

Research

Clinical analysis of the nose on Down syndrome patients in the Minangkabau tribe

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ABSTRACT

Background: Down syndrome (DS) is a congenital disorder due to prenatal trisomy 21 which causes malformations of organs and body shape, including the nose. The variables measured are the points that determine the aesthetics of the nose. **Purpose:** To describe primary data obtained from nose anthropometry of DS in the Minangkabau tribe that can be used as a reference in nose reconstruction in patients with DS to restore physiological function and add aesthetic value. **Method:** A descriptive study with a cross-sectional method using primary data as subjects. The sample of this study were persons with DS who had Minangkabau ethnicity, totaling 22 samples with an age range of 13-25 years, from special schools in Padang city. The study was conducted by observation and anthropometry of the nose using graphical images computerized by software called rhinobase software. **Result:** Showed that the nose width was 15.25 ± 2.07 mm, the ala nasi width was 41.41 ± 3.47 mm, the nasofrontal angle was $133.59^\circ \pm 5.89^\circ$, the nasolabial angle was $109.24^\circ \pm 13.60^\circ$, and the nose length was 32.16 ± 3.24 mm. **Conclusion:** Various results were found on the size of the aesthetic points of the nose of DS patients in the Minangkabau ethnic group when compared to DS patients in different race, ethnic, or non-DS patients.

Keywords: clinical of the nose, Down syndrome, Minangkabau tribe.

ABSTRAK

Latar belakang: Sindrom Down (SD) merupakan kelainan bawaan akibat trisomi 21 prenatal yang menyebabkan malformasi organ dan bentuk tubuh, termasuk hidung. Variabel yang diukur adalah titik-titik yang menentukan estetika hidung. **Tujuan:** Untuk mendeskripsikan data primer yang diperoleh dari antropometri hidung SD pada suku Minangkabau agar dapat digunakan sebagai acuan dalam rekonstruksi hidung pada pasien SD untuk mengembalikan fungsi fisiologis dan menambah nilai estetika. **Metode:** Penelitian deskriptif dengan metode potong lintang dengan menggunakan data primer sebagai subjek. Sampel penelitian ini adalah penyandang SD yang beretnis Minangkabau, berjumlah 22 sampel dengan rentang usia 13-25 tahun dari Sekolah Luar Biasa (SLB) di kota Padang. Penelitian dilakukan dengan cara observasi dan antropometri hidung menggunakan gambar grafis yang dikomputerisasi dengan perangkat lunak bernama software rhinobase. **Hasil:** Menunjukkan lebar pangkal hidung $15,25 \pm 2,07$ mm, lebar ala nasi $41,41 \pm 3,47$ mm, sudut nasofrontal $133,59^\circ \pm 5,89^\circ$, sudut nasolabial $109,24^\circ \pm 13,60^\circ$, panjang hidung $32,16 \pm 3,24$ mm. **Kesimpulan:** Dari penelitian ini ditemukan berbagai hasil mengenai ukuran standar estetika hidung pasien SD suku Minangkabau jika dibandingkan dengan pasien SD pada ras, etnis, atau pasien bukan DS.

Kata kunci: klinis hidung, sindrom Down, suku Minangkabau

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INTRODUCTION

Down syndrome (DS) is a congenital disease caused by all or part of trisomy of chromosome 21. This disease was first described by a British doctor named John Langdon Down in 1866. This disease is worldwide in distribution and has an impact on physical characteristics, cognitive development, and health. In 2011, the estimated prevalence of DS in the world was between 1 in 1000 births, with around 3,000-5,000 babies born with chromosomal abnormalities per year.¹ Down syndrome is divided into three types, namely trisomy 21, translocation Down syndrome, and Down mosaic.²

The cause of DS is idiopathic. Most of the DS sufferers have an extra causal chromosome 21 (HSA21).³ Births to DS sufferers can occur due to several risk factors such as in mothers with gestations at the age of 35 years or more, suffering from or being carriers of a DS genetic translocation, and having gave birth to a child with DS. This syndrome occurs due to disturbed development during the embryological process of the fetus, which has an impact on the morphology or physiology of the body that is different at birth compared to normal children, i.e. a shortened neck, small hands and feet, small ears, flat nose, flat face, and other abnormalities.

To diagnose DS during pregnancy can be done by two methods, namely using a screening test and a diagnostic test.⁴ In the treatment, it should be underlined that DS is a condition that lasts from the time the patient is still in the womb until death. There are many complications that may occur in people with DS which can occur acutely or chronically such as hearing loss, ear infections, eye disease, and heart defects.⁵

Therefore, comprehensive management is needed to improve cognitive and physical abilities that are hampered.

Each of the tribes from all populations in the world has prominent morphological characteristics, especially on the face. For example, tribes in Europe, Africa, Southeast Asia, East Asia, the Middle East, and India have varied characteristics in terms of physical and facial characteristics.⁶ Various studies have been conducted on facial characteristics, especially noses, in tribes in various world regions such as in Turkey⁷, Korea⁸, Taiwan⁹, and Indonesia, namely in Jakarta for the Javanese¹⁰ tribe and in North Sumatra for the ethnic group.¹¹ The research data was obtained to serve as the basis for standard rhinoplasty operations which are still based on the Caucasian ethnicity and do not yet fully cover Indonesians.¹²

The results of this study will be a reference in various scientific fields related to clinical matters on the nose, such as referrals for rhinoplasty, especially in patients with DS with one of its characteristics, namely deficiency or even absence of the nasal bones and characteristics of the Asian nose in the Minangkabau tribe. Not only cosmetic, rhinoplasty is also a treatment for patients with breathing problems in the inner nose, septal deviation, and airway obstruction.

