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Original Research Article

ASSESSMENT OF DIGITAL PATTERNS IN CARCINOMA BREAST PATIENTS OF MADHYA PRADESH

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ABSTRACT

Background: Breast cancer is one of the most common cancer in females, it's development has genetic basis which has been already established. Fingerprint patterns are also formed under genetic control early in development almost at the same period during the development of mammary buds .They do not change significantly thereafter, and thus remains almost same whole life. So these patterns may be evaluated as a non-invasive anatomical marker for breast cancer risk .

Methodology: In this study assessment of the fingerprint patterns of both hands of 109 female breast cancer patients were taken and compared with the patterns of 109 age matched normal healthy females.The Patterns were obtained by Ink method in an A4 size white paper. Fingerprints patterns (arches,loops and whorls) and total finger ridge count of both the groups was studied and analysed.

Results: On statistical analysis it was observed that Whorl pattern are the significantly most common finger print pattern associated with breast cancer patients as compared to normal healthy females of Madhya Pradesh.

Conclusion: The finger print patterns are significantly associated with carcinoma breast and in a developing country like India it may serve as an inexpensive and effective tool for screening the high-risk population for breast cancer.

KEY WORDS: Dermatoglyphics , Digital Patterns , Breast Cancer, Total Finger Ridge Count.

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INTRODUCTION

Dermatoglyphics is the study of epidermal ridge configuration on palms, soles and fingertips [1]. It has been used in diverse fields of genetic research, psychiatry, pediatric medicine and anthropology. The dermal ridge develop in relation to the volar pads which are formed by the 6th week of gestation and reach maximum size between 12thand 13th weeks [2].The pattern of epidermal ridges that develop on the surface of the palms and the soles is determined genetically, and constitutes the basis for examining fingerprints in criminal investigations and medical genetics [3]. Abnormal chromosome complements affect the development of ridge patterns; for example, approximately 50% of neonates with Down syndrome have distinctive ridge patterns that are of diagnostic value [3].

Many diseases due to altered genetic make up have different fingerprint patterns associated with them, this has been verified in hundreds of independent studies. Breast cancer is the most common cancer in women worldwide and second most common cancer in Indian women. It can be life threatening disorder if not diagnosed during early stages. Exact etiology of breast cancer is unknown but it has genetic background which has been extensively studied and proved. Mammary buds develop during intrauterine life around 6th week as solid downgrowth of the epidermis in the underlying mesenchyme [4].This means that the genetic message contained in the genome either normal or abnormal is translated during this period and is also reflected by fingerprint patterns[5].

Previous studies on dermatoglyphics have given us the proof that it can be used to screen many diseases with genetic background. So fingerprints can be anatomical marker to assess the breast cancer risk. Its importance lies in its cost-effectiveness, non-invasive nature and it can be performed in any setting. It may be used for screening high risk subjects among general population and help us to guide them to undergo further established investigations to detect breast cancer.

MATERIALS AND METHODS

This study was conducted on 109 diagnosed and histopathologically confirmed female cases of breast cancer within the age group of 18 to 70 years attending the Radiotherapy department of Government Cancer Hospital, Indore. Similarly 109 age matched normal healthy female controls with no family history of cancer or any other genetic disorder were selected from female students and staff members of Mahatma Gandhi Memorial Medical College and M.Y. Hospital, Indore and female attendants of cancer patients. Subjects with inheritable disorders other than breast cancer like Diabetes, hypertension, schizophrenia or mental retardation were excluded from the study. Informed consent was taken from both groups. Fingerprint patterns were taken by Ink method as described by Cummins and Midlo [6].

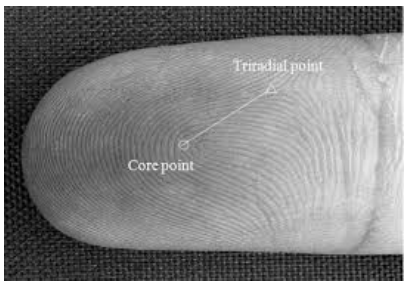
According to ink method first the hands of the subjects were washed properly with soap and water and any greasy material was removed with spirit ,after drying, fingers were placed over the ink pad and rolled over it from one edge of the nail to the other, so that entire fingerprint pattern area is evenly covered with ink, Rolled Impression of all the fingers of both hands were obtained on a A4 size white paper kept on the table top by placing the side of the finger bulb upon the paper and rolling it to the other side until it faces the opposite direction, the recorded patterns were studied using a magnifying lens.Fingerprint patterns (arches, whorls & loops) and Dermatoglyphic landmarks like triradius and core were studied.

Triradius: It is formed by the union of three ridge systems. The geometric center of the triradius is called as triradial point [7] (figure 1).

Core: It is in the center of the dermatoglyphic pattern [7] (figure 1).

