lobular length and width) were measured using Vernier callipers. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) 19.0 software. Pearson's correlation coefficient was applied to determine the association between stature and ear parameters. Simple and multiple linear regression models were established to assess the predictive value of auricular dimensions in stature estimation.

Results: Statistical analysis revealed a significant correlation between stature and the length of the auricle (males: r-value =0.204, p-value=0.026; females: r-value=0.328, p-value=0.002) and concha (males: r-value=0.267, p-value=0.003; females: r-value=0.331, p-value=0.002). Gender-specific regression equations were formulated for calculating stature from these parameters, with greater predictive accuracy. The regression equations were: Males: Stature=146.6+0.35×auricle length; Females: Stature=124.9+0.53×auricle length.

Conclusion: This study developed region- and gender-specific regression models that can reliably be used for assessing stature and thus aid in the identification of unknown individuals with mutilated or burnt body parts during mass disasters or medico-legal cases. Therefore, this approach to stature estimation has practical utility and relevance in forensic science and anthropology.

Keywords: Anthropometry, Correlation, Ear, Forensic anthropology, Height, Regression

INTRODUCTION

The Uttarakhand state of India is located in the Himalayan mountain range and is known for its high peaks and fast-flowing rivers [1]. Its rough terrain makes it vulnerable to frequent natural calamities, leading to mass disasters and loss of human life [2]. Often, fragmented, mutilated, or charred body parts are recovered, which poses serious challenges in the identification of victims [3]. In such situations, anthropometry provides a useful tool for individual identification [4-6]. Stature is one of the most important parameters that assists in racial, gender, and personal identification. Traditionally, limb measurements are considered the best predictors of an individual's stature [5]. However, during large-scale devastation, it becomes challenging for forensic experts to accurately measure limb dimensions when only charred or dismembered body parts are available [6,7]. In these circumstances, craniofacial measurements—especially auricular dimensions—become important because they are easily accessible for examination in both living and deceased individuals [4,7-9]. Thus, auricular measurements are valuable for stature estimation and for identification of victims during large-scale disasters [10-13]. The shape and size of the auricle are influenced by genetic, environmental, and developmental factors, and therefore show ethnic and gender variations [11,12,14-16]. Hence, the auricle serves as a viable tool for forensic experts and anthropologists in establishing individual identity during disasters and medico-legal investigations [5,12,14,15].

Several studies have been conducted among different population groups by various authors, which support this view [17-20]. Durgawale JM and Jadhav SS, in their study on a Western Maharashtrian population, found a significant correlation between stature and ear dimensions [17]. Similarly, Srijith et al., reported a significant association between auricular parameters and stature among South Indian males and females [7,18]. Abdeelaleem SA and Fouad Abdelbaky FA, in a study conducted on a cohort from Upper Egypt, emphasised the need for population-specific regression equations for precise estimation of stature [19]. The Garhwal region of Uttarakhand is home to a distinctive population characterised by unique genetic traits, environmental conditions, and cultural practices [21]. These factors contribute to body dimensions that differ from those of other regions of India and the world [6,15]. The mountainous terrain further plays an important role in influencing these physical attributes. A literature search revealed limited anthropometric data on auricular metrics and their correlation with stature in this region [6,21]. Therefore, this study was undertaken in the Garhwal region of the Himalayas, an area prone to natural calamities, to explore the relationship between stature and auricular dimensions, if any, and to formulate predictive models. Using a community-based approach, the author attempted to collect population-, region-, and gender-specific data that will be useful in identifying victims of mass disasters and medico-legal cases, as well as in advancing anthropological research.

MATERIALS AND METHODS

A community-based cross-sectional study was conducted in the Garhwal region of Uttarakhand, India, from July 2024 to June 2025. Ethical clearance was obtained from the Institutional Ethics Committee (vide letter number MC/IEC/2024/38 dated 01 July 2024).

Inclusion criteria: Individuals aged 18-40 years and inhabitants of this region for at least two generations were included in the study.

Exclusion criteria: Participants with a history of trauma or surgery [16], congenital anomalies of the ear [20], or systemic illnesses associated with growth disorders [22] were excluded from the study.

