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# FOREWORD

Welcome to the 16th Volume of ESTEEM Academic Journal for December 2020 issue: an online peer-referred academic journal by Universiti Teknologi MARA, Cawangan Pulau Pinang, which focusing on innovation in science and technology that covers areas and disciplines of Engineering, Computer and Information Sciences, Health and Medical Sciences, Cognitive and Behavioral Sciences, Applied Sciences and Application in Mathematics and Statistics.

It is a pleasure to announce that ESTEEM Academic Journal has been successfully indexed in Asean Citation Index and MyCite, a significant move, which will increase the chance for this journal to be indexed in SCOPUS. ESTEEM Academic Journal has also been nominated as one of the top 3 of the best science and technology journals in Universiti Teknologi MARA. Starting year of 2021, the publication issue will be moved to March and August for every year.

In this 2020, the world has been impacted on the Covid-19 issue that has changed our daily life to a new normal. Although Covid-19 issue has still affected the world not only on academician and research area, ESTEEM Academic Journal have received tremendous supports and responses from authors internationally and locally from various backgrounds in science and technology areas. Nine articles from the field of innovation in science and technology are successfully published after undergoing screening and reviewing processes that involved international and local reviewers. It is our aim to ensure that all the published articles are of the highest quality.

It is an honour to have a form of partnership and assistance from panel of international advisors and editors for this issue. Thus, I would like to take this opportunity to thank many people who have worked together for the issue to be released. In particular, my greatest thanks are due to our Rector, Professor Ts. Dr Salmiah Kasalong and the Deputy Rector of Research, Industry, Community and Alumni Network, Associate Professor Chem. Dr. Nor Aziyah binti Bakhari for their unfailing support and advice towards the successful publication of this issue. My deepest gratitude also goes to the editorial team of ESTEEM Academic Journal December 2020; Dr Syarifah Adilah, Dr Ainorkhilah, Puan Suzana, Dr Mah Boon Yih, Pn Isma Noornisa, Dr Salina and Dr Vicinisvarri Inderan for their support, commitment and expertise in making this issue published on time.

My greatest appreciation also goes to the panel of reviewers for their persevering and attentive efforts in reviewing the articles voluntarily by giving constructive and invaluable comments to ensure the quality of the articles. Finally, my gratitude goes out to the authors who have submitted articles to ESTEEM Academic Journal, for their trust in us in publishing their research works. Last but not least, as this year is ending, may the New Year bring tremendous joy and success for all of us. Happy New Year 2021! Dr.

**Ir Dr Nor Salwa Damanhuri**
Chief Editor
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# CONTENT OF JOURNAL



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# Anthropometric Characteristics of Malay Nose- A Pilot Study

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**ABSTRACT**

*Anthropometric analysis provides the most reliable comparison of the body forms by using specific landmarks determined in respect of anatomical prominences. The knowledge of unique shape, anatomy and dimensions of the nose is very useful for surgeon undertaking its repair and reconstruction. Prosthetic rehabilitation also requires the ability to imagine the position and dimension of the nose within the facial proximity. Therefore, the access to nasal data for each population are advantageous. The aims were to measure parameters of external nose of a Malay population and to determine the significant difference in nose value parameters between gender and age group. The direct anthropometric measurements were carried out in 86 Malay subjects within the age range of 18 to 55 years old who attended UiTM dental clinic. Nasal landmarks were identified, and the nose parameters were measured using digital calliper. The values were expressed as mean, standard deviation and range. Nasal height, width and length of the nasal bridge were higher in male. The intercanthal width and philtrum length were statistically not significant for both genders. There were significant differences in nasal width, philtrum length, intercanthal width and outer intercommisural mouth width between the three age groups. However, the height of the nose, length of the nasal bridge and nasal index between age group were statistically not significant. The male population and the 41-55 years age group have higher nose value parameters. The most common type of nose was platyrrhine: broad. This study also suggested that Malay population have medium broad nose as the nasal index for both genders was ≤ 84.90.*

**Keywords:** *anthropometry; direct measurement; leptorrhine; mesorrhine; platyrrhine*

## 1. INTRODUCTION

Anthropometric analysis is a method, aiming to achieve the most reliable comparison of the body forms by using specific landmarks determined in respect of anatomical prominences [1]. According to Carvalho (2012), anthropometric facial proportions and symmetry are considered determinants of beauty [2]. When evaluating the face, one of the things that often call for attention is the set of three facial prominences that characterize the profile: the lips, the nose, and the chin [3]. The set of these three features constitutes the aesthetic facial triad [4] and the nose is a person's most determining feature of beauty because it is at the centre of the face [2, 5]. The nose is one of the main components of the facial aesthetics, and the study of its form is of great importance in plastic surgery and forensic facial reconstruction[3, 6]. The shape of the nose is a signature indicating the ethnicity, race, age and sex [7-17]. The human nose can also

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be affected by socioeconomic status, environment and region [16, 17]. As a consequence of natural selection in human evolution, the narrower noses are favoured in cold and dry climates while broader noses in warmer, moister ones [18]. The size, shape, and proportions of the nose provide a visual basis suggesting the character of the person [15, 19].

