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Fingerprint patterns Sumba ethnic population in Tambolaka city, East Nusa Tenggara

Erliningsih Gloriana Gollu[1*], Nila Kartika Sari[1], Hasminar Rachman Fidiastuti[2]
[1] IKIP Budi Utomo Malang
[2] Universitas Tribhuwana Tunggadewi

* Corresponding Author: nilahakam@gmail.com

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ABSTRACT

One of the biological features that humans have is fingerprints. Genetic factors have a role in the formation of fingerprint patterns. In general there are three patterns in the fingerprint that is loop, arch and whorl. The purpose of this research is to know the pattern of fingerprints on Sumba ethnic population in Tambolaka city, East Nusa Tenggara. This research uses qualitative descriptive method because it aims to know the pattern of sidik on Sumba ethnic population. Data collection was done by using documentation, interviews and giving respondents. The research benefits provide information on the pattern of fingerprints on the Sumbanese ethnic population based on the shape of the fingerprint. The sample consists of 56 people. Overall of the patterns contained in the ten fingers of Sumba samples were mostly found in *loop* patterns with a percentage of 54.41%, *whorl* patterns 43.97%, and *arch* patterns of 1.62%. Based on the results of research on the pattern of fingerprints on Sumba ethnic population in Tambolaka the most dominant fingerprint pattern is to have the pattern with the highest order of loops seen on the left thumb, left middle finger and little finger, *whorl* pattern where this pattern is the highest pattern Second after *loop* and the third is the *arch* pattern.

INTRODUCTION

Each individual has special characteristics that are given by God. These characteristics need to be identified so that they can be used to identify a person's identity and differentiate themselves from other individuals (Retno et al., 2003; Gazali et al., 2012). Fingerprints are a unique trait possessed by every human being, where in this world there will not be 2 humans with the same fingerprint even for a pair of twins. Therefore, currently fingerprints are widely used as proof of individual identity in various areas of life, starting from fingerprint verification. Human natural characteristics, namely physiological and behavioral characteristics such as face, fingerprints, palms, iris and retina of the eye (Nugroho et al. 2009; Arifin et al, 2011; Gazali et al, 2012). Fingerprint patterns are formed from the beginning of embryonic development, namely at 13 weeks of embryonic age to 24 weeks of embryos, fingerprint patterns begin to form in the third month and are fully formed in the fifth month (Setiawan., 2016; Hidayati, 2015; Beatrice, 2009). There are three fingerprint

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patterns in general, whorl, arch and loop (Hidayat, 2015). Fingerprint patterns are determined by many genes (polygenes) so that genetically they never change for life, unless influenced by factors such as environmental damage (Sinta et al., 2012; Retno et al., 2003; Hidayati, 2015).

Fingerprints are one of the physiological characteristics that are currently the most widely used for identification. Fingerprint test is an analytical technique to identify the patterns of a person's fingerprint lines that are genetically permanently attached to a person. Each pattern formed on the fingerprint is a marker of the potential and inherent characteristics of a person (Wiji et al., 2014; Abdillah, 2010). Fingerprints are the result of reproduction of the skin on the surface of the finger, whether intentionally taken or stamped with ink or the marks left by objects. The basic shape of the fingerprint is determined by the epidermis layer of the skin, where if there is damage to this layer it will be temporary. Fingerprints that exist on a person are permanent and their characteristics and shape are maintained from birth to death (Meilia et al, 2009). Fingerprint analysis is one of the biometric methods to determine a person's character. Fingerprint analysis was developed as one of the methods to determine the most dominant fingerprint pattern. Fingerprints as a picture of a genetic map is a picture of potential that is carried from birth. The results of fingerprint analysis are not affected at all by the amount of information recorded in memory. Therefore, fingerprint is a genetic picture of a person from birth (Gunawan & Hutama, 2014). The population in this study is ethnic Sumba, Lombu Village, Wewewa Tengah sub-district, Southwest Sumba Regency using 56 samples. In the city of Tambolaka, East Nusa Tenggara no one has conducted research on fingerprints until now. So the researchers will conduct a study to determine the fingerprint pattern in the ethnic Sumba population in the city of Tambolaka, East Nusa Tenggara.

MATERIALS AND METHODS

This study is about fingerprint patterns in the ethnic Sumbanese population in the city of Tambolaka, East Nusa Tenggara. In the research, the researcher went directly to the field (Tambolaka city) to collect data with oral interviews and gave respondents to participate in research on the Sumba ethnic population. The fingerprint pattern was taken by asking the respondent to clean all the fingers of the right and left hands using 75% alcohol, then dry them with a tissue. After that, all the fingertips of the respondent were affixed to the stamp pad in turn, then printed on the identification sheet. Fingerprint pattern retrieval is done by turning the respondent's fingertip from the right to the left or vice versa on the identification sheet, so that the entire respondent's fingerprint pattern can be copied on the identification sheet.

RESULTS AND DISCUSSION

In the study of fingerprint patterns on the Sumba ethnic population in Tambolaka using 56 samples, the dominant pattern was the loop pattern seen on the left thumb, left middle finger and left little finger, the second pattern was the whorl fingerprint pattern and the last pattern was the fingerprint pattern. arch fingerprint. Every individual has inherited or inherited traits from both parents because the individual comes from the parent's sex cells. The tendency of character is biologically determined or dependent on hereditary factors. All hereditary traits are not passed

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down without changes from one generation to the next. Individuals who come from a combination of genes that come from both parents (Beatrice, 2009). The fingerprint pattern of each individual is different, not only that the fingerprints of each individual finger are also different between fingerprints, index fingers , middle finger, ring finger and little finger left. Therefore it can be used as a person's identity (Beatrice, 2009). The results of identification of the fingerprint pattern of the Sumba ethnic group showed that the fingers of the right and left hands were dominated by the ulnar loop pattern. The predominance of the ulnar loop pattern in ethnic Sumbanese is seen on the left thumb, left middle finger and left little finger. which can be seen in figure 1.

left thumb	left middle finger	left little finger
		
Ulnar Loop	*Ulnar Loop*	*Ulnar Loop*

Figure 1 The dominant fingerprint pattern in the Sumbanese ethnicity is the ulnar loop pattern on the left thumb (T), left middle finger (M) and left little finger (L)

In general, fingerprints are divided into 3 main patterns, namely whorl, loop and acrh. In this study, the frequency distribution of the Sumba ethnic sample was totaled from 56 people to 555 fingerprint patterns. It can be seen that the majority of samples have a loop fingerprint pattern of 54, 41% or 302 fingers, while the remaining 43.97% or 244 fingers have a whorl fingerprint pattern and 1.62% or 9 fingers have an arch fingerprint pattern. This is in accordance with research conducted by Hidayat (2006), which states that the characteristic of Javanese ethnicity is to have a loop pattern (52.1%) or 365 fingers, while the remaining 41.6% or 291 fingers have a fingerprint pattern. whorl and 6.3% or 44 fingers had arch fingerprint patterns.

Table 1. Frequency Distribution based on the fingerprint pattern of the Sumba ethnic sample

Fingerprint Pattern	Frequency	Precentage (%)
Whorl	244	43,97
Loop	302	54,41
Arch	9	1,62
Total	555	100

The unique nature of this fingerprint is one of the advantages as a means of identifying a person, but on the other hand it complicates the matching process because of the large number of people identified. One effort to simplify as well as

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speed up fingerprint matching is by grouping or classifying based on certain characteristics (Suwarno, 2008). The existence of genetic variation of a living thing can be caused by several factors, including mutation, marriage, migration, and the selection process (Sari, 2018). Strongly influenced by the sequence of nucleotides encoded in its DNA structure. If an individual has close kinship with another individual or group of individuals in a region with another region, it can be a polypism and a polymorphism, then the level of similarity of genetic information will also be high. This variation is of course largely determined by mutation, recombination and migration of genes from one location to another. Molecular markers rely on DNA characteristics that can be applied to identify genomic variations at various levels of organisms (Yudianto et al, 2013).

CONCLUSIONS

Conclusion From the results of the study, it was concluded that the fingerprints in the Sumba sample were mostly loop patterns (54.41%), while the whorl pattern was the second largest pattern after the loop pattern (43.97%), arch patterns (1.62 %). In the whorl, loop and arch fingerprint patterns in the Sumba sample, there is a significant relationship in the percentage of occurrence so that there are differences between women and men. This difference in fingerprint patterns is a variation of the biological characteristics possessed by the population. This research is still far from perfect. Researchers conducted research on Sumba samples in Sumba as well. Future research is expected to be able to choose a more specific location specifically for Sumba in order to obtain more data and find out more about the characteristics of more fingerprints. The researcher hopes that in the next research more samples will be reproduced . Researchers hope that IKIP Budi Utomo Malang, especially the Department of Biology Education in the future, will continue to be able to further develop fingerprints as an identification tool.

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