Sample size: A total of 208 healthy volunteers (119 males and 89 females) were selected using a multistage sampling method [23]. Sample size was estimated using the formula:

$n = z^2 \times p\,(1-p)/e^2$ [24],

where 'p' denotes standard deviation (0.84) [4], 'e' is margin of error (0.05) and 'z' is z-score: 1.96 with confidence interval set at 95%.

The Garhwal region of Uttarakhand comprises 15 blocks, and based on the calculated sample size of 206, 14 subjects were selected from each block. These 14 individuals were further distributed into six age groups (each covering a four-year interval), resulting in two to three participants from every age group (1-2 females and 1-2 males). A computer-generated random number table was used to select individuals. Written informed consent was obtained from all study participants prior to data collection.

Study Procedure

Auricular parameters were measured using standard anthropometric instruments as illustrated in [Table/Fig-1]. Auricle length [Table/Fig-1a] was measured as the distance between super-aurale and sub-aurale [15], and auricle width [Table/Fig-1b] as the distance between post-aurale and pre-aurale [15]. Conchal length [Table/Fig-1c] was taken as the distance between concha superior and incisura intertragica inferior [15], and conchal width [Table/Fig-1d] as the distance between anti-helical curvature and incisura anterior auris posterior [15]. Lobular length [Table/Fig-1e] was considered the distance between intertragica inferior and sub-aurale, while lobular width [Table/Fig-1f] was measured between lobule posterior and lobule anterior [12]. These auricular parameters were recorded in millimetres using Vernier callipers [16], with the subject's head positioned in the Frankfurt horizontal plane [22,25,26]. Stature [Table/Fig-1g] was measured in centimetres using a metallic measuring tape [14]. It was recorded as the distance between the vertex and the floor [7], with the individual standing barefoot on level ground in an erect posture, and heels, back, and head touching the wall behind [8].

[Table/Fig-1]: Measurement of study parameters; a) Auricle length; b) Auricle width; c) Conchal length; d) Conchal width; e) Lobular length; f) Lobular width; g) Stature

All measurements were taken three times by the same investigator, and the average of the three readings was recorded to minimise intraobserver bias. Quality control was ensured by validating the measuring instruments using objects of known dimensions.

STATISTICAL ANALYSIS

Data were statistically analysed using SPSS version 19.0. Pearson's correlation coefficient was used to assess the relationship between stature and various auricular parameters. Simple and multiple linear regression equations were formulated separately for males and females using different auricular parameters. A p-value <0.05 was considered statistically significant.

RESULTS

Demographic details of the sample population are illustrated in [Table/Fig-2]. Descriptive data of stature; length and width of the auricle; length and width of the concha; and length and width of the lobule for both genders are described in [Table/Fig-3].

Gender	n (%)	Mean age (years)
Male	119 (57.2)	29.33±6.90
Female	89 (42.8)	29.44±7.25

[Table/Fig-2]: Demographic details of the sample population.

Parameters	Male Mean±SD	Female Mean±SD
Stature (cm)	168.1±6.5	155.5±5.9
Auricle length (mm)	62.1±3.8	58.0±3.7
Auricle width (mm)	33.1±2.8	30.1±2.2
Conchal length (mm)	27.5±1.8	25.2±2.3
Conchal width (mm)	19.3±2.0	17.9±1.9
Lobular length (mm)	17.7±2.4	17.7±2.4
Lobular width (mm)	19.5±2.4	18.5±2.0

[Table/Fig-3]: Descriptive data of measured parameters for both genders.

Correlation coefficients between stature and various auricular dimensions are shown in [Table/Fig-4] and illustrated in [Table/Fig-5]. Stature showed a significant positive correlation with auricle length and conchal length in both males and females (p-value <0.05). No significant correlation was found between stature and other auricular parameters (auricle width, conchal width, lobular length and lobular width).

