TROPICAL GENETICS

Volume 4, No 2, November, 2024
https://ojs.genetikawan-muda.com/index.php/tg

Original Research

Identification of the comparison of the length of the index finger and the ring finger

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Article Info

Article history:
Received, 13 March 2024
Accepted, 16 July 2024
Available online 30 November 2024

Keywords:
2D:4D ratio, Index finger, ring finger, testosterone, estrogen

How to cite:
Fauzi, A., Fachry, R, and Syamsurizal, S.. 2024. Identification of the comparison of the length of the index finger and the ring finger. *Tropical Genetics* 4(2): 28-31

Abstract

The length of the index finger (also known as the second finger or 2D finger) and ring finger (also known as the third finger or 4D finger) can be used as identifiable characteristics in humans. The relationship between the ratio of index finger length to ring finger length (2D:4D) is influenced by the hormones testosterone (in men) and estrogen (in women). Where this hormone is a hormone inherited from genes and its expression is influenced by the sex influence gene, so that there is a difference between the length of the index finger and the length of the ring finger. Estrogen and testosterone hormones that will affect the work of HOXD and HOXA in determining the length of a person's fingers. The purpose of the study was to determine the incidence of long index fingers compared to ring fingers in students and female students at SMA Muhammadiyah 1 Padang. This study shows that the difference in length between the index finger and ring finger can vary between individuals. Some studies have also found a correlation between the length of the index and ring fingers with factors such as height and genetic characteristics.

Introduction

The ratio of the length of the index finger to the ring finger in a person is a character or trait inherited through genes whose expression is influenced by sex (sex influence gene). The length of the second or index finger (2D) and the fourth or ring finger (4D) has been the concern of several experts because it is related to sex differences. The ratio of 2D to 4D for most males was found to be smaller than for females (Honekopp and Watson, 2010; Kornhuber et al., 2011). A character or trait inherited through a gene whose expression is influenced by sex (sex influence gene) can be seen in the ratio of index finger length to ring finger length (Syamsurizal, 2016a). The hormone that affects the ratio of the length of the index finger to the ring finger in men is the hormone testosterone while in women it is the hormone estrogen. With the differences in the types of hormones involved, experts are interested in further research (Honekopp and Watson, 2010; Kornhuber et al., 2011).

The 2D:4D ratio is the relative length of the index finger (2D) and ring finger (4D) that is influenced by stable and consistent steroid hormone exposure in each individual. The index and ring fingers are the most sensitive to exposure to steroid sex hormones in the prenatal period, therefore the 2D:4D ratio is known to indicate various diseases and disorders (Kumar et al., 2016).

This 2D:4D ratio may be associated with predisposition to certain diseases, such as coronary heart disease (Fink et al., 2006; Wu et al., 2013) especially in males. It is associated with prenatal testosterone levels. Women who have a low 2D:4D ratio are predisposed to migraine and tension-type headache, but not men (Xie et al., 2015). In addition, the 2D:4D ratio is associated with a tendency to

develop cancer, such as testicular cancer and prostate cancer in men, cervical cancer and breast cancer in women, and gastric cancer (Hopp et al., 2014). The 2D:4D ratio can be used as a marker of prenatal sex hormone exposure, whereas in adulthood, there is no significant relationship between sex homon levels and the 2D:4D ratio, either in men or women (Muller et al., 2011).

The difference in the length of the index finger and ring finger between males and females is influenced by the dominant gene, which shows its effect on both male and female individuals. However, in the homozygous recessive state, the dominant effect will not be seen in the phenotype. The short index finger is caused by a dominant gene in a male (TT/Tt genotype) and the long index finger has a recessive gene for genotype II. However, a short index finger female has the TT genotype, while the long index finger has the Tt/tt genotype. The ratio of the index finger and ring finger is related to hormonal conditions in the womb or will certainly affect a person's personality while growing up (Lee, 2016).

Method

The research was conducted on October 5, 2023. In this study using descriptive research. Data was obtained by surveying directly or visiting respondents in class. The sample in this study were all students of SMA Muhammadiyah 1 Padang City. Observations are divided into three categories, namely first the index finger is longer than the ring finger, the index finger is the same length as the ring finger, and the index finger is shorter than the ring finger.

In order to obtain more accurate and specific information regarding the comparison of the length of the index finger with the ring finger between students and female students at SMA Muhammadiyah 1 Padang, it is recommended to conduct a more in-depth study with a larger and representative sample.

