RESEARCH PAPER

Study The Relation Between Fingerprint Patterns And Cancer (Breast & Prostate)

Ritu Sharma[1], Dr. Ashok Sagar[2*], Ms. Neha Jha[3], Dr. Mukesh Kumar[4], Dr. Amit Singhal[5], Dr Shri Bhagwan [6] Jay prakash singh Rajput [7]

[1]M.sc Student Forensic Science, Department of Forensic Science, Santosh Deemed to be University, Ghaziabad, India, ritukaushik2201@gmail.com

[2]Professor and Head of Department, Department of Forensic Medicine & Toxicology, Santosh Deemed to be University, Ghaziabad, India. Email: dr.sagarashok@gmail.com

[3]Senior Tutor, Department of Forensic Science, Santosh Deemed to be University, Ghaziabad, India, Nehajha524@gmail.com

[4]Associate Professor Department, Department of Forensic Medicine & Toxicology, Santosh Deemed to be University, Ghaziabad, India. Email: mukeshudct1877@gmail.com

[5]Professor, Department of Pharmacology, Maharishi Markndeswar Institute of Medical Sciences and Research Mullana, Ambala, Haryana, India. Email: dramitkmmc@gmail.com

[6]Professor, Amrita school of medicine, Faridabad , shribhagwan315@gmail.com

[7]Associate Professor, Department of Physiology, Netaji Subash Medical College and Hospital, Bihta, Patna, jpsrajput50@gmail.com

ABSTRACT

Introduction: Dermatoglyphics means "skin patterns" and is a way of studying the tiny lines and shapes on the skin of fingers, palms, toes, and soles. Fingerprint pattern can serve as indicators for genetically linked health conditions. People with certain health conditions or syndromes often have different patterns on their fingertips compared to others. These patterns form during the fifth and sixth weeks of a baby's life and are fully developed by the 21st week. Once they are formed, they never change. These lines help fingers grip things and are also used to identify people in a unique way.

Aim: To compare fingerprint patterns among breast cancer patients, prostate cancer patients and healthy controls to identify potential fingerprint markers associated with cancer predisposition.

Methods: This was a comparative and case-control study set up for a comparison between two groups to observed the patterns on people's fingers, called dermatoglyphics, in those with breast or prostate cancer compared to people who are healthy. Total of 70 people took part in this research study. 35 people who had been diagnosed with breast/prostate cancer. Additionally, 35 healthy individuals, matched for age and sex with cancer patients and had no history of cancer were took for study. Standard ink-rolled ten-digit fingerprints were recorded.

Results: Among (35) healthy controls , Loops were identified as the predominant fingerprint pattern (64.2%), with Arches (20.6%) and Whorls (15.2%). However, in (30) breast cancer patients there was a marked shift in pattern distribution. In this group, whorls emerged as significantly more common, present (45%) establishing them as the most frequent pattern. Loops showed a slight decrease, found (40%), while Arches were observed (15%). This inversion in the dominant pattern suggests a possible link between the increased presence of Whorls and the occurrence of breast cancer. In a similar vein, among (5) prostate cancer patients, Whorls were more identified as the most prevalent pattern, observed (48%) and Loops were present (36%) and Arches were the least common about (16%).

Conclusion: These findings suggest that the heightened occurrence of whorl patterns and a diminished count of loop patterns, notably observed in cases of breast cancer, may function as potential indicators for screening or assessing individual risk. Although the fingerprints alone are not a unique diagnostic indicator; they do represent a non-invasive and low-cost method of investigation.

Keywords: Fingerprints; breast cancer; prostate cancer; whorl pattern; cancer biomarkers.

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INTRODUCTION

Dermatoglyphics means "skin patterns" and is a way of studying the tiny lines and shapes on the skin of fingers, palms, toes, and soles. Fingerprint pattern can serve as indicators for genetically linked health conditions. People with certain health conditions or syndromes often have different patterns on their fingertips compared to others. These patterns form during the fifth and sixth weeks of a baby's life and are fully developed by the 21st week. Once they are formed, they never change. These lines help fingers grip things and are also used to identify people in a unique way. Doctors can use these patterns for medical tests without taking any samples. In 1892, Francis Galton & Edward Henry

*Author for Correspondence: dr.sagarashok@gmail.com

began their 1st study on fingerprints & classified them. They described three main types of fingerprint patterns: Arches, Loops and Whorls [7,8].The patterns include fingerprints, ridge patterns & palm prints. By the passage of time, studying fingerprints has given people a lot of knowledge about this study. Palm prints have more information than fingerprints.