Gender-specific simple linear regression models were developed to estimate stature from various auricular parameters. These are shown in [Table/Fig-6]. The regression equations were as follows:

- Males: Stature = 146.6 + 0.35×auricle length
- Females: Stature = 124.9 + 0.53×auricle length

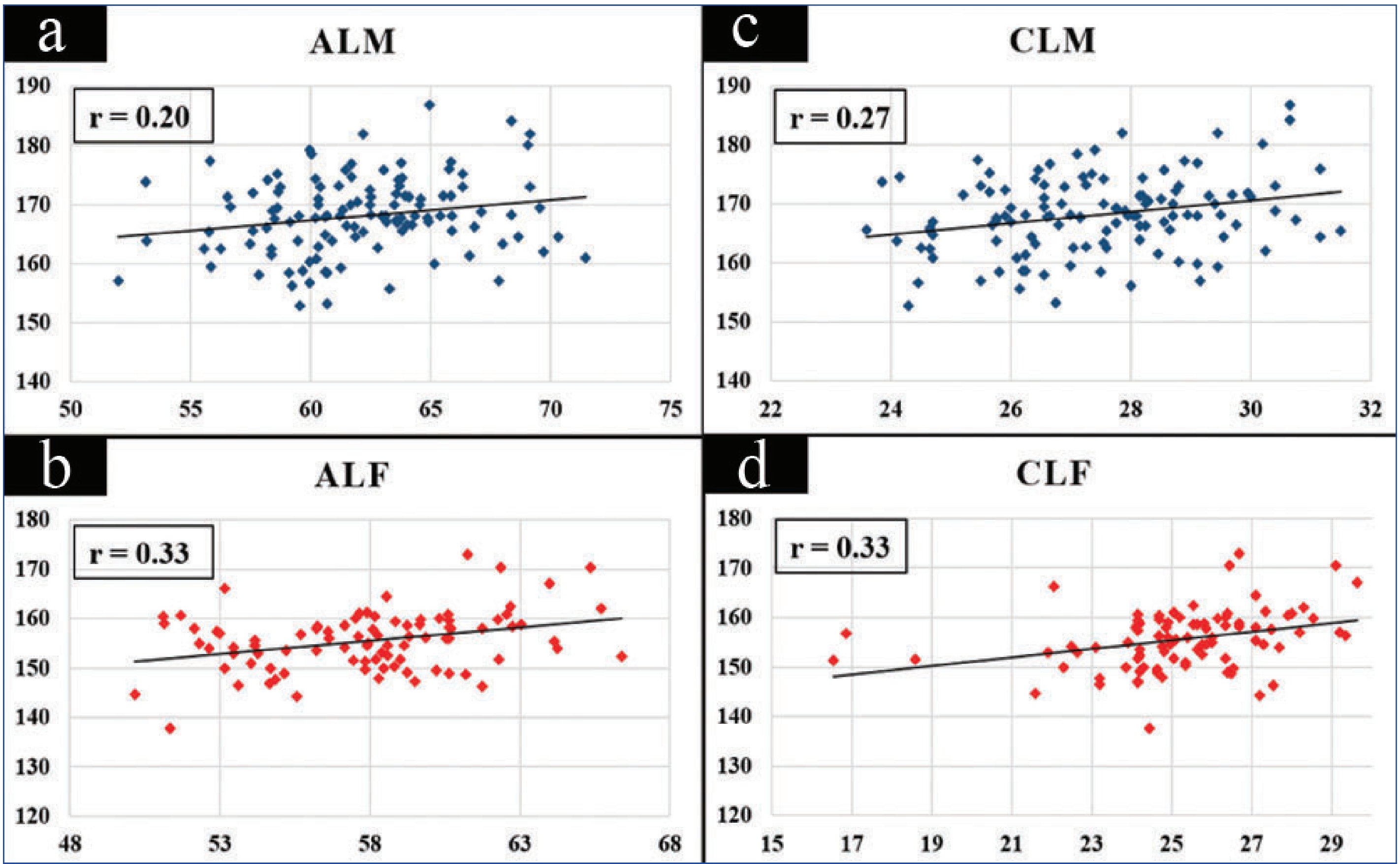
Multiple linear regression models incorporating more than one auricular parameter improved predictive accuracy. These are presented in [Table/Fig-7].

