A Study of Nail Growth in Diabetics Vs the Non-Diabetics

DrShishirkumar C Naik[1], DrVidya Paranjape[2], Dr A.D.Mathur[3], Dr Pooja Garg[4*], Dr Prerana Upadhyaya[5], Dr Shivarama CH[6], Dr Roshan S[6], Dr SLDV Ramana Murty Kadali[7], Mrs Chethana Y K[8], Mrs Nishitha C Salins[8], Mr Kartikeya Vivek[9], Dr KritikaGarg[9]

1. Associate Professor, Department of Anatomy, JNUIMSRC, Jaipur.
2. Professor and HOD, Department of Pediatrics, JNUIMSRC, Jaipur.
3. Principal and Controller, Professor, Department of General Medicine, JNUIMSRC, Jaipur.
4. Assistant Professor, Department of Anatomy, JNUIMSRC, Jaipur.
5. Professor and Head, Department of Pharmacology, JNUIMSRC, Jaipur.
6. Professor, Department of Anatomy, Kanachur Institute of Medical Sciences, Mangalore.
7. Professor, Department of Pharmacology, JNUIMSRC, Jaipur.
8. Tutor, Department of Anatomy, Kanachur Institute of Medical Sciences, Mangalore.
9. Student, 1st year MBBS, JNUIMSRC, Jaipur.

***Corresponding author:** Dr. Pooja Garg

Abstract:

Background:

Diabetes Mellitus is one of the most commonly encountered diseases today in the modern world. Gone are the days where it was considered the disease of the affluent. All thanks to the fast food culture. In our Country millions are diagnosed and yet the diagnosed patients only form the tip of the iceberg. This disease not only causes the problems to an individual but also is a burden to the community and the nation adding load to the already burdened healthcare in our country. The financial loss and the economic impact on the community are huge. Plenty of methods are there to diagnose the disease but it's not at the grass root level. By the time the patients are diagnosed, many will show signs sort of complications that have already started. Is there a very useful basic

way to screen diabetes? This study puts on an effort to find the answer.

Aims and Objectives:

To determine whether there is a difference of growth rates in the nails between the diabetics and the non-diabetics.

Materials and Methods:

This study was started in 2018 in Kanachur Institute of Medical Sciences and ended in JNUIMSRC, Jaipur in August 2021. Total of 314 patients and an equal number of controls were studied and have been reported. This study is a cross sectional study. Two hundred twenty four patients and controls were studied in Kanachur Institute of Medical Sciences, Mangalore and the rest were from JNUIMSRC, Jaipur.

Results:

Significantly lower nail growth in group 2 (Control group) is seen.

Conclusion:

This can be considered as a useful tool in the hands of paramedical workers especially in the underprivileged areas.

Keywords: Nail growth, diabetes, rate, cases, controls

Introduction:

It is a well-known fact that without checking the hands a clinical diagnosis would be incomplete. According to an author the hand gives more clinical information than any other organ in the body.[1]The nails of the fingers as always thought by our clinical teachers should be looked at and it would give us a plethora of clinical information. The colour, shape, texture and some specific features have been constantly associated with diseases. This information in some has been lifesaving as it was associated in very early stages of the disease. It is known to reflect on the normal physiology of the body as well as the deep seated pathologies also.

Diabetes is a metabolic disorder and there are two types. Type 1 is associated with the lack of insulin production and the Type 2 is basically the receptors in the body will not be sensitive to insulin. There are a plethora of changes which are bound to happen due to this metabolic mismatch. But according to some studies it has been found that, by the time the patients reach the Doctor's office the complications may have already started and this complicates the treatment adding to the stress and strain of the disease. But is there a way to identify this metabolic disorder early? Is there any manifestation which points out towards this disease?

Some studies have been pointed out towards the more growth rate of the integument system. So this study puts in a novel effort to find, if there are any differences in the growth rate of the nails of fingers in diabetics when compared to that of the normal individuals.

Materials and Methods:

This study was started in 2017 in Kanachur Institute of Medical Sciences and ended in JNUIMSRC, Jaipur in August 2021. Total of 314 patients and an equal number of controls were studied and have been reported. Two hundred twenty four patients and equal number of controls were studied in Kanachur Institute of Medical Sciences, Mangalore and the rest were from JNUIMSRC, Jaipur. Patients who were known diabetics and had no secondary complications were taken up for the study. These patients attended the OPDs in the Department of General Medicine. The controls were age and sex matched and was confirmed to be non-diabetics and was selected from the students, staff, patient's relatives, parents and also the local guardians of the students.

Inclusion criteria:

- Cases were selected who attended the OPD in the Department of General Medicine
- Controls were the students, staff, parents and their guardians who were not diabetics

Exclusion criteria:

- Those who did not consent
- Those whose nails of index fingers were not anatomically correct.
- The diabetics who were having complications.
- Any complications of the nails, infections were excluded
- Subjects who were immuno-compromised or on immune modulator drugs.

The study was conducted in three hundred fourteen known diabetic patients and equal number of controls. The study was a multi-centric study. This was studied in two institutions across two states in Mangalore, Karnataka and Jaipur, Rajasthan. The study began in Kanachur Institute of Medical Sciences, Mangalore and was continued in JNUIMSRC, Jaipur. The students of both the institutes actively participated in this study.

Students were trained to first mark a line at the base of the nail with a permanent marker or India ink. Then at the end of one month the measurement was taken from the initial point and has been reported. The students who were posted were also allotted one case and the

responsibility of the measurement was given to them. All the measurements were compiled in an excel sheet.

Statistical analysis:

Descriptive statistics and Student's t test was done.

Results:

Table 1: Demographics of the study

		Group 1 (n=314)	Group 2 (n=314)
Mean age		54.67 ± 3.72 years	52.84 ± 2.38 years
Sex	Male	236	235
	Female	78	79
Mean weight		71.28 ± 7.94 Kgs	68.28 ± 5.38 kgs

In group -1 seventeen male patients did not turn up, in group-2 three male participants did not turn up

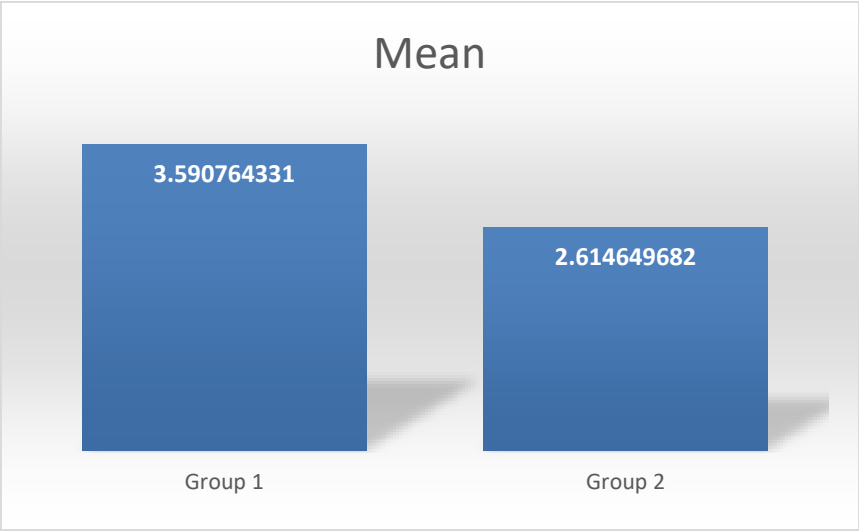
Table 2: Unpaired t test of the nail growth between the two groups.

t-Test: Two-Sample Assuming Equal Variances

	Group 1	*Group 2*
Mean	3.590764	2.61465
Variance	0.221097	0.141127
Observations	314	314
Pooled Variance	0.181112	
Hypothesized Mean Difference	0	
df	626	
t Stat	28.73939	
P(T<=t) one-tail	9.1E-117	
t Critical one-tail	1.647291	
P(T<=t) two-tail	1.8E-116	
t Critical two-tail	1.963761	