In 1892, Francis Galton & Edward Henry conducted pioneering research on fingerprints, establishing their classification system. They categorized the fingerprints into 3 main types: Arches, Loops and Whorls. Archaeologists found fingerprints on pottery tablets in Babylon that are more than 4,000 years old, tracking back to 1792–1750 BCE.

(1) Arches pattern has two kinds: (a) Plain Arch & (b) Tented Arch.

(2) The Loop pattern divided into two types: (a) Radial Loops & (b) Ulnar Loops.

(3) The Whorls pattern have four subgroups:(a) Plain Whorl, (b)Central Pocket Loop, (c) Double Loop, and (d) Accidental Whorl.

Link between cancer (breast & prostate) and fingerprints

Cancer is a major global contributor to mortality, accounting for a significant number of deaths worldwide. Some studies suggest that looking at fingerprint patterns might help spot people who could be more likely to get certain genetic diseases early [14]. Because of this, this study looks at existing research on different types of hand fingerprint patterns and whether they might be connected to a higher risk of cancer. The study aims to discover which fingerprint patterns are correlated with cancer and the corresponding cancer types.

MATERIAL & METHODS

Study Population

This was a **comparative and case-control study** set up for a comparison between two groups to observed the patterns on people's fingers, called dermatoglyphics, in those with breast or prostate cancer compared to people who are healthy. Total of 70 people took part in this research study-35 people who had been diagnosed with breast/prostate cancer. Cancer patients were recruited from Santosh Hospital Ghaziabad and Subharthi Hospital in Meerut.

Additionally, 35 healthy individuals, matched for age and sex with cancer patients and had no history of cancer were took for study. Those healthy people selected from Forensic Medicine & Toxicology Department (Santosh deemed to be University).

Inclusion Criteria

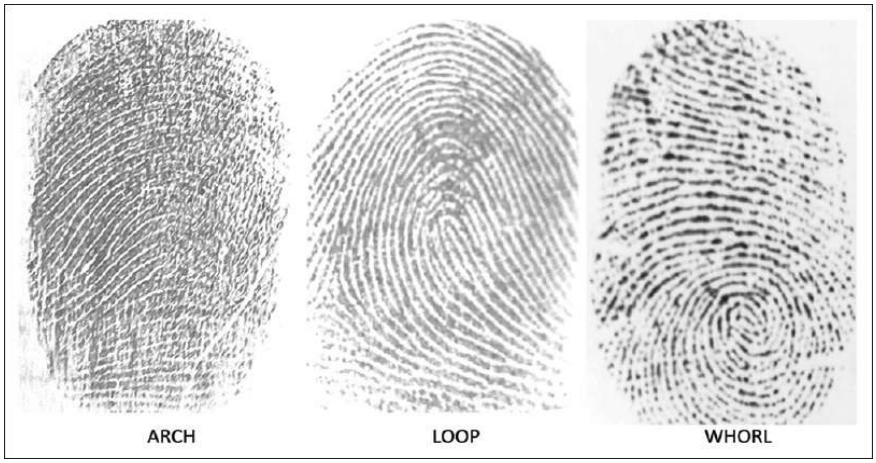
Diagnosed cases of breast or prostate cancer.

Exclusion Criteria

Finger deformities or dermatological conditions. Hand injuries or scars affecting ridge clarity.

Data collection & analysis

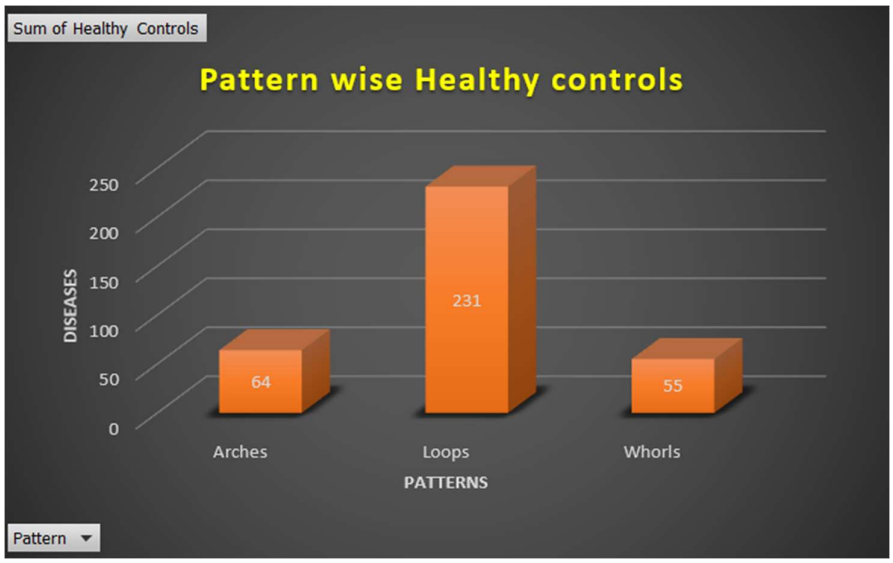
Hand hygiene was ensured by asking each patient to cleanse their hands using any soap and water before collection of data. This helps make the fingerprints clear. They then dried their hands with a clean towel or paper. Next, a thin layer of ink was spread over a flat surface using the metal roller. The roller helped make sure the ink was spread evenly without making it too thick, which could cause smudges. Then, each finger was rolled gently from the tip of the nail to the other end across the inked surface and then onto the fingerprint card. The rolling was done from the thumb side (radial) to the little finger side (ulnar) to cover all the lines properly. This was repeated for all ten fingers, starting with the right hand, from the thumb to the little finger, and then the left hand in the same order. Each card was labelled with the participant's name, contact number and signed consent form and the date when the fingerprints were taken, and whether it was the left or right hand. After collecting the fingerprints, the cards were left to dry in the air for 10 to 15 minutes to prevent them from getting smudged. Lastly, all fingerprints were observed under 10x magnifying lens to analysed the ridge details, core, delta and different types of fingerprint patterns (Arches, loops and Whorls).



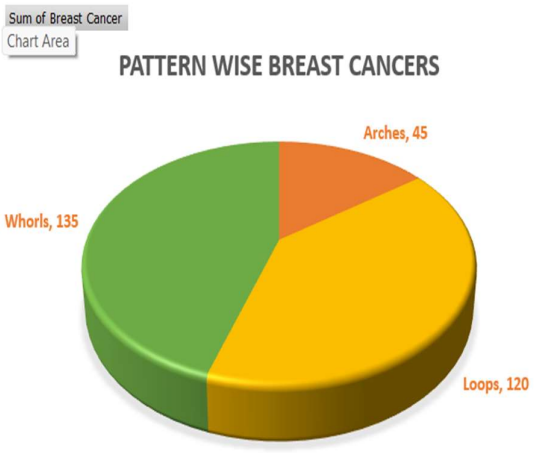
RESULT

The study aimed to investigate the distribution of dermatoglyphic patterns—Loops, Whorls, and

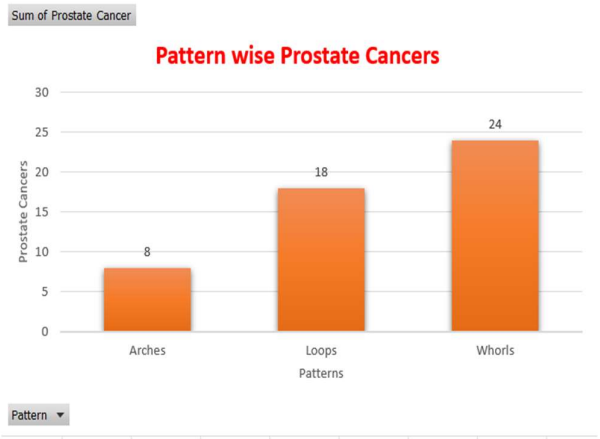
Arches—among healthy individuals, breast cancer patients, and prostate cancer patients. Among 350 patterns of **healthy controls (35), Loops were identified as the predominant fingerprint pattern,** accounting for 231 cases (64.2%), with Arches appearing in 74 instances (20.6%) and Whorls in 55 instances (15.2%). This observed pattern aligns with the general population's typical distribution, characterized by the prevalence of loops. However, in **(30) breast cancer patients** (n = 300), there was a marked shift in pattern distribution. In this group, **whorls emerged as significantly more common,** present in 135 instances (45%) establishing them as the most frequent pattern. Loops showed a slight decrease, found in 120 instances (40%), while Arches were observed in only 45 cases (15%). This inversion in the dominant pattern suggests a possible link between the increased presence of Whorls and the occurrence of breast cancer. In a similar vein, among 5 prostate cancer patients (n=50), **Whorls were more identified as the most prevalent pattern,** observed in 24 fingers (48%). Loops were present in 18 fingers (36%), and Arches were the least common, found in only 8 fingers (16%). This pattern mirrors the trend observed in breast cancer patients, further supporting the hypothesis that Whorls may be more prevalent in individuals with certain types of cancer. Even though Arches have always been the least common pattern across all three groups, their reduction in cancer patients is a component of the particular pattern shift. Fingerprint pattern analysis shows promise as a supportive, non-invasive screening method for early cancer detection or risk evaluation; however, further investigation using broader and more diverse population studies is necessary.



(Figure.1)



(Figure.2)



(Figure.3)

• In healthy control subjects, loop patterns were most prevalent (66%), followed by Arches (18.3%) and then Whorls (15.7%).(Figure.1)

• Breast Cancer Patients had a higher prevalence of whorls (45%), followed by loops (40%), and arches (15%).(Figure.2)

• Whorl patterns were more common in prostate cancer patients (48%) than loop (36%) or Arch (16%) patterns.(Figure.3)

The patterns were compared between healthy people and those diagnosed with either breast or prostate cancer. The partitioning of loops, whorls, and arches can be accounted for in each grouping as demonstrated in the following table:

Group	Loops (L)	Whorls (W)	Arches (A)	Total Prints
Healthy Controls	231	55	64	350
Breast Cancer Patients	120	135	45	300
Prostate Cancer Patients	18	24	8	50

DISCUSSION

The current study showed a distinct difference in the distribution of fingerprint patterns between healthy subjects and patients with breast or prostate cancer. Loop fingerprint pattern was most likely observed in healthy group of control sample nearly (66%), and this finding is consistent with the dermatoglyphic literature. In patients diagnosed with breast cancer, the most common type of fingerprint was whorl (45% frequency). Whorls were also the most frequently identified fingerprint type in prostate cancer patients (48%), which is a significant difference compared to a healthy group or controls. The altered frequency of patterns suggests an association between the morphology of fingerprints and some predisposition to and pattern of disease. The predominant presence of whorl patterns in cancer patients, contrasted with their relative rarity in healthy individual's fingerprints (15.7%), highlights a significant difference that warrants further investigations and important questions related to genetic factors and developmental aesthetic can be fundamentally assessed as indicators of cancer or potential cancer conditions.

CONCLUSION

This research examined the distribution of various fingerprint patterns: loops, whorls, and arches in healthy individuals, and patients with breast or prostate cancers. The findings are markedly different in dermatoglyphics patterns in the control group when compared to the cancer samples. While loops were the most common fingerprint pattern in healthy individuals (66%), their prevalence decreased in patients with breast cancer (40%) and prostate cancer (36%).

A considerably higher number of whorl fingerprint pattern were mostly observed in female patients having breast cancer (45%) in comparison with control sample (16%), suggesting a possible link to the disease. Arches were somewhat stable across the groups, but somewhat more prevalent in the healthy individuals.

These findings could mean that the fingerprint patterns reflect biological changes, minor or otherwise, that are somehow caused or associated to cancer by genetic and or developmental means.

The heightened occurrence of whorl patterns and a diminished count of loop patterns, notably observed in cases of breast cancer, may function as potential indicators for screening or assessing individual risk. Although the fingerprints alone are not a unique diagnostic indicator; they do represent a non-invasive and low-cost method of investigation.

There is great potential with dermal ridges going forward; if these patterns are repeated in further studies, we can begin to understand and predict actions. Further research involving larger and more varied group is necessary to analyse the internal patterns and determine their potential cause.

Consequently, dermatoglyphics offers a potentially valuable yet underutilized avenue for enhancing personalized cancer patient risk assessment.

DECLARATION

Funding-

No external funding was received.

Conflicts of Interest-

The authors declare no conflict of interest.

Ethical Approval-

Approved by Institutional Human Ethics Committee (F. No. SU/2025/CRF/218).

Informed Consent-

Written informed consent was obtained from all participants.

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