DISCUSSION

The present study revealed that ear parameters (auricle and conchal length) can be used to estimate stature in both genders in the

	Male		Female	
Parameters	r-value	p-value	r-value	p-value
Auricle length	0.204	0.026	0.328	0.002
Auricle width	0.102	0.270	0.201	0.059
Conchal length	0.267	0.003	0.331	0.002
Conchal width	0.038	0.681	0.165	0.121
Lobular length	-0.023	0.801	-0.016	0.882
Lobular width	-0.134	0.146	0.03	0.783

[Table/Fig-4]: Correlation coefficient between stature and various auricular dimensions.
r: Correlation coefficient; p-value <0.05: Significant



[Table/Fig-5]: Correlation between stature and auricular parameters of males and females. a) Correlation between stature and auricle length of male population; b) Correlation between stature and auricle length of female population; c) Correlation between stature and conchal length of male population; d) Correlation between stature and conchal length of female population.
ALM: Auricular length in male; ALF: Auricular length in female; CLM: Conchal length in male; CLF: Conchal length in female; X-axis: Auricular Parameters; Y-axis: Stature

Parameters	Gender	Regression equations	SEE	R^2	p-value
Auricular length	Male	S=146.6+0.35×ALM	6.4	0.034	0.026
	Female	S=124.9+0.53×ALF	5.7	0.097	0.002
Conchal length	Male	S=141.7+0.96×CLM	6.3	0.063	0.003
	Female	S=133.7+0.87×CLF	5.6	0.099	0.002

[Table/Fig-6]: Simple linear regression equations between stature and auricular parameters.
S: Stature; SEE: Standard error of estimate; R^2: Coefficient of determination

Parameters	Regression equations	SEE	R^2	p-value
ALF+CLF	S=118.6+(0.37×ALF)+(0.62×CLF)	9.74	0.134	0.001
ALM+CLM	S=137.3+(0.14×ALM)+(0.8×CLM)	10.41	0.060	0.010

[Table/Fig-7]: Multiple linear regression equations between stature and more than one auricular parameter.
ALM: Auricular length in male; ALF: Auricular length in female;
CLM: Conchal length in male; CLF: Conchal length in female.

study population. Stature estimation is required for establishing individual identity [27], especially during mass disasters when only fragmentary body parts are found [9]. Similar studies conducted by various authors in different regions of the world are summarised in [Table/Fig-8] [7,10,11,14,17-19,24].

A statistically significant positive correlation was found between stature and auricle length in both sexes. These results are in accordance with studies conducted by Anyanwu GE et al., and Taura MG et al., on Nigerian populations [28,29]. Laxman K, Purohit K et al., Durgawale JM and Jadhav SS, and Srijith et al., also demonstrated similar findings in their studies on different ethnic groups [10,11,17,18]. Kumari A et al., found a correlation between stature and auricle length only in females, while Abdelaleem SA and Fouad Abdelbaky FA, reported the same only in males [14,19]. In contrast, Dauda IM et al., and Dixit V et al., in Uttar Pradesh reported a significant correlation of stature with auricle length only on the right side [24,30].

Author/year	Place	Males			Females		
		n	r-value	Regression equation	n	r-value	Regression equation
Dauda IM et al., [24] 2024	Nigeria	198	0.259 (Right) 0.236 (Left)	-	192	0.207 (Right) 0.228 (Left)	-
Purohit K et al., [11] 2024	North India	150	0.81 0.86	77.91+1.36×RAL 71.12+1.61×LAL	150	0.64 0.72	82.47+1.28×RAL 83.79+1.33×LAL
Kumari A et al., [14] 2022	North India	100	-	-	100	0.55 0.51	93.719+1.110×RAL 109.943+0.838×LAL
Srijith and Murugan M [7] 2019	Tamil Nadu	-	-	-	50	0.97 0.98	87.35+1.17×RAL 87.51+1.17×LAL
Laxman K [10] 2019	Hyderabad	180	0.963	-	120	0.898	-
Srijith et al., [18] 2019	South India	50	0.98 0.98	93.93+1.14×RAL 93.90+1.14×LAL	-	-	-
Durgawale JM and Jadhav SS [17] 2018	Western Maharashtra	102	0.949	69.2+17.8×AL	102	0.920	49.11+20.38×AL