Figure 1. Guiding Students to Follow Instructions

Figure 3. Assisting Students in Sampling

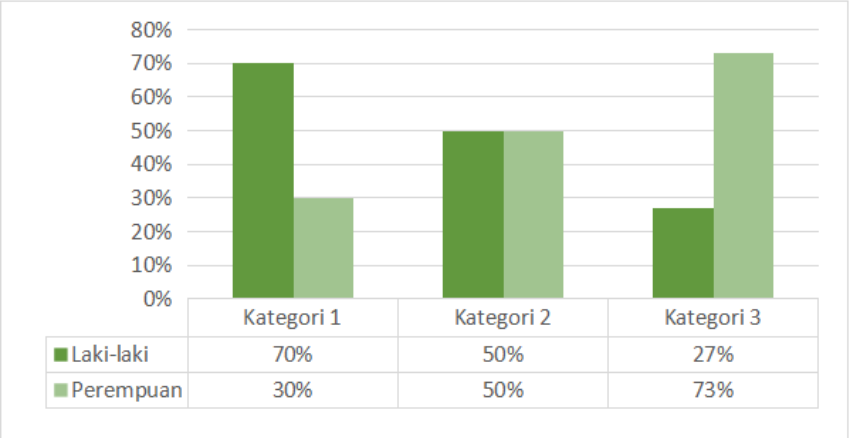
Results and Discussion

From the observation of 100 students, it was found that most of the males had long index fingers (category 1) and most of the females had short index fingers (category 3), three male students and three female students had index fingers of the same length as the ring finger (category 2).

Table 1. Finger length distribution of students at SMA 1 Muhammadiyah Padang City

Category	Male	Female	Total
1	35 (70%)	15 (30%)	50 (100%)
2	3 (50%)	3 (50%)	6 (100%)
3	12 (27%)	32 (73%)	44 (100%)

Description:
Category 1: The index finger is longer than the ring finger
Category 2: The index finger is the same length as the ring finger
Category 3: The index finger is shorter than the ring finger



In this study, the sample used was all 100 students of SMA Muhammadiyah 1 Padang. In male students, category 1 is obtained, namely the index finger is longer than the ring finger, there are 35 students with the total percentage (70%), in category 2, the index finger is the same length as the ring finger and the number of students is 3 and the percentage value is (50%), in category 3, the index finger is shorter than the ring finger with the number of students, namely 12, the value is obtained (27%). In general, the size of human fingers has been formed since individuals in the womb. There are several factors that can affect finger size, one of which is sex hormones (testosterone and estrogen) (Thomson, 2013).

However, female students in category 1 that the index finger is longer than the ring finger with the number of students 15 known the percentage value (30%), in category 2 that the index finger is the same length as the ring finger with the number of students 3 known value (50%), and in category 3 that the index finger is shorter than the ring finger with the number of students 32 known the presentation value (73%) (Syamsurizal, 2017).

From the results that have been obtained, the highest percentage value is category 1 in male students that the index finger is shorter than the ring finger and contrary to female students whose highest percentage is in category 3 that the index finger is longer than the ring finger (Syamsurizal, 2016b).

Conclusion

From the results of the research that has been done, the results of the most categories in men (Masculine) are in the 1st category with a total of 35 (70%). While in women (Feminine), namely in the 3rd category with a total of 32 (73%). Based on the theory that men have a longer index finger than the ring finger and in women the ring finger is longer than the index finger. In this study both genders are in accordance with this theory.

References

Agus, Rosana, dan Sjafaraenan. 2013. Penuntun Pratikum Genetika. Universitas Hasanuddin. Makassar.

Ayunda, S. N., Syamsurizal, S., Rahmi, I. F., & Nursal, D. (2023). Association between fingerprint patterns and intelligence quotient (IQ). Tropical Genetics, 3(2), 31–38.

Hönekopp, J., Manning, J. T., & Müller, C. (2006). Digit ratio (2D:4D) and physical fitness in males and females: Evidence for effects of prenatal androgens on sexually selected traits. Hormones and Behavior, 49(4), 545-549.

Honekopp, J., Watson S. 2010. Meta-analysis of digitratio 2D:4D shows greater sex difference in the right hand. Am J Hum Biol 22:619-630.

Lee,C., 2016. Analitycal Models For Genetics of Human Traits Influenced By Sex. Current Genomics. 17(5): 160-169

Manning, J. T. (2002). Digit ratio: A pointer to fertility, behavior, and health. Rutgers University Press.

Manning, J. T., & Fink, B. (2011). Digit ratio (2D:4D), dominance, reproductive success, and cancer: Testing the role of genes. Journal of Evolutionary Psychology, 9(4), 261-278.

Robertson J, Zhang W, MuirK, Jliu J. Radiographic assessment of the index to ring finger ratio (2D:4D) in adults. J. Anat 2008; 212(2):47.

Syamsurizal, S. (2016a). Arch As Genetic Marker Type-2 Diabetes Mellitus.

Syamsurizal, S. (2016b). Jumlah Sulur sebagai Penanda Diabetes Mellitus Tipe-2 Etnis Minangkabau. Biospecies, 9(2).

Syamsurizal, S. (2017). Sudut ATD sebagai Penanda Diabetes Mellitus Tipe-2 (DMT2). Bioscience, 1(1), 1–7.

Syamsurizal, S., Halifah, S., & Badriyya, E. (2021). Pedigree analysis of diabetes mellitus in Minangkabau ethnic. Tropical Genetics, 1(2), 61–67.

Zheng, Z., Cohn, M. J., & Wellik, D. M. (2015). Fingers crossed: From the "limb identity" gene to a limbless heart. Seminars in Cell & Developmental Biology, 47, 44-52.