

## Evaluation of the Length & Width of all the Nails of Hand – An Observational Survey Study

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**Abstract:** Several conditions can affect the configuration of a person's fingernails. While the shape and curvature of the nails may offer diagnostic insights into various diseases, limited studies have accurately defined normal fingernail Anthropometry. In our study, we measured the length and width of fingernails of the upper limbs of 100 volunteers with healthy nails. The greatest nail width was found on the thumb, followed by the index, middle, ring, and little fingers. Width of fingernail was influenced by handedness and age. Our quantitative data on fingernail measurement can serve as a reference for diagnosing nail-related diseases and deformities, as well as for guiding reconstructive or aesthetic nail surgeries.

**Keywords:** Finger nail, Length and Width of Nail, Anthropometry,

### 1. Introduction

All primates have nails, which are protective flattened plates that are often located at dorsal surfaces of the terminal phalanges of the fingers and toes. It is a modest evolutionary gift. These nails are comparable to the claws of other tetrapod animals. Alpha-keratin, a strong, stiff protein, makes up fingernails and toenails.[1]

The nail is the matrix's permanent byproduct. The integrity of the surrounding tissues and the bony phalanx, which contribute to the nail apparatus, are two factors that determine its proper appearance and growth. Nails are not as essential to human survival as the heart or lungs are. Nonetheless, they might be viewed as a window tool for evaluating the state of health of various body components.

By applying counterpressure to the finger pulp, the nail helps to improve the fine, accurate movements of the distal fingers.[2] Even though the nail lacks nerve endings, it functions as a counterforce when the tip of the finger touches an object, increasing the sensitivity of the fingertip. Lastly, the nail serves as a tool that permits certain cutting or scraping motions as well as what is known as "extended precision grip" (such as extracting a splinter from one's finger).

### 2. Material and Method

This research data included total 100 healthy individual who fall under inclusion criteria.

2.1 Material: Vernier caliper  
Stadiometer  
Consent form  
Case record form

2.2 Method:

- 100 volunteers who fall under inclusion criteria will be enrolled for the survey.
- Length and width of all the nails of both the upper limb will be taken using vernier caliper.
- Measurement of Nail for Length – Mid-point of nail fold to mid-point of free edge of skin.
- Measurement of Nail for Width – The transverse distance between the two mid-point of the nail in lateral nail groove.
- Height of individual will be measured in standing anatomical position using no.

### 2.3 Inclusion criteria

- Individuals of either gender ranging between 25 to 40 years of age.
- Individuals with no abnormality related to bone
- Individual without any abnormalities related to nail.
- Individual have properly trimmed nails to the edge of the skin

### 2.4 Exclusion criteria

- Individual below 25 and above 40 years of age.
- Individual has not properly developed finger or with extra finger or previous history of traumatic injury of the finger.
- Individual has discolored, dry, damaged, spotted mark in nail.
- Person has clubbing nail, spoon shaped, swelling, tenderness, soreness or pus around the nail fold.
- Individual having pit, notch, crack nail and it separated from nail bed.
- Individual who are having any continuous medication for any chronic disease.

## 3. Observation and result

Table 1. measurement of length and width Nail of right & left hand

Subject	Right Hand		Left Hand	
	Mean(in cm)	SD(in cm)	Mean(in cm)	SD(in cm)
Thumb nail length	1.25	0.21	1.28	0.21
Thumb nail width	1.32	0.19	1.28	0.16
Index fingernail length	1.05	0.19	1.06	0.19
Index fingernail width	1.01	0.11	0.99	0.13
Middle fingernail length	1.05	0.19	1.08	0.19
Middle fingernail width	1.09	0.12	1.06	0.13
Ring finger nail length	1.02	0.21	1.02	0.22
Ring fingernail width	1.02	0.14	0.99	0.14
Little fingernail length	0.92	0.19	0.91	0.22
Little fingernail width	0.84	0.13	0.83	0.16

## 4. Discussion

In countries like India, where people frequently use their hands for various tasks, maintaining nail hygiene is crucial for overall health. Nail trimming is a vital aspect of hand hygiene. Both the CDC (Centers for Disease Control and Prevention) and WHO (World Health Organization) provide specific guidelines for nail care among health care professionals.[3]

Several factors can affect nail structure:

- **Age:** As we age, nails typically grow more slowly and become dull and brittle. Fingernail plates grow at a rate of about 3.5 mm per month, and their color may shift from translucent to yellowed or opaque. Longitudinal ridges may also develop, which can be a normal part of aging. However, changes in nails can also result from infections, nutritional deficiencies, trauma, and other health issues.[4]
- **Bone:** Fingernails and toenails can serve as useful indicators of metabolic changes in the body, as they are in contact with the periosteum of the phalangeal bones. Consequently, physiological and pathological processes affecting blood and bone may influence the mineral content of the nails. Therefore, analyzing the mineral composition of nail plates could be a valuable complement to bone densitometry in monitoring bone health.[5]
- **Hormones:** Nails are composed of a hardened protein called keratin. Fluctuations in estrogen and other hormone levels can weaken the keratin layer, making nails more prone to breaking.[6]

Changes in fingernail shapes can involve conditions such as clubbing, pincer nails, hook nails, parrot beak nails, and koilonychia. Variations in fingernail sizes include brachyonychia, dolichonychia, micronychia, and macronychia.[7] As a result, recognizing the normal appearance of fingernails may be crucial for diagnostic assessment.

Well-groomed fingernails are a key aspect of an attractive appearance, and achieving an ideal nail shape is an important factor in creating a visually appealing look.

Handedness was found to affect the transverse curvature of fingernails, where width was significantly larger in the dominant hand compared to the non-dominant hand. As a result, the fingernail on the dominant hand was flatter than that on the non-dominant hand. Additionally, age plays a role in transverse fingernail curvature, as the radius of curvature increases significantly with age, suggesting that fingernails become flatter over time.

## 5. Conclusion

This article primarily examines nail measurements in terms of length and width across specific age group, as well as their aesthetic use for beauty purposes. It is commonly noted that many systemic abnormalities tend to manifest locally, particularly in the hair, skin, or nails. External features like the tongue, skin, hair, and nails can offer valuable clues about underlying health issues, which can be useful for medical professionals in

diagnosing conditions. A key limitation of our study is its small sample size. Therefore, additional large-scale studies on fingernail anthropometry across different age groups would be helpful in generalizing our findings.

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