Abdelaleem SA and FouadAbdelbaky FA [19] 2016	Egypt	120	0.963	78.21+1.37×RAL	80	0.925 0.878	57.6+(2.96×RAW) 131.94+(1.41×LCW)
Airan N et al., 2026	Garhwal, Uttarakhand	119	0.204	146.6+0.35×AL	89	0.328	124.9+0.53×AL

[Table/Fig-8]: Correlation coefficient and regression equations as found by other authors [7,11,14,17-19,24].
n: Sample size; RAL: Right auricle length; LAL: Left auricle length; RAW: Right auricle width; LCW: Left conchal width

Laxman K, conducted a study on 300 subjects (180 males and 120 females) and found that all ear parameters correlated with stature. Among these, the most reliable parameter was auricle length (R^2=0.728 on the right side and 0.815 on the left), and auricle width (R^2=0.655) only on the right side in males. They also reported a significant correlation between stature and conchal width (R^2=0.791) only on the left side in females [10].

The present study also found a statistically significant correlation between stature and conchal length in both genders. Similar findings were reported by Srijith and Murugan M, who concluded that conchal length is the most reliable parameter [7].

Auricle width, conchal width, lobular length and lobular width did not show any statistically significant relationship with stature in this study. Similar findings were reported by other researchers. Murthy SPKS and Babu YK, in a study on 100 individuals in Chennai (25 males and 75 females), found an R^2 value of zero and were therefore unable to derive linear regression formulae [31]. They concluded that auricular dimensions cannot be reliably used to estimate stature. Anyanwu GE et al., also found no correlation between stature and lobular length [28].

However, contrary findings have been reported by other investigators. Kumari A et al., found a moderate correlation between stature and auricle width and lobular length; Dauda IM et al., found a correlation with auricle width and lobular length in males and right lobular length in females [14,24]. Similarly, Abdelaleem SA and Fouad Abdelbaky FA, reported a correlation with right auricle and left conchal width in females, and Taura MG et al., with auricle width. Dixit V et al., also concluded that stature was significantly correlated with right auricle width, lobular length, and left lobular dimensions [19,29,30]. Srijith and Murugan M, also reported a correlation with auricle width, conchal, lobular, and tragal dimensions [7].

Obaje SG et al., used digital anthropometric methods in their study on 240 South East Nigerian individuals. They observed stronger correlations between stature and ear index (r-value=0.92) and lobular index (r-value=0.90) in males compared to females {ear index (r-value=0.82) and lobular index (r-value=0.86)} [5].

In this study, gender-specific simple linear regression equations were derived using auricular and conchal length separately. Further, predictive accuracy was enhanced, with higher R^2 values, by developing multiple linear regression equations using both parameters simultaneously. Similar findings were also observed by other authors [Table/Fig-8] [7,10,11,14,17-19,24].

Rastogi P et al., conducted a study on 297 individuals (147 males and 150 females) and provided regression equations for stature estimation. In males, the regression equation was: S=68.972+(14.151×Right auricle length)+(2.017×Right auricle width) on right-side and S=69.396+(13.963×Left auricle length)+(2.292×Left auricle width) on left-side in males. In females, the regression equations were: S=111.182+(5.359×Right auricle length)+(5.643×Right auricle width) +(5.792× Right lobular length) +(-6.334×Right lobular width) on right-side and S = 101.41 + (7.227×left auricle length) + (8.032×left auricle width) + (1.063×left lobular length) – (4.983×left lobular width) on the left side [32].

The moderate R^2 values calculated in this study suggest that while ear parameters can consistently be used to assess stature, they can predict stature more accurately when used in combination with other cranial dimensions.

Limitation(s)

While this study demonstrates encouraging results, certain limitations should be mentioned. The study employed only auricular parameters for estimating stature and did not consider other craniofacial dimensions. Moreover, as this was a region-specific study, the results cannot be generalised to wider population groups.

CONCLUSION(S)

The present study has shown that auricle and concha length are reliable tools for estimating stature in both genders of Garhwal, Uttarakhand, India. It has also established region- and gender-specific simple and multiple regression models for assessing stature from various auricular measurements. These research findings provide valuable inputs to the field of forensic anthropology. They will aid in identifying unknown individuals when limb dimensions are difficult to measure. The ease of access to auricle measurements and their non invasive nature make this approach more practical and convenient. Integrating these findings with other craniofacial parameters will certainly enhance accuracy in forensic identification.

Thus, ear parameters such as auricle and conchal length can be confidently used as alternatives to limb measurements for stature estimation in adults of the Garhwal region of Uttarakhand. Although the sample size was adequate for preliminary investigation, future studies involving larger numbers of participants may refine the findings of the present research. Moreover, inclusion of additional craniofacial parameters will increase the reliability of estimation.

Acknowledgement

Authors wish to express their sincere gratitude to all those who supported them throughout the course of this research. Special thanks are extended to the volunteers who participated in this study. Authors also acknowledge the support provided by our institute, which made the implementation of this research possible.

REFERENCES

[1] Kansal ML, Singh S. Flood management Issues in hilly regions of Uttarakhand (India) under changing climatic conditions. Water. 2022:01-24.
[2] Kaira P, Joshi J, Pant N. Disasters and sustainable development: A case study from Kumaun Himalaya. Int J Geogr Geol Environ. 2023;5(1):183-92.
[3] Boer HHd, Roberts J, Delabarde T, Mundorffg AZ, Blau S. Disaster victim identification operations with fragmented, burnt or commingled remains: Experience-based recommendations. Forensic Sci Res. 2020;5(3):191-201.
[4] Nigam R, Kumar PK, Kulshreshtha S. Anthropometric study of external ear in north Indian population. Int J Anat Res. 2019;7(3.2):6800-03.
[5] Obaje SG, Nwankwo SC, Egwu AO. Stature estimation from the right external ear of undergraduate students in south-east Nigeria 1. SEEMEDJ. 2020;4(2):12-19.
[6] Deopa D, Thakkar HK, Prakash C, Niranjan R, Barua MP. Anthropometric measurements of external ear of medical students in Uttarakhand Region. J Anat Soc India. 2013;62:79-83.
[7] Srijith, Murugan M. Estimating stature in females by using the external ear morphometry. Indian J Forensic Community Med. 2019;6(3):182-87.
[8] Rathee M, Kaur J, Rathee SK. Facial anthropometry: A reliable tool for stature estimation in Haryanvi population. Indian J Forensic Med Toxicol. 2021;15(4):1888-92.
[9] Krishan K. Estimation of stature from cephalo-facial anthropometry in North Indian population. Forensic Sci Int. 2008:181(1-3):52.e1-6.
[10] Laxman K. A study of determination of stature in Hyderabad population from external ear morphometry. Medico-legal Update. 2019;19(1):164-68.
[11] Purohit K, Yadav B, Gupta S. A study on utility of ear morphometry for estimation of stature among north Indian population. JCHR. 2024;14(1):2524-30.
[12] Hiware SD, Alfaqeeh KA, Alattallah SS, Faisal AY, Alessa AM, Amalraj VC, et al. Morphometric parameters of the ear and their sexual dimorphism in the eastern province of Saudi Arabia. Cureus. 2024;16(1):01-12.
[13] Maitreyee M. A study of sexual dimorphism of human auricle by morphometry and topographical location. Natl J Clin Anat. 2018;7(2):85-90.

[14] Kumari A, Devadas D, Patel JK, More RS, Dubey P, Kumari K. Morphometric analysis of external ear to estimate the stature and sexual dimorphism in North Indians: A cross-sectional study. J Clin Diagn Res. 2022;16(5):10-14.
[15] Purkait R, Singh P. Anthropometry of the normal human auricle: A study of adult Indian men. Aesthetic Plast Surg. 2007;31:372-79.
[16] Singh AB, Gupta P, Singh P. Anthropometric assessment of human auricle in north Indian population. Natl J Maxillofac Surg. 2022;13(2):234-37.
[17] Durgawale JM, Jadhav SS. Length of external ear: A tool for prediction of height- study in western Maharashtra population. J Evid Based Med Healthc. 2018;5(16):1381-84.
[18] Srijith, Murugan M, Santhosh CS. Morphometric study of the external ear to estimate stature among male medical interns in Coimbatore region, South India. JKAMLS. 2019;28(2):04-10.
[19] Abdelaleem SA, FouadAbdelbaky FA. Estimation of stature in upper Egypt population from external ear morphometry. Int J Forensic Sci Pathol. 2016;4(10):276-84.
[20] Singhal J, Sharma N, Jain SK, Budhiraja V, Rastogi R, Garg R, et al. A study of auricle morphology for identification in Indians. Ann Int Med Den Res. 2016;2(4):217-24.
[21] Agarwal S, Malasi A. Anthropometric measurements of external ear parameters and its analysis with sexual dimorphism in medical students of Dehradun. Int J Life Sci Biotechnol Pharma Res. 2025;14(1):357-64.
[22] Rani D, Krishan K, Sahani R, Baryah N, Kanchan T. Variability in human external ear anthropometry-anthropological and forensic applications. Clin Ter. 2021;172(6):531-41.
[23] Laake P, Benestad HB, Olsen BR, editors. Research Methodology in the Medical and Biological Sciences. London: Elsevier; 2007.
[24] Dauda IM, Mohammad IA, Husein HI, Kumurya HS, Sharif MI, Ibrahim I, et al. Relationship between external ear morphometry and stature among hausa population from selected tertiary institutions in Kano metropolis, Nigeria. J Exp Clin Anat. 2024;21(1):101-09.
[25] Standring S, editor. Gray's anatomy the anatomical basis of clinical practice. 42 ed. Amsterdam: Elsevier; 2020.
[26] Jaiswal P, Sharma A, Jain A. Aural and nasal anthropometry: An observational study. Natl J Clin Anat. 2022;11(3):164-68.
[27] Wankhede KP, Kamdi NY, Parchand MP, Anjankar VP, Bardale RV. Estimation of stature from maxillofacial anthropometry in a central Indian population. J Forensic Dent Sci. 2012;4(1):34-37.
[28] Anyanwu GE, Didigu R, Chia T, Obasi KK, Kiekwe V. Auricular parameters: A tool for stature, gender and ethno-facial determination in a Nigerian population. Ulutas Med J. 2023;9(4):227-32.
[29] Taura MG, Adamu LH, Gudaji A, Modibbo MH. Height prediction from external ear morphometry; A pilot study. Int J Res Health Sci. 2016;4(1):15-19.
[30] Dixit V, Potdar P, Dhakar JS. Correlation between size of pinna & height of individual in Uttar Pradesh population. Acad Anat Int. 2019;5(2):29-33.
[31] Murthy SPKS, Babu YK. Estimation of stature of physiognomic ear length and breadth. Int J Sci Develop Res. 2021;6(4):511-15.
[32] Rastogi P, Singh D, Mishra A, Gupta S. Stature estimation and sex determination using anthropometric measurements of normal human ear auricle. J Indian Acad Forensic Med. 2020;42(3):189-92.

PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Anatomy, Veer Chandra Singh Garhwali Government Institute of Medical Science and Research, Srinagar Garhwal, Uttarakhand, India.
2. Professor, Department of Anatomy, Veer Chandra Singh Garhwali Government Institute of Medical Science and Research, Srinagar Garhwal, Uttarakhand, India.
3. Undergraduate Student, Department of Anatomy, Veer Chandra Singh Garhwali Government Institute of Medical Science and Research, Srinagar Garhwal, Uttarakhand, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Niyati Airan,
Associate Professor, Department of Anatomy, Veer Chandra Singh Garhwali Government Institute of Medical Science and Research, Srinagar Garhwal, Uttarakhand, India.
E-mail: niyatiairan@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Oct 17, 2025
- Manual Googling: Nov 13, 2025
- iThenticate Software: Nov 15, 2025 (9%)

ETYMOLOGY: Author Origin

EMENDATIONS: 6

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. No

Date of Submission: **Oct 15, 2025**
Date of Peer Review: **Nov 05, 2025**
Date of Acceptance: **Nov 18, 2025**
Date of Publishing: **Feb 01, 2026**