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THE ROLE OF ANTHROPOMETRIC MEASUREMENTS IN NASAL SURGERY AND RESEARCH IN PAKISTAN

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Abstract:

Introduction: *Anthropometry comes from a Greek word "Anthropos" which means human and "metron" which means measure. According to the WHO, the anthropometry is an inexpensive and noninvasive technique for assessing the size, proportions, and composition of the human body.* ***Objectives:*** *The basic aim of the study is to analyze the role of anthropometric measurements in nasal surgery and research in Pakistan.* ***Material and methods:*** *This analytical study was conducted in Jinnah Hospital, Lahore during January 2019 to October 2019 with the permission of ethical committee of hospital. Our research is specific in the measurement of facial width, facial length, nasal width, and nasal length in Pakistani environment. The data was collected from 50 patients of both genders. The age group is 18 to 21. Convenient sampling method was used in determining the sample size. The anthropometric data was collected by measuring the distance between facial and nasal landmarks as provided by Farkas et al.* ***Results:*** *The results of the anthropometric analysis obtained from selected participants. The mean values obtained were: nasolabial angle of 105.41°; nasofrontal angle of 137.13; Goode's ratio of 0.63; alar width/length ratio of 0.85; alar/intercanthal distance ratio of 1.15. Only 6% of the population sample had an intercanthal distance equal to the alar distance, other 6% showed a greater intercanthal distance compared to the alar, while the great majority (88%) had a greater alar distance compared to the intercanthal. The alar distance was significantly greater than the intercanthal distance (p < 0.001).* ***Conclusion:*** *It is concluded that anthropometric measurements of the nose may help to answer important clinical questions in research on the effects of surgery on nasal and facial development.*

Key words: *Nasal, Facial, Anthropometry, Humans*

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INTRODUCTION:

Anthropometry comes from a Greek word "Anthropos" which means human and "metron" which means measure. According to the WHO, the anthropometry is an inexpensive and noninvasive technique for assessing the size, proportions, and composition of the human body. Naso-facial anthropometry is a specific component of the anthropometric field that focuses on the facial and nasal regions which is also vital for sex determination, forensics uses, quantifying naso-facial dysmorphology, facial surgery, and diagnostic comprehension[1]. By using accurate anthropometric measurements in craniofacial region, we can treat and reconstruct congenital or posttraumatic facial disfigurements successfully[2].

Anthropometric measurements of the nose provide objective data about the size and shape of the nose. Data of average nasal anthropometric values for various ethnic groups is promoted to be of great importance in planning aesthetic nasal surgery, but there may be fundamental problems with this approach[3]. Norms and patterns of nasal esthetics are essential for an adequate preoperative evaluation and surgical programming.

The esthetic nasal patterns used are a blend of artistic beauty ideals and tracings in models and celebrities[4]. Because they do not consider population measures, they vary according to the period, and allow a discrepancy between the surgeon's preference and the patient's real desire for rhinoplasty[5]. Not all populations wish to obtain an esthetic result according to these values, but prefer a natural result, that is, one with some of the nasal characteristics of the population to which they belong to[6].

Theoretical background of the study

Anthropometry of any parts of the body varies between individuals and among races. The face and the nose are important physiognomic features in humans. Face and nose are developed from fronto-nasal prominences, nasal prominences, and maxillary and mandibular prominences and final characteristic of the face depends mainly on the changes in the proportion and position of these facial components[7]. Knowledge of the absolute and relative variability in the size and shape of the human body is crucial to study human growth, population variation, and medico-legal identification in forensics as well as in the optimization of instruments such as respirators, gas and dust masks, and military helmets[7].

Aims and objectives

The basic aim of the study is to analyze the role of anthropometric measurements in nasal surgery and research in Pakistan.

MATERIAL AND METHODS:

This analytical study was conducted in Jinnah Hospital, Lahore during January 2019 to October 2019. Our research is specific in the measurement of facial width, facial length, nasal width, and nasal length in Pakistani environment. The data was collected from 50 patients of both genders. The age group is 18 to 21. Convenient sampling method was used in determining the sample size. The anthropometric data was collected by measuring the distance between facial and nasal landmarks as provided by Farkas et al. (2005) in Farkas craniofacial anthropometry system.