The facial proportions are essential to facilitate the surgeon who require a facial analysis in the diagnosis and treatment planning [20]. Anthropometric findings, dimensions of the face and skull, allow researchers to use it in diagnosis, classification and treatment of craniofacial disorders through orthographic surgery or facial plastic surgery [1, 21]. In 2014, nearly 16 million cosmetic procedures were performed in the United States alone and nose reshaping (Rhinoplasty) is among the five most popular plastic surgery procedures [20]. In Asia, cosmetic surgery has become more popular, and countries such as China and India have become Asia's biggest cosmetic surgery markets. Thus, the knowledge of the unique shape, anatomy and dimensions of the nose is very useful for surgeons undertaking its repair and reconstruction [14].

Farkas has done the research extensively in many ethnic groups in the field of facial anthropometry [22]. Facial morphometry is well discussed in Caucasians [22] and African Americans [7] but, only a limited number of studies exist for Asian Americans [23]. Moreover, the results of the studies conducted in certain ethnic groups or regions may not be applicable to the populations elsewhere [6]. Therefore there is a need for systematic study for each ethnic groups or region [20]. According to Farkas (2005), the present study, conducted by investigators working separately across the world and with small samples of the population, is clearly preliminary in nature and extent. Yet it may fulfil its mission if medical and anthropological investigators continue the work of establishing normative data of the face. These data are urgently needed by medical professionals but have been lacking up till now [22].

Normative data are indispensable for precise determination of the degree of congenital or post-traumatic facial deviations from the normal [22]. Despite the parameters of nasal index are needed for each ethnic group, there is no available study measuring the nasal index in Malay population. In this study, we want to determine the parameters of external nose in Malay population and if there is significant difference in nose value parameter between gender and age group.

## 2. SUBJECT AND METHODS

### *2.1 Subjects*

This study was a cross-sectional study on 86 (31 men and 55 women) Malay adult individuals, who attended Universiti Teknologi MARA (UiTM) Dental Centre. The group was randomly selected between the age range from 18 to 55 years old. The subjects are Malay with no mixed racial parentage and had no history of developmental and neurological defect of facial region, surgical or non-surgical cosmetic treatment of nose and facial region and craniofacial trauma. Ethic approval was obtained from Institute of Research and Management, Universiti Teknologi MARA (REC/79/17) and written informed consent was attained prior to the study.

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### *2.2 Landmarks*

Anthropometric measurements were made from frontal, lateral and inferior view of the nose (Figure 1, Figure 2 and Figure 3) adapted from of Sadacharan (2016) [20]. The landmarks of the measurement points were as follows:

Nasal width (al-al): From right to left nasal alae.

Height of the nose (n-sn): From the innermost point between forehead and nose to midpoint at the union of the lower border.

Length of the nasal bridge (n-prn): From the innermost point between forehead and nose to most protruding point of the nasal apex.

Philtrum length (sn-ls): From midpoint at the union of the lower border to midpoint of the vermilion line of the upper lip.

Intercanthal width (en-en): From right to left of the internal commissure of the eye fissure. (note to author: the spelling of "commissural" is with a double m and s yea? Please correct them if I am wrong)

Outer intercommissural mouth width (ch-ch): From right to left of the labial commissural.

Nasal Index (NI) was calculated in the whole group based on following definitions:

Ratio of horizontal to horizontal measurements:

Intercanthal-nasal width index (en-en/ al-al)

Nose-mouth width index (al-al/ ch-ch)

Ratio of vertical to horizontal measurement: Nasal index= Nasal ~~breadth~~ width / nasal height x 100

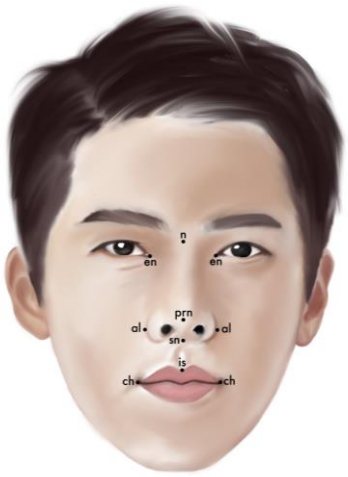


Figure 1: Landmarks of the anthropometric measurement points from frontal view.

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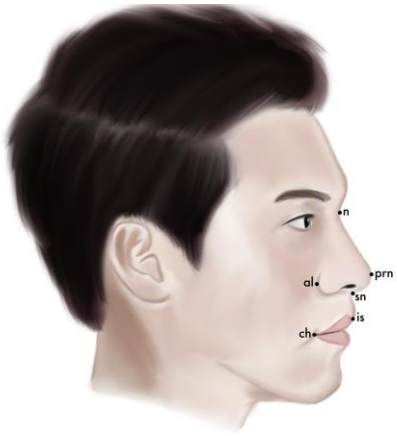


Figure 2: Landmarks of the anthropometric measurement points from a lateral view

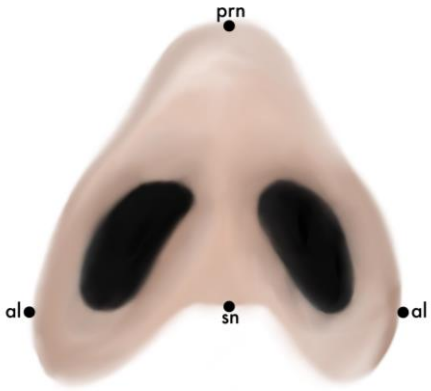


Figure 3: Landmarks of the anthropometric measurement points of nose from an inferior view

### *2.3 Anthropometric technique*

Two examiners performed all the measurements throughout the study. A pilot study consisting of 10 subjects of female and male with equal number was carried out to calibrate both examiners in order to ensure they will produce consistent, accurate and reliable measurements. Reliability test for intra-class reliability test were analysed using intraclass correlation coefficient (ICC). Average measure of ICC was reported as 0.961. Thus, both of the examiners had reached a good agreement while the intra-examiner had reached an excellent agreement.

Subject was sat in an upright position (90 degree) with the face looking straight upfront. The anthropometric landmarks were identified on the subjects with careful inspection and then marked on the face with black liquid eyeliner. Measurements were taken using a digital calliper at a precision level of 0.1 mm with maximum care and comfort on the subjects. Three readings were taken by a single examiner for each measurement.

Data were collected and statistical analysis was done using descriptive statistics and independent sample t-test and ANOVA, using SPSS version 23.0 software. $P \leq 0.05$ was

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considered significant, statistically. Each measurement was taken three times and the calculation with accuracy of 1 mm was considered.

## 3. RESULTS AND STATISTICAL ANALYSES

Mean of nasal index for male population was 82.29±9.78 while for female population was 84.52±9.45. There was no significant difference between both genders.

Table 1: Comparison table of the values obtained from measurements in 6 nasal dimensions between gender.

| Landmark | Gender | N | Mean±SD | Sig. |
|---|---|---|---|---|
| Nasal width (al-al) | male | 31 | 38.51±3.38 | .011 |
| | female | 55 | 36.55±3.29 | |
| Height of the nose (n-sn) | male | 31 | 47.07±3.40 | .000 |
| | female | 55 | 43.47±3.37 | |
| Length of the nasal bridge (n-prn) | male | 31 | 40.44±3.81 | .000 |
| | female | 55 | 36.18±3.47 | |
| Philtrum length (sn-ls) | male | 31 | 13.89±2.51 | .125 |
| | female | 55 | 13.07±2.27 | |
| Outer intercommisural mouth width (ch-ch) | male | 31 | 52.42±4.02 | .057 |
| | female | 55 | 50.63±4.19 | |
| Intercanthal width (en-en) | male | 31 | 30.57±2.46 | .460 |
| | female | 55 | 30.13±2.71 | |
| Intercanthal- nasal width index (en-en/al-al) | male | 31 | .80±.09 | .269 |
| | female | 55 | .83±.09 | |
| Nose-mouth width index. (al-al/ch-ch) | male | 31 | .74±.06 | .432 |
| | female | 55 | .72±.07 | |
| Nasal index= nasal width / nasal height x 100 | male | 31 | 82.29±9.78 | .302 |
| | female | 55 | 84.52±9.45 | |

*. Significant at $p < .05$

The measurements of nasal dimension between age groups are summarized in Table 2. The nasal index corresponds to the basal relationship of the nose between the nasal width and the nasal height. The age group 18-25y had a mean nasal index of 82.42 ± 9.09, whereas 26-40y group had a mean of 85.76 ± 10.01. Age group of 41-55y showed the highest nasal index with a mean of 87.89 ± 10.62. The differences were insignificant for all age groups.

## 4. DISCUSSION

Anthropometric parameters of the nose vary with age, sex, and ethnic background. The racial and ethnic morphometric differences in the nasal complex in the world populations have been the focus of investigations [15].

From the present analysed data, there were significant difference in the mean value of nasal width, height of the nose, length of the nose, and outer intercommissural mouth width across the gender. There was no significant difference in the mean intercanthal width and philtrum length across the gender. The male population showed a higher mean value in the nasal anthropometric of nasal width, height of the nose, length of the nose and the outer intercommissural mouth width.

The results according to gender were compared to the previous studies of North American White and Asian population as tabulated in Table 3 and Table 4 .

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Table 2:The measurement of Nasal dimension between age groups

| Landmark | Age group | Mean ± SD | Sig. |
|---|---|---|---|
| Nasal width (al-al) | 18-25 years old (n=61) | 36.75 ± 3.10[a] | 0.007 |
| | 26-40 years old (n=12) | 36.88 ± 4.47 | |
| | 41-55 years old (n=13) | 39.98 ± 2.78[a] | |
| Height of the nose (n-sn) | 18-25 years old (n=61) | 44.85 ± 3.59 | 0.224 |
| | 26-40 years old (n=12) | 43.23 ± 4.95 | |
| | 41-55 years old (n=13) | 45.81 ± 3.30 | |
| Length of the nasal bridge (n-prn) | 18-25 years old (n=61) | 37.81 ± 4.08 | 0.560 |
| | 26-40 years (n=12) | 36.59± 5.01 | |
| | 41-55 years old (n=13) | 38.30 ± 3.51 | |
| Philtrum length (sn-ls) | 18-25 years old (n=61) | 12.86 ± 2.14[a] | 0.003 |
| | 26-40 years (n=12) | 13.90 ± 2.66 | |
| | 41-55 years old (n=13) | 15.20 ± 2.32[a] | |
| Outer intercommisural mouth width (Ch-ch) | 18-25 years old (n=61) | 50.18 ± 3.73[a] | 0.000 |
| | 26-40 years old (n=12) | 51.87 ± 4.30[b] | |
| | 41-55 years old (n=13) | 55.86 ± 3.05[ab] | |
| Intercanthal width (En-en) | 18-25 years old (n=61) | 30.82 ± 2.44[a] | 0.010 |
| | 26-40 years old (n=12) | 28.75 ± 3.50[a] | |
| | 41-55 years old (n=13) | 29.19 ± 1.55 | |
| Intercanthal-nasal width index (En-en/ al-al) | 18-25 years old (n=61) | 0.84 ± 0.08[a] | 0.000 |
| | 26-40 years old (n=12) | 0.78 ± 0.11 | |
| | 41-55 years old (n=13) | 0.73 ± 0.06[a] | |
| Nose-mouth width index (Al-al/ ch-ch) | 18-25 years old (n=61) | 0.73 ± 0.07 | 0.362 |
| | 26-40 years old (n=12) | 0.71 ± 0.04 | |
| | 41-55 years old (n=13) | 0.72 ± 0.07 | |
| Nasal index = Nasal breadth / nasal height x 100 | 18-25 years old (n=61) | 82.42 ± 9.09 | 0.126 |
| | 26-40 years old (n=12) | 85.76 ± 10.01 | |
| | 41-55 years old (n=13) | 87.89 ± 10.62 | |

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Table 3:Comparison of nasal parameters in male population

| **Study** | | **Parameters** | | | | | |
|---|---|---|---|---|---|---|---|
| | | **en-en** | **n-sn** | **al-al** | **ch-ch** | **n-pn** | **sn-ls** |
| Present study | Malay males (n=31) | 30.57 | 47.07 | 38.51 | 52.42 | 40.44 | 13.89 |
| Farkas et.al 2005 | Japanese males (n = 30) | 37.5 | 56.9 | 38.2 | 48.4 | | |
| Farkas et.al 2005 | Thai males (n = 30) | 37.2 | 51.5 | 40.8 | 50.3 | | |
| Farkas et.al 2005 | Vietnamese males (n = 30) | 36.7 | 52.1 | 40.2 | 47.5 | | |
| Farkas et.al 2005 | Singaporean Chinese males (n = 30) | 37.6 | 53.8 | 39.2 | 49.6 | | |
| Farkas et.al 2005 | North American White Male | 32.9 | 53.0 | 34.7 | 53.3 | | |
| B. Khandekar et.al 2005 | Indian | 32.3 | | | 53.5 | | |

