Research Report

Anthropometric study of nasal index of the Bali Aga population

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ABSTRACT

Background: Anthropometry is the measurement of human and more inclined to focus on the dimensions of the human body. Nasal indexes can be used to help determine personal identity, especially race, ethnic and gender differences. **Purpose:** The general objective of this study was to find out the results of nasal index anthropometric studies on Bali Aga populations in Tenganan. **Methods:** In this study, 20 samples (4 male and 16 female) within age group of 17-30 years old of Bali Aga population in Tenganan Village were measured strictly on Frankfort's plane with the help of a sliding caliper. **Results:** The results of nasal anthropometry measurements obtained an average width of the nose of 38.790 mm, the average nose length of 45.490 mm and nasal index measurements obtained an average of 85.6416. **Conclusion:** Nasal index can be used to help determine personal identity, especially race, ethnic and gender differences. The result of nasal index in Bali Aga population in Tenganan Village is the Platyrrhine nose (wide nose).

Keywords: anthropometry, nasal index, Bali Aga

ABSTRAK

Latar belakang: *Antropometri adalah pengukuran manusia dan lebih cenderung terfokus pada dimensi tubuh manusia. Nasal indeks dapat digunakan untuk membantu menentukan identitas personal, terutama perbedaan ras, etnis, dan jenis kelamin.* ***Tujuan:*** *Tujuan umum penelitian ini adalah untuk mengetahui hasil studi antropometri nasal index pada populasi Bali Aga di Tenganan.* ***Metode:*** *Studi ini melibatkan, 20 sampel (4 laki-laki dan 16 perempuan) dari penduduk Bali Aga Desa Tenganan yang diukur pada Frankfort's plane dengan bantuan jangka sorong.* ***Hasil:*** *Pada hasil pengukuran antropometri hidung didapatkan rata-rata lebar hidung sebesar 38.790, rata-rata panjang hidung sebesar 45.490 serta pengukuran nasal index didapatkan rata-rata 85.6416.* ***Kesimpulan:*** *Nasal indeks dapat digunakan untuk membantu menentukan identitas personal, terutama perbedaan ras, etnis, dan jenis kelamin. Hasil nasal index pada populasi bali aga di Desa Tenganan adalah jenis hidung Platyrrhine (hidung lebar).*

Kata kunci: *antropometri, nasal index, Bali Aga*

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INTRODUCTION

The science of anthropometry develops mainly in the context of anthropology. Anthropometry includes careful and meticulous use of the point on the body for measurement, the specific position of the subject to be measured and the correct use of the device. Measurements that can be performed on humans generally include measurement of mass, length, height, width, depth, circumference (rotation), curvature (arc), soft tissue measurements (skin folds).[1]

The nose is the most prominent part of the face and is one of the body's protective organs against the unfavorable environment. Anatomically, it is divided into the outer nasal or nasal pyramid and the nasal cavity or cavum nasi. The outer nose structure from top to bottom consists of the nose bridge, the nasal root (*dorsum nasi*), the tip of the nose (*tip*), ala nasi, the columella and the nostrils (*anterior nares*). The outer nose is covered by bones and cartilages that coated by the skin, connective tissue and some small muscles to dilate or narrow the nostrils. Nasal index is the ratio between the width of the nose and the nose length multiplied by 100. This index describes the shape of the nose.[2]

Nasal indexes can be used to help determine personal identity, especially race, ethnic and gender differences. Some study outside Indonesia show nasal index can be used to help determine some race or ethnic. The study to determine the average values of facial anthropometric norms according to sex and to establish nasal index of Turkish adults found the nasal index obtained in this study is 64.17 mm in female, 66.12 mm in male.[3] Based on the mean nasal index of Gwalior region, the predominant nose type is Mesorrhine in 63.73% of male and female.[4] The results of nasal index study of the Isokos in Nigeria, falls within the platyrrhine (broad nose) type.[5]

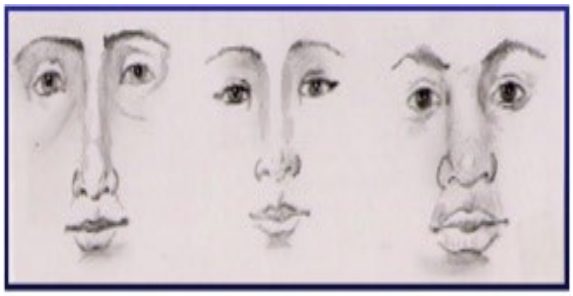

Figure 1. Nasal index: 1. Leptorrhine; 2. Mesorrhine; 3. Platyrrhine.[6]

The Balinese people are an Austronesian ethnic group native to the Indonesian island of Bali. The Balinese populations of 4.2 million (1.7% of Indonesia's population) live mostly on the island of Bali, making up 89% of the island's population. The Balinese originated from three periods of migration. The first waves of immigrants came from Java and Kalimantan in prehistoric times and were of proto-Malay stock. The second wave of Balinese came slowly over the years from Java during the Hindu period. The third and final wave came from Java, between the 15th and 16th centuries, about the same time as the conversion to Islam in Java, causing aristocrats and peasants to flee to Bali after the collapse of the Javanese Hindu Majapahit Empire in order to escape Mataram's Islamic conversion. This in turn reshaped the Balinese culture into a syncretic form of classical Javanese culture mixed with many Balinese elements.[7]

The Bali Aga tribe is one of the sub-groups of the Balinese who were considered as the native Balinese. Bali Aga is called as Bali Mountains because they are live in mountainous areas that are still rural areas and have not been touched by technology. The Bali Aga tribe has been living in Bali for a long time before migration from Majapahit, Java came.

The Tenganan traditional village community is one of the indigenous people of Bali or referred to as the "Bali Aga"

community, which lives in Bali on the mountain area. Tenganan Village is located in Manggis District, Karangasem Regency, Bali Province with an area of 917,218 ha. Tenganan Village, also known as Tenganan Pegringsingan, is one of a number of traditional villages in the Bali Aga community on the island of Bali. The climate in Tenganan Village is tropical, with an average rainfall of 1,500-2000mm/ year and temperatures ranging from 28-30^{o} C.[8]

Studies on the nasal index in the population in Bali are still lacking. Therefore, it is necessary to conduct a research on nasal index in Tenganan village as one of the Bali Aga villages.

METHODS

This research was a descriptive research. This study aims to provide an overview of the nasal index of the Bali Aga population in Tenganan Village. The study was conducted in Tenganan Village, Manggis Sub-district, Karangasem District in January-February 2018. The inclusion criteria for this study were all Tenganan villagers aged 17-30 years old. The exclusion criteria for removing the subject from the study were any injuries of the face skeleton (including the nose); had undergone surgery on the bones of the face skeleton (including the nose); had experienced diseases that caused disturbance to the growth of facial bones, such as Down syndrome, cleft lip, cleft palate, cleft lip and palate, microcephaly and macrocephaly.

Measurements were taken in Frankfort's plane with subjects in a comfortable sitting position. Based on nasal index, types of nose were classified into three types, i.e., leptorrhine - <70; mesorrhine - 70-84.9 and platyrrhine ->85.[2,9]

Measurements to be taken: 1.Nose height, i.e. distance between nasion (n) and subnasal (sn); 2. Nose width, i.e. the distance between right and left alae, measured in milimeters (mm) with the help of a sliding caliper.

The measurements above were used to calculate Nasal index based on the following formula: Nasal index = (Nose width (mm)/ Nose length (mm)) x 100.

The data were put on Microsoft Excel and summarized statistically by mean and standard deviation.

RESULTS

The subjects were all Tenganan villagers aged 17-30 years old.

Table 1. Sample characteristics (n=20)

Variable	Frequency	Percentage (%)
Age gap		
17-21	10	50
22-26	9	45
27-30	1	5
Gender		
Male	4	20
Female	16	80
Nasal index		
Leptorrhine (narrow nose)	0	0
Mesorrhine (medium nose)	10	50
Platyrrhine (broad nose)	10	50

Table 2. Mean of nasal index measurements

	N	Minimum	Maximum	Mean	Std. Deviation
Nose width	20	32.70	46.60	38.7900	3.42143
Nose length	20	40.00	53.60	45.4900	3.94233
Nasal Index	20	72.46	98.31	85.6416	8.29618

Based on the results of descriptive statistics on the research data, the samples include 4 males (20%) and 16 females (80%), the age majority of patients is 17-21 years (50%), while the lowest is 27- 30 years (5%). The result of nasal index measurement was none of the leptorrhine nose, while the mesorrhine and the platyrrhine nose respectively as many as 10 people (50%).

The results of nose anthropometry measurements obtained an average nose width of 38.790, the average nose length of 45.490 and nasal index measurements obtained an average of 85.6416, namely the type of platyrrhine nose (broad nose).

DISCUSSION

Nasal index is the ratio of nose width to nose length multiplied by 100. Nasal index can be used to help determine personal identity, especially race, ethnic and gender differences. Based on the results of descriptive statistics on this research, there were 4 males (20%) and 16 females (80%), the age majority of patients is 17-21 years old (50%), while the lowest is 27- 30 years old (5%). The nasal index measurement result was none of theleptorrhine nose, while mesorrhine and platyrrhine nose respectively as many as 10 people (50%).

The results of nose anthropometry measurements obtained an average nose width of 38.790 mm, the average nose length of 45.490 mm and nasal index measurements obtained an average of 85.6416, namely the type of platyrrhine nose (broad nose). Many researches had been conducted around the world regarding nasal index. Some comparative studies on nasal index, especially in Indonesia, among others, was the research of Intan Pratiwi et al.[10] about The Nose Profile of Indonesian Young Female Between The Age of 19-21 Years Old that Meets Criteria of Attractive According to Students Semester 5 of Medical Doctor Program FKUA 2010 obtained the results of the average nasal index of 73.23 (Mesorrhine type). Sample research is mostly Javanese (76%). The Batak tribal nasal index based on Mulyana's research is 0.92.[9] According to the Mirta,[11] study the nasal index in Javanese women is 1. Another result was obtained by Mirta where 90% of Javanese women had a nose width greater than the intercantal distance.

The study conducted by Tri Martani,[12] who examined the differences in the mean of facial anthropometric parameters of Javanese, Minang and Batak obtained that the shape of the nose, 387 (97.2%) people had symmetrical noses. Based on the form of dorsum, 300 (75.4%) people had flat dorsum, 58 saddle noses (14.6%) people, and 40 (10.1%) people had a hump nose.

Some studies outside Indonesia include Paul Oluwayinka, et al.[13] research on An Anthropometric Study of some Basic Nasal Parameters of Three Major Ethnic Groups in Kogi State, Nigeria, acquired the three tribes in Kogi State, Nigeria have a Platyrrhine nose type. A research in India by Sudhakar Kumar Ray,[14] on Anthropometric Study of Nasal Index among the Population of Western Uttar Pradesh Region obtained an average nasal index of 73.98 (Mesorrhine type).

Nasal index can be used to help determine personal identity, especially race, ethnic and gender differences. The result of nose anthropometry measurements in Bali Aga population in Tenganan Village is the platyrrhine nose (wide nose).

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