Data collection

A 12-inch (0.003 mm) fast display caliper series EC05 was used in data collection. The subjects were asked to sit with their head held out straight in anatomical position. They were explained verbally about the measurement procedures and precautionary steps. Facial height is measured as a straight distance between nasion (n) and gnathion (gn), while facial width is the distance between zygion (zy) and zygion. As for the nasal indices, nasal length is measured as the distance between nasion (n) and subnasale (sn), while nasal width is the interalar distance. All these measurements were in millimetre and were then recorded in tables provided in the questionnaire. The average for all measurements was calculated, as well as the facial index and nasal index.

Exclusion criteria

1. Individuals that have had facial trauma, septoplasty, or septorhinoplasty and craniofacial abnormalities was excluded from this study.

Statistical analysis

The data was further analysed statistically to determine the mean, standard deviation, and significance level. ANOVA test and -test were done for data analysis using SPSS 17.0 software to find the facial and nasal indices, means, and standard deviations for all parameters and the value.

RESULTS:

The results of the anthropometric analysis obtained from selected participants. The mean values obtained were: nasolabial angle of 105.41°; nasofrontal angle of 137.13; Goode's ratio of 0.63; alar width/length ratio of 0.85; alar/intercanthal distance ratio of 1.15. Only 6% of the population sample had an intercanthal distance equal to the alar distance, other 6% showed a greater intercanthal distance compared to the alar, while the great majority (88%) had a greater alar distance compared to the intercanthal. The alar distance was significantly greater than the intercanthal distance ($p < 0.001$). Comparing the results obtained in the

population studied and those presented in the literature, except for the nasolabial angle, the population anthropometric measurements were statistically different and larger than the esthetic ideal.

Table 01: Statistical analysis of nasal proportions

Variable	Ideal value	Caucasians from Curitiba			*p*-Value
		Mean	SD	95% Confidence Interval	
Nasolabial angle,°	*105.0*	105.41	10.66	103.34–107.52	0.70
Nasofrontal angle,°	125.0	137.13	7.98	135.57–138.69	<0.001
Goode's ratio	0.58	0.63	0.05	0.62–0.64	<0.001
Alar width/length ratio	0.7	0.85	0.18	0.81–0.88	<0.001
alar/intercanthal distance ratio	1.0	1.15	0.1	1.13–1.17	<0.001

Note: Difference between means (normal distribution); level of significance <0.05.
P < 0.05.

Gender difference was statistically significant for all facial and nasal parameters for selected participants. Males had higher mean value than the females.

Table 02: Mean (±SD) of the facial length (FL), facial width (FW), nasal length (NL), and nasal width (NW) of male and female in two age groups

Anthropometric variables	Age group 18-19			Age group 20-21			value
	Male Mean (±SD)	Female Mean (±SD)	value	Male Mean (±SD)	Female Mean (±SD)	value	
FL	115.24 (±5.87)	106.63 (±3.96)	0.000	118.13 (±6.52)	107.39 (±4.38)	0.000	0.166
FW	131.73 (±9.74)	115.06 (±4.70)	0.000	137.33 (±7.11)	121.94 (±7.06)	0.000	0.002
NL	51.79 (±3.42)	45.79 (±2.75)	0.000	50.15 (±4.34)	45.61 (±3.28)	0.000	0.260
NW	40.50 (±2.39)	36.36 (±1.96)	0.000	40.91 (±2.78)	38.09 (±3.20)	0.000	0.067

DISCUSSION:

In a study of rhinoplasty candidates and volunteers, although more than 89% of participants objectively had some asymmetric facial measure, medical evaluators visually detected asymmetries in only 54% of volunteers and in 59% of rhinoplasty candidates, demonstrating the superiority of anthropometric measurements compared to the visual assessment[4]. There are different methods of objective evaluation of nasal and facial measures, and they can be divided into anthropometric analysis and cephalometric evaluation[10]. The anthropometric evaluation considers the points in the soft tissues, and can be divided into direct, when done directly in the patient, or indirect, through photographs, also called photogrammetry[11]. The cephalometric study considers bone and soft tissue points through the use of standardized radiographs and photographs.

Kaushal et al. stated that nasal index of a race appears to be markedly related to climate; the narrow and long noses favored cold and dry climate, as there was more surface area for warming the air, whereas flat and broad nose types were seen in warm and moist climate, as a consequence of natural selection in human evolution[12].

CONCLUSION:

It is concluded that anthropometric measurements of the nose may help to answer important clinical questions in research on the effects of surgery on nasal and facial development.

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