*. Nasal width (al-al) ,Height of the nose (n-sn),Length of the nasal bridge (n-pn), Philtrum length (sn-ls),Outer intercommisural mouth width (ch-ch), Intercanthal width (en-en)

Table 4:Comparison of nasal parameters in female population

| **Study** | | **Parameters** | | | | | |
|---|---|---|---|---|---|---|---|
| | | **en-en** | **n-sn** | **al-al** | **ch-ch** | **n-pn** | **sn-ls** |
| Present study | Malay Female (n=55) | 30.13 | 43.47 | 36.55 | 50.63 | 36.18 | 13.07 |
| Farkas et.al 2005 | Japanese Females (n = 30) | 35.0 | 53.3 | 37.1 | 46.5 | | |
| Farkas et.al 2005 | Thai Females (n = 30) | 36.0 | 49.5 | 40.2 | 45.4 | | |
| Farkas et.al 2005 | Vietnamese Females (n = 30) | 36.6 | 50.4 | 39.8 | 48.5 | | |
| Farkas et.al 2005 | Singaporean Chinese Females (n = 0) | 36.1 | 51.7 | 37.2 | 47.3 | | |
| Farkas et.al 2005 | North American White Female | 31.6 | 48.9 | 31.4 | 49.8 | | |
| B. Khandekar et.al 2005 | Indian | 30.5 | | | 47.0 | | |

*Nasal width (al-al) ,Height of the nose (n-sn),Length of the nasal bridge (n-pn), Philtrum length (sn-ls),Outer intercommisural mouth width (ch-ch), Intercanthal width (en-en)

The nasal width of present study showed consistent value to previous studies on Japanese and Singaporean Chinese [22]. The mean value intercanthal width was in consistent with North American White [22] and Indian [24] but lower than Japanese, Thai, Vietnamese (Farkas et.al 2005) [22]. The mean value of the height of the nose was higher in previous studies done in

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Japanese, Thai, Vietnamese and North American White [22] and Indian [24] whereas the outer intercommissural mouth width showed consistency with Thai, North American White [22] and Indian [24].

The mean values for all parameters of nose morphometry reported by different author varies in different populations. Variations in the nose morphology arise through number of factors which include gender, race, dietary, climate, and environment [7-18]. The results of the studies conducted in certain ethnic groups or regions may not be applicable to the populations elsewhere [20]. This is supported by Kunjur et al. who suggested that the aesthetic standards of a particular group may not suit other patients belonging to diverse racial and ethnic background [25].In this study, the nasal morphometric variation was significant between male and female sample group. The male sample has a lower nasal index as compared to female. This finding is inconsistent with Pazos et. al [3] who conducted studies in 180 samples among Chilean, whereby the researcher observed a higher nasal index in the female samples. This different finding might be due to different ethnicity group as Malay belongs to the Ongoloid while Chilean belongs to Caucasian group. There was no significant difference between the age group and this finding is consistent with Uzun et. al [15].

The importance of nasal index in anthropological studies has been recognized for a long time [26]. Being based on both bony and cartilaginous landmarks, this index differs from most other anthropological indices. According to the nasal index (NI), the nose was classified as leptorrhine: fine (NI $\leq$ 69.90), mesorrhine: medium (70.0 $\leq$ NI $\leq$ 84.90) or platyrrhine: broad (NI $\geq$ 85.0). In this study, the nasal index increases proportionally with the age group. Both 26-40y and 41-55y age group have platyrrhine which represents the broad nose whereas 18-25 age group has mesorrhine which represents the medium nose. The nasal index has been found to modify between childhood, young adulthood and adolescence [26]. Based on this method of classification, it was found that most of Malay subjects were considered to have the type of nose lying in the borderline between mesorrhine “medium” nose and platyrrhine “broad” nose.

## 5. CONCLUSION

Male population and the 41-55 years age group have a higher nose value parameters. The most common type of nose was platyrrhine: broad. This study also suggested that the Malay population have a medium broad nose as the nasal index for both genders was $\leq$ 84.90.

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