Rhinoplasty itself is a surgical procedure performed to reconstruct the nose to change or restore function and aesthetics. Before and after this procedure, it is necessary to perform anthropometry on the patient's nose to find out whether the purpose of this action has been achieved in accordance with the action plan.¹³ Thus knowledge of anthropometry is needed in patients, both based on ethnicity and other factors so that it can produce the desired end result. This action is assisted by Rhinobase

Software which is a software used to analyze faces that contain patient databases.¹⁴ Some of the anthropometric points used are the nose width (Mf-Mf), the ala nasi width (Al-Al), the nasofrontal angle (NFA), nasolabial angle (NLA), and nose length (NT).

The researchers wanted to conduct a study to find out the clinical picture of the nose of people with DS in the Minangkabau tribe so that the collected data could be used as a reference for rhinoplasty in patients with DS in the Minangkabau tribe. Therefore, a clinical analysis research was carried out on the nose of persons with DS who were of the Minangkabau ethnicity.

METHOD

This research was a descriptive study with a cross-sectional method where the results of this study were to describe the clinical picture of the nose of DS sufferers in the Minangkabau tribe. This research was conducted in the period from January to December 2022. The population for this study was taken from students with DS in the Minangkabau tribe at special schools in Padang city. The sample for this study was taken from a population that met the inclusion and exclusion criteria for both variables, namely persons with DS in the Minangkabau ethnic group which was taken using consecutive sampling technique. The population subjects who met all inclusion and exclusion criteria were used as sample amounting to 22 subjects with DS in the

Minangkabau tribe. The inclusion criteria in the sample were pure Minangkabau ethnic males or females from three generations, and the exclusion criteria were subjects who had undergone nose reconstruction. Researchers collected data on DS sufferers in the Minangkabau tribe who met the inclusion criteria.

The subject sat in a place that had been prepared and then documented using a smartphone camera at a distance of 1 meter from the examiner. Variable measurements were taken on the nose using a ruler and then input into Rhinobase Software so that the data was immediately processed. The results of the data input into Rhinobase Software will show other comprehensive anthropometric data according to the researcher's variables

This research obtained a research permit from the Faculty of Medicine, Andalas University with a research permit number: B-5941/UN16.02.WD1/PP/2022. This research also obtained ethical approval from the Faculty of Medicine, Andalas University with the certificate number for passing ethical review: 993/UN.16.2/KEP-FK/2022.

RESULT

Based on the primary data that had been obtained from 22 samples that suited the inclusion criteria for the research sample, the following was a descriptive result of the characteristics of DS sufferers in the Minangkabau tribe.

Table 1. Characteristics of subjects

Characteristics	N	%
Gender		
Male	15	68.18%
Female	7	31.81%

Age		
13	1	4.54%
14	2	9.09%
15	2	9.09%
16	1	4.54%
17	3	13.63%
18	1	4.54%
19	1	4.54%
20	2	9.09%
21	4	18.18%
22	2	9.09%
23	2	9.09%
24	0	0.00%
25	1	4.54%

Table 2. Average anthropometric results of DS sufferers in the Minangkabau tribe

Anthropometric measurements	Mean	SD	Min.	Max.
Nose width	15.25	2.07	10.6	19.4
Ala nasi width	41.41	3.47	34.1	48
Nasofrontal angle	133.59	5.89	119	143
Nasolabial angle	109.24	13.60	86.2	128
Nose length	32.16	3.24	26.6	37.5

DISCUSSION

Based on research on clinical analysis of the nose of DS sufferers in the Minangkabau tribe at the age of 13-25 years, the following conclusions were found: nasal root width 15.25 ± 2.07 mm, nasal width 41.41 ± 3.47 mm, nasofrontal angle $133.59^\circ \pm 5.89^\circ$, nasolabial angle $109.24^\circ \pm 13.60^\circ$, nose length 32.16 ± 3.24 mm. Patients with DS had a narrower nose bridge than normal person due to growth disturbances during the prenatal period. Persons with DS have a wider palate than Caucasians, and not wider than normal persons of African and Asian races. In anthropology, African and Asian races have wings that tend to be wide, and Caucasians have shorter wings.^{14,15} Persons with DS have a shorter nasofrontal angle than Caucasians and Africans. The nasolabial angle in persons with DS in Minangkabau ethnicity was

greater than the nasolabial angle in normal people of Minangkabau ethnicity and African race, because clinically persons with DS have a long and flat philtrum. Patients with DS have a shorter nose length due to clinical aspects that limit growth during the fetus.¹⁶ This was also stated by Wexler et al.¹⁷ that the characteristic appearance of the nose of a patient with DS like a saddle nose, namely the bridge of the nose/nasal bones was flat.

In conclusion, various results were found on the size of the aesthetic points of the nose of DS patients in the Minangkabau ethnic group when compared to DS patients in different race, ethnic, or non-DS patients.

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