Ridge counting of the fingerprint patterns was also done to calculate **Total finger ridge count** (TFRC) which is actually the total of ridge count of all the ten fingers of a person. The ridge counting is done along a straight line connecting the triradial point to the point of core. The ridges containing the point of core and triradial point are both excluded from the count (figure 1).For each subject ten fingerprints were obtained. Overall 1090 fingerprints for cases, similarly 1090 fingerprints for controls were obtained for analysis. For comparison of qualitative data i.e. fingerprint patterns between both the groups was tested using chi-square test. And for comparing quantitative data i.e. total finger ridge counts t- test was used.

Fig. 1: Depicting triradius, core and Ridge counting.



RESULTS

It was observed that total percentage of whorls in cases were 44.77% whereas in controls it was 38.89%.The p-value is less than 0.05, this suggests that the total number of whorls were

significantly higher statistically in breast cancer patients as compared to normal healthy females. While comparing the total percentage of loops in cases with controls, it was found 47.43% in cases which was lesser than their percentage in controls which was 50.91%, but this difference was not statistically significant. The percentage of arches were 7.70% in cases and 9.90% in controls and p- value is higher than 0.05 which is statistically non-significant (Table1).

Table 1: Comparison of percentage of different fingertip patterns in total fingers of breast carcinoma cases and the control group.

Fingertip pattern	Cases (Total no. of fingers=1090)	Controls (Total no. of fingers=1090)	P value
Whorls	44.77%	38.89%	0.005
Loops	47.43%	50.91%	0.1
Arches	7.70%	9.90%	0.069

On comparing between different type of finger-tip patterns observed in two or more fingers of subjects in both the groups and finding association of presence of a particular fingertip pattern in two or more fingers out of ten fingers of subjects with the breast cancer, It was found that significantly higher number of breast cancer patients i.e. 83.48% show presence of whorls in their two or more fingers as compared to controls where it was 68.80%, it was also observed that presence of two or more whorls is significantly associated positively with carcinoma breast (odd's ratio = 2.15).The difference in incidence of two or more loops in fingers of subjects is not statistically significant between cases and controls, though it is associated positively with breast cancer cases but the association is not statistically significant. The difference in incidence of arches between cases and controls is neither statistically significant nor there is any association is found with its incidence and breast cancer (Table 2).

Table 2: Comparison of percentage of different fingertip patterns in total fingers of breast carcinoma cases and the control group.

Pattern type	Cases (109)	Controls (109)	Odds ratio	P value
WHORL	83.48%	68.80%	2.15	0.02
LOOP	87.15%	82.56%	1.43	0.3
ARCH	11.00%	18.00%	0.55	0.12

On comparison of mean of Total finger ridge count between cases and controls; it was observed that there is no significant difference between the mean TFRC of cases and controls (Table 3).

Table 3: Comparison of Mean of Total finger ridge counts of both groups.

Group	Mean	Standard deviation
Cases (109)	114.21	36.8
Controls (109)	109.4	43.87
P Value	0.381	

DISCUSSION

About Fingertip Patterns: Studies done by King MC et al [8], Haung C and Mi M [9], Seltzer M H. et al [10] observed that the whorl patterns are more frequent in breast cancer patients than in control group. Engler et al [11] noted that among subjects with six or more whorls, 95% of them either had cancer or were at high risk. Sakineh Abbasi et al [12] in their study found more digital whorls (6 out of 10) in breast cancer patients as compared to control group. Chintamani et al[13] showed that the whorls are increased in cancer patients as compared to controls. S P Fulari et al[14] found significantly more whorls i.e. having six or more in majority of patients.In our study also total number of whorls were significantly higher in breast cancer cases than controls. It is also observed that 83.48% breast cancer cases show presence of whorls in their two or more fingers as compared to controls where it was 68.80% which is significant and goes in accordance with previous studies.In our study there was no significant difference in total number loops between cases and controls whereas Seidman HM et al [15] and Haung C and Mi M [9] found more loops in breast cancer cases than in control subjects. Bierman et al [16] analyzed the four patterns of ulnar loops significantly associated with breast cancer and classified them as accidentals, transitionals, angled ulnar loops and horizontal ulnar loops.

Chintamani et al also found more loops in breast cancer patients[13]. N S Sridevi in their study found that ulnar loops were significantly more in breast cancer patients[17]. S P Fulari et al found lower percentage of ulnar loops in cases as compared to control group[14] , this could be

due to difference in geographical area and rcial groups of study. Chintamani et al [13] found significantly reduced arches in breast cancer patients than in control group. Sukhre and Mahajan found a significantly increase in the number of arches in carcinoma breast patients as compared to that in the controls, on both the hands[18]. Engler et al. reported the low frequency of the arches in the car-cinoma breast patients as compared to that in the controls [11]. Abbasi et al., reported a decrease in the frequency of the arches[12]. Sridevi et al., reported that on compar-ing all the ten digits, a significant decrease in the arch pattern was reported (P value = 0.05) from the right hands of the carcinoma breast patients[17].But in our study there was no significant difference in proportion of arches in both the groups.

About TFRC: Fuller reported a low TFRC (123.49±44.35), but the difference was not significant [19]. Huang et al reported no significant differences in the TFRC and the AFRC between the cancer patients and the controls [9]. Chintamani et al., reported a low mean total finger ridge count in the carci-noma breast patients as compared to the controls[13]. Sridevi et al, reported a high TFRC in the cancer patients as compared to the controls[17]. Results of our study for TFRC coincides with fuller [19] and Huang et al [9] but are not in agreement with other two above mentioned studies, which could be due to different racial group and geographical area.

CONCLUSION

This study was done to find any significant dermatoglyphic difference between breast carcinoma patients and healthy controls and it has been found that there is a possible positive correlation between fingerprint patterns and breast cancer. Hence dermatoglyphics could be helpful in screening out risk group which can be subjected to timely mammography and detecting possibility of breast cancer, so as to enable us to take preventive prophylactic measures like prophylactic surgery or chemoprevention.In order to designate a particular dermatoglyphic pattern that would be pathognomonic of carcinoma breast, a uniform system of classification of dermatoglyphic patterns should be used and larger sample size in different population groups and geographical areas is required to be studied.

Conflicts of Interests: **None**

REFERENCES

[1]. Henry ER. Classification and uses of finger prints. 8thed. London: HM. Stationary Office 1937:1-45.
[2]. Babler W. Embryologic development of epidermal ridges and their configurations. In: Dermatoglyphics: Science in transition. Birth defects (Edited by: CC P, RM G, BA S). Wiley-Liss: New York; 1991. p. 95-112.
[3]. Moore K L , Persaud T V N ,Torchia M G.The Developing Human: Clinically oriented embryology. 9th edition. Elsevier Publication;2016: 438.
[4]. Moore K L , Persaud T V N , Torchia M G .The Developing Human: Clinically oriented embryology. 7th edition. Elsevier Publication; 2004:492-3.
[5]. Balgir RS.Congenital oral clefts and dermatoglyphics. ISRJ Med Sci 1984;20:622-4.
[6]. Cummins H and Midlo WC. Fingerprints,Palms and Soles: An Introduction to Dermatoglyphics. 2nd edition. New York: Dover Publication. 1961:1-319.
[7]. Schaumann B and Alter M. Dermatoglyphics in medical disorders. New York: Springer 1976:22-87.
[8]. King MC, Go RCP, Elston RC, Lynch HT, Petrakis NL. Allele increasing susceptibility to human breast cancer may be linked to the glutamate pyruvate transaminase locus. Science 1980; 28:406-8.
[9]. Huang C, Mi M. Digital dermal patterns in breast cancer. Proc Natl Sci Coune Repub China1987; 11:133-6.
[10]. Seltzer MH, Plato CC, Fox KM. Dermatoglyphics in the identification ofwomen either with or at risk for breast cancer. Am J Med Genet. 1990 Dec;37(4):482-8.
[11]. Engler et al. Digital dermatoglyphics and Breast cancer. Breast cancer research and treatment. 1982;2(3):261-5.
[12]. SakinehAbbasi, NahidEinollahi, NasrinDashti and VaezZadeh: Study of dermatoglyphics patterns of hands in women with breast cancer. Pak J Med Sci. January – March 2006;22(1):18-22.
[13]. Chintamani et al. Qualitative and quantitative dermatoglyphic traits in patients with breast cancer: a prospective clinical study. BMC Cancer 2007 (Mar) ;7:44.
[14]. S P Fulari, M M Pirzade, AshwiniJadhav. Study of dermatoglyphics in breast cancer. National Journal of Medical Sciences. 2012(JAN); 1(1):29-32.
[15]. Seidman H M, Stellman S D, Mushinski M H. A different perspective on breast cancer risk factors: Some implications of the non attributable risk. Cancer Research .1982;32:301-313.
[16]. Bierman HR, Faith MR, Stewart ME. Digital dermatoglyphics in mammary cancer.Cancer Invest. 1988;6(1):15-27.

[17]. N S Sridevi, C R Wilma Delphine Silva, Roopa Kulkarni, C.Seshagiri. Romanian Journal of Morphology and Embryology. 2010;51(3):547-550.

[18]. S B Sukhre, A A Mahajan. Dermatoglyphics in the identification of women either with or at risk for breast cancer. 51st journal of Anatomical society of India. 5(1); 2004-01; 2004-06.

[19]. Fuller I C . Inherited predisposition to cancer? A dermatoglyphic study. Br J Cancer. 1973;28(2):186–189.

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