Significantly lower nail growth in group 2 is seen

Graph 1: The mean growth seen in the two groups:



Discussion:

It is a well-known fact that without checking the hands a clinical diagnosis would be incomplete. According to an author the hand gives more clinical information than any other organ in the body.[1] Cutaneous manifestations in diabetes has been reported world-wide and many authors have reported this.[2] The growth of any part of the body in physical proportions will depend on the nutrition and external environmental factors. The genetic background is also supposed to be mentioned in here. The normal growth of finger nails as documented by many researches is 0.5 mm per week and that roughly translates to 2 to 2.5mm per month. There are a lot of authors who have reported that the finger nails on all fingers do not grow on similar scales and there is a minute yet different rate of growth.[3,4,5,7] Some authors have reported that the growth rate of the nails was the same and is about 0.1mm per day[6]. So there is a lot of range to be considered about. There are reports that as the individuals grow old the rate of growth decreases[8]. Some also have reported that there is some individual personality type, in whom there is a nail growth sprout. The individuals who have very shy and nervous by nature, and have a tendency to bite their nails have greater nail growth rates. People who live in low altitude, regions where temperatures are recorded higher and people who live towards the equator have high growth rates when compared to their counterparts[9].

Hyperaemias, pregnancy to name a few are known to have high growth rates and infections especially the viral infections have less nail growth rates when compared to others.[10] Other metabolic disorders have an inverse relation with the nail growth. [9,10]Now why this is caused would be the question? There are no definite answers for this, as many theories have been postulated by various authors. The metabolism may be altered as hypothysed by one of the author [11]. Another noted hypothesis can be because of the leakage of the plasma proteins due to high capillary leakage which is very common in diabetes. This may cause an exponential growth in connective tissues [12]. This study has put in a sincere effort to find answer to the question and has been successful shed some light.

Conclusion:

This study gives us conclusive evidence that the growth rate of nails of fingers is more in diabetics when compared to that in normal individuals. Many such studies have to take place in different places across the country so as to bring in a regression analysis study. This can be considered as a useful tool in the hands of paramedical workers especially in the underprivileged areas.

Acknowledgement:

I thank the students of MBBS batches 2017, 2018 and 2019 of Kanachur Institute of Medical Sciences, Mangalore and the MBBS students of 2020/21 batch of JNUIMSRC, Jaipur for helping me to complete the study.

References:

1. Kumar A, Accelerated nail growth in diabetics, International Journal of Healthcare Sciences, 2014, Vol. 2, Issue 1, pp: (163-166).
2. Toy JL. &McNicol GP. , 1976, Looking at the hand. Journal of Applied Medicine, Vol. II : 703
3. Sibbald RG. &SchachterRK., 1984, The Skin and Diabetes Mellitus: International Journal of Dermatology. Vol. 23, 567
4. Copenhaver WM., Kelly DE., Wood RL. Bailey's Textbook of Histology, 17th Ed. 1978, 440-442
5. Williams & Warwick Gray's Anatomy (Churchill Livingstone) 36th Ed. 1980, 1223, 155-156, 227
6. Sibinga MS., 1952, Observations on growth of fingernails in health and disease, Paediatrics, 24, 225-233.
7. Baden H. P., Physical Properties of Nails J. of Investigative Dermatology 1970, 55, 115.

8. Bean W. B., Nail Growth – 30 years of Study. Archives of Internal Medicine 1974, 134, 497.
9. Fitzpatrick JB., Eisen AZ., Wolif Klaus, Freedberg IM., Austen KF., Dermatology in General Medicine, 2nd Ed (1979) McGraw Hill Book Co. New York, Chap. 53, 418-437.
10. Bean WB., 1963, Nail Growth – A Twenty year study, Arch. Of Int. Med. III, 476-482.
11. Bean WB., 1963, A note on finger nail growth, j. of investigative dermatol. 20, 27-31,
12. Hamilton JB., Terada H &Mestter GE., 1955, Studies of growth throughout the lifespan of Japanese: Growth and size of nails and their relationship of age , sex, heredity and other factors J. of Gerontology; 10, 401-415, 1955