Qualitative and Quantitative Dermatoglyphics and the Estrogen Exposure in Breast Cancer Risk: an Epigenetic Context.

Running Title: Dermatoglyphics and Breast cancer epigenetics

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Abstract –

Background – The lastingness of dermatoglyphics suggest epidermal ridges as a bio-signature for studying the epigenetic insults in the prenatal period. Approaching the preventive measures in epigenetic viewpoint aid to reduce the incidence of carcinoma. **Objective** – To inquire the association of qualitative and quantitative dermatoglyphics and the estrogen exposure in spotting out breast cancer risk in an epigenetic context. **Materials and Methods** – We performed the study among 150 females in three groups. The outcome of dermatoglyphic variables includes six or more whorls, Mean finger ridge count, A- B Subtotal ridge count, ATD angle and pattern intensity index. The variables of reproductive and genetic factors are increased menstrual age, Nulliparity, First Full Term Pregnancy >30yrs, and Positive Family History. The statistical procedure used are odds ratio and the level of significance using P- value. **Results** - Increased menstrual age is significantly associated with six and more whorls (P<0.0001), Mean finger ridge count (P<0.04), A-B Ridge count (P<0.0001), ATD angle (P<0.0001), Pattern intensity index (<0.0001). Nulliparity is significantly associated with the ridge count (P<0.0001), ATD angle (P<0.001), full term pregnancy >30yrs is associated significantly with A-B ridge count (P<0.01), ATD angle (P<0.02), pattern intensity index (P<0.05). Positive Family History is associated significantly with all the variables. **Conclusion:** To encapsulate six or more whorls are associated with high frequency with positive family history, Mean finger ridge count, and pattern intensity index is related in high frequency with menstrual age and ATD angle is linked in high frequency with nulliparity when compared with other reproductive factors.

Key words – Dermatoglyphics; breast neoplasm; epigenetics; estrogen; parity

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Introduction –

Dermatoglyphics is the scientific study of patterns of the ridged skin on the palms, fingers, soles, and toes. A dermal ridge pattern forms an important representation of the genetic and epigenetic programming of fetal life. Dermatoglyphic traits are genetically determined, their polygenic inheritance and lastingness after birth suggest epidermal ridge as a bio-signature for studying the epigenetic insults in the prenatal period of one's life. The carcinoma of the breast is one of the leading causes of cancer and cancer-related death in women globally.

Approaching the preventive measures in epigenetic viewpoint aid, to reduce the incidence and the mortality rate of carcinoma. The lifetime estrogen exposure of a woman plays a decisive role in epigenetic setting. The synergistic activity of hormones estrogen and progesterone in a women's different phase of life indeed decides the breast cancer risk. The hormone-based life events include early menarche, late menopause, first full-term pregnancy > 30 years of age, obesity, nulliparity, hormone replacement therapy exploits the epigenetic programming and reprogramming of a pregnant mother, the developing fetus (female daughters) and her generations.[1, 2, 3, 4] The crucial period of epigenetic programming and reprogramming occurs in-utero, during puberty and pregnancy period of a women's life. This decisive period is highly

influenced by environmental conditions like food, exercise, pollution, sleep, and stress that may positively impacts breast cancer risk. [5, 6, 7, 8]

The study aims to inquire about the association of qualitative and quantitative dermatoglyphics and the estrogen exposure in spotting out breast cancer risk in an epigenetic context.

Materials and methods:

We performed the study among 150 females in three groups, each comprising of 50, the candidates are age-matched between 35-60 years. We began the study after getting approval from the Institutional Human Ethical Committee, -IHEC No-06/10/2012, dated -09th October 2012. Chennai, Tamilnadu. We gave detailed explanation about the procedure to the participants and their co-operation and willingness are obtained with informed consent. The sample size is estimated to be 50 in each group for detecting odds ratio of 4 for 90% power at 5% significance level. Sampling technique used is simple random allocation. The participants are grouped based on selection criteria. Group I indicates females diagnosed histopathologically for breast cancer as their primary site of carcinoma. Group II indicates females who are a designated as high risk for breast cancer based on their family history for breast cancer in their first-round relative, or existence of any two elements based on their endogenous exposure to estrogen which includes Menstrual age (early menarche below 12 years, late menopause above 50 years) Parity status (First Full Term Pregnancy – FFTP above 30 years of age, Nulliparity), Personal history of fibro-adenoma, obesity, Hormone Replacement Therapy (HRT). Group III indicates normal healthy females. The exclusion criteria for the group I &II includes breast cancer developed as secondaries from the primary site of origin elsewhere, females exposed to chemotherapy or radiation therapy, females affected with any other major non-communicable diseases, Male participants and those who do not possess proper visible dermal ridges due to their profession. The exclusion criteria for group III includes Personal or family history of breast cancer, Personal or family history of non- cancerous tumor, population exposed to chemotherapy or radiation therapy, the population affected with any other major health problem, Male participants, and those who do not possess proper visible dermal ridges due to their profession.

The data of hormone-based life events of study participants are collected as a part of subjective assessment. Dermatoglyphic variables are collected in the form of digital photographic images of the digits and palm of right and left hand and the variables are analyzed using the computer. All the outcome variables are assessed by a trained evaluator who is blind to the study and group status. The outcome of dermatoglyphic variables includes Six or more whorls, Mean finger ridge count <12.5, A-B Subtotal ridge count >34.8, ATD angle <43degree, and pattern intensity index > 12.5. [4, 9] The variables of reproductive and hereditary factors are increased menstrual age, Nulliparity, FFTP>30yrs, and Positive Family History.

Results -

The statistical procedure used to analyze the frequency of association between the Dermatoglyphic Pattern and the reproductive factors is the odds ratio and the level of significance using the p-value. The statistical analysis tested the null hypothesis that there is no difference in the finger ridge patterns and lines between the three study groups. The differences are considered statistically significant at P <0.05.

The outcome of the research describes the dermatoglyphic variable six or more whorls observed in 27% of females with increased menstrual age, among which 15% fall under breast cancer group, 10% high-risk females, and 2% normal females with a significance level of P-value 0.0001. Similarly, 29% of females with nulliparity are related to the six or more whorls among which 12% fall under the breast cancer group, 15% higher risk females, and 2% normal population. The findings describe 11 % of females with first full-term pregnancy >30 years of age associate to Six or more whorls among which 5 and 6 percent, respectively fall under breast cancer and high-risk females. Nulliparity and age at first full-term birth are not significantly associated with the given variable. 39% of the study population with a positive family history in their first-round relative are observed to have six or more whorls among which 23 and 16 percent, respectively fall under breast cancer and high-risk group with a significance level of P-value 0.0001. (Figure 1, Table -1)

The dermatoglyphic variable Mean finger ridge count <12.6 is perceived in 33% of females with increased menstrual age, among which 14% fall under breast cancer group, 19% high-risk females with a significance level of P-value 0.0001. Similarly, the 16% females with nulliparity are associated with the Mean finger ridge count <12.6 among which 8% fall under breast cancer group, 8% higher risk females with a significance level of P-value 0.0001. The investigation details 9% of females with first full-term pregnancy >30 years of age-related to Mean finger ridge count <12.6 among which 5 and 4 percent, respectively fall under breast cancer and high-risk females and not significantly associated with the given variable. 27% of the study population with a positive family history in their first-round relative are perceived to have Mean finger ridge count <12.6 among which 15 and 12 percent, respectively fall under breast cancer and high-risk group with a significance level of P-value 0.0001. (Figure 1, Table -1)

The dermatoglyphic variable A-B ridge count <34.8 is considered in 29% of females with increased menstrual age, among which 13% fall under breast cancer group, 14% high-risk females, and 2% normal females with a significance level of P-value 0.0001. Similarly, 21% of females with nulliparity are linked to the A-B ridge count <34.8 among which 13% fall under breast cancer group, 8% higher risk females, and the variable don't exhibit statistically significant association. The findings describe 9% of females with first full-term pregnancy >30 years of age is linked to A-B ridge count <34.8 among which 4 and 5 percent, respectively fall under breast cancer and high-risk females with a significance level of P-value 0.01. 25% of the study population with a positive family history in their first-round relative are observed to have

A-B ridge count <34.8 among which 14 and 11 percent, respectively fall under breast cancer and high-risk group with a significance level of P-value 0.0001. (Figure 1, Table -1)

The dermatoglyphic variable ATD angle <43° is considered in 26% of females with increased menstrual age, among which 14% fall under breast cancer group, 10% high-risk females, and 2% normal females with a significance level of P-value 0.0001. Similarly, the 27% females with nulliparity are linked to the ATD angle <43° among which 16% fall under breast cancer group, 9% higher risk females, and 2% normal females with a significance level of P-value 0.0001. The findings suggest 8% of females with first full-term pregnancy >30 years of age are linked to ATD angle <43° among which 5 and 3 percent, respectively fall under breast cancer and high-risk females with a significance level of P-value 0.02. 22% of the study population with a positive family history in their first-round relative are observed to have ATD angle <43° among which 13 and 9 percent, respectively fall under breast cancer and high-risk group with a significance level of P-value 0.01. (Figure 1, Table -1)

The dermatoglyphic variable pattern intensity index >12.5 is observed in 35% of females with increased menstrual age, among which 19% fall under breast cancer group, 14% high-risk females, and 2% normal females with a significance level of P-value 0.0001. Similarly, 25% of females with nulliparity are linked to the pattern intensity index >12.5 among which 13% fall under breast cancer group, 10% higher risk females, and 2% normal females and not statistically significant with the variable. The findings suggest 9% of females with first full-term pregnancy >30 years of age are linked to pattern intensity index >12.5 among which 6 and 3 percent, respectively fall under breast cancer and high-risk females with a significance level of P-value 0.05. 26% of the study population with a positive family history in their first-round relative are observed to have pattern intensity index >12.5 among which 16 and 10 percent, respectively fall under breast cancer and high-risk group with a significance level of P-value 0.0001. (Figure 1, Table -1)

Discussion –

The purpose of the study is to explore the association of the dermatoglyphic patterns with distinct reproductive factors namely increased menstrual age, nulliparity, first full-term pregnancy, and positive family history. The findings of the investigation recommend the qualitative variable Six or more whorls to have a significant association with increased menstrual age, population with positive family history, and not significantly associated with nulliparity and first full-term pregnancy status. The quantitative variables of the study propose Mean finger ridge count <12.6 to have a significant association with reproductive factors, namely increased menstrual age, Nulliparity, and in population with positive family history. None of the normal group population is observed to have the variable associated with reproductive factors. The results indicate A-B ridge count <34.8 to have a statistically significant association with reproductive factors, namely increased menstrual age, age at first full-term pregnancy, and in

population with positive family history. None of the normal group population is observed to have the given variable associated with reproductive factors except menstrual age. The dermatoglyphic variable ATD angle <43° recommends having a statistically significant association with all the given reproductive factors and the population with positive family history. The results of research recommend the pattern intensity index >12.5 to have a statistically significant association with all the given reproductive factors menstrual age, age at first full-term pregnancy, and the population with positive family history. (Figure 1, Table -1)

To encapsulate six or more whorls is associated with high frequency with positive family history, Mean finger ridge count, and pattern intensity index are related in high frequency with menstrual age and ATD angle is linked in high frequency with nulliparity when compared with other reproductive factors. Nulliparity and First Full Term Pregnancy >30yrs are the incidences in a lifetime that may be due to either inheritance or acquired. The epigenetic mechanism may play a vital role in this context. The inheritance of the Nulliparity and FFTP>30yrs are exhibited as distinct dermal ridge patterns. The inheritance may be due to transference of affected gene from parents to daughter cell or may be due to epigenetic alteration of parents resulting in a deficient gene that may be transferred to daughter without any changes in nucleotide sequence.

A case-control study conducted among the Moroccan population in the year 2014 and 2015 reported the two reproductive factors early menarche and nulliparity to have a significant association with the increased risk of breast cancer whereas first full-term pregnancy is associated with decreased risk of breast cancer. These findings reinforce the study results as most of the dermatoglyphic variables describes a high frequency of association with menstrual age. Their results conclude the definite association of distinct reproductive factors for breast cancer and recommend preventive and screening interventions to be focused on priority on these high-risk populations. The number of epidemiological studies conducted throughout the world reported the influence of reproductive factors like age at menarche, age at first full-term pregnancy, age at menopause, parity status and history of breastfeeding in the breast cancer risk. (10, 11, 12, 13)

In a collaborative study conducted on a group of hormonal factors in breast cancer one hundred and seventeen epidemiological studies are reviewed which includes 118964 females affected with breast cancer and 306091 are under a healthy population. The study calculated the risk ratio associated with the age of menarche and the age of menopause for breast cancer risk. The results of the study prove that breast cancer risk is increased for proportional to younger the age of menarche and similarly the risk increases proportionate to the delay in the age of menopause. The results of this study are similar to findings of the current dermatoglyphic study mimicking its positive association with breast cancer and suggesting a possible association of menstrual age with breast cancer risk. The study also proves the increased risk of premenopausal for breast cancer compared to the postmenopausal women of an identical age. The study concluded that

endogenous ovarian hormones are associated with estrogen receptor-positive breast cancer than with estrogen receptor-negative disease for the lobular type of cancer when compared to ductal tumors. [14]

A review published by the department of nutritional sciences in the year 2016, reported the role epigenetic effects on the developing fetus influenced by the endocrine disruptors in the food and drinking water. These substances are said to disrupt the hormonal regulation epigenetically and increase the breast cancer risk of developing fetus. The review focuses on the aromatic hydrocarbons, Bisphenol A, its effects in tumor suppressor gene epigenetic prints that follow a similar pattern found in sporadic breast cancer. The study also hypothesized the food components that positively regulate the epigenetic mechanisms act in a protective way against these inducing disruptors. These pieces of evidence support the hypothesis of the current study as the maternal environment highly influences the epigenetic imprinting of the fetus which can be reflected in the dermatoglyphics of the developing fetus. As the epigenetic mechanism is reversible, bioactive food components and a healthy lifestyle can reverse the epigenetic imprinting and regulate the gene expression which can aid in cancer prevention. On this hypothesis, the current study through its distinct dermatoglyphic patterns can aid as a screening tool for spotting the breast cancer population at risk and play a pivotal role in taking preventive measures by initiating lifestyle modification to those high-risk population. [15]

The outcome of a dermatoglyphic meta-analysis performed to hypothesize the epigenetic influence in the development of chronic diseases concludes the epigenetic programming during the first trimester of gestation and the impact decline gradually through the second trimester. Each dermatoglyphic variable has a gestational timeline relative to the development of organ systems and its insults. This demands an assumption that the epigenetic disruptors specifically affecting organ systems can be linked to the disorder under investigation. [16, 17, 18]

Dermatoglyphic analysis of a study performed in the Bosnian population described significant association for palmar ATD angle and Subtotal ridge counts, namely A-B, B-C, and C-D, did not show a significant association for both right and left hand. These findings recommend having an association with a positive family history which is in agreement with the results of the current study. [19] Palmar dermatoglyphic variable exhibited significant association with single nucleotide polymorphism of DNA repair genes in breast cancer risk with a relative risk of 2 to 4 times. The findings of the study recommend dermatoglyphics as an effective biomarker for spotting breast cancer risk. A Study performed to analyze the association of the fluctuating asymmetry of dermatoglyphics with DNA repair gene polymorphism in spotting the breast cancer risk recommends the variables, namely FA Finger ridge count of thumb, ring and A-B ridge count to have significant relation compared to other dermatoglyphic measurable variables in spotting breast cancer risk which is in agreement with the present study. [4, 20,21]

Limitation and Recommendations:

The limitation of the study is its sample size. Future investigations should be performed with a large scale population in an epigenetic perspective to generalize the results. Approaching the preventive strategy for breast carcinoma in epigenetic viewpoint assists in decreasing the incidence and the mortality rate of breast carcinoma in the current and future generations.

Conclusion

The finding of the current study is suggestive of the possible association of the Hormone based life events and breast cancer risk to have an epigenetic context. The association of dermatoglyphics with positive family history and breast cancer risk is highly suggestive of the genetic influence of the disease. The hypothesis investigates and recommends the dermatoglyphics as a bio-signature of fetal epigenetic insults influenced by estrogen exposure in spotting out females at risk for breast cancer.

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Conflict of interest – Nil

References:

1. Jacob K. Kresovich, Zongli Xu, Katie M. O Brien, Clarice R. Weinberg, Dale P. Sandler, Jack A Taylor, Epigenetic mortality predictors and incidence of breast cancer , Aging 2019:11(24).11975 – 11987. doi: 10.18632/aging.102523
2. Bray F, Ferlay J, Soerjomataram I, Siegel Rl, Torre LA, Jemal A, Global Cancer Statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries, CA:A Cancer Journal for Clinicians, 2018, 68(6):394 -424. Doi : 10.3322/caac.21492
3. Shreshtha Malvia, Sarangadhara Appalaraju Bagadi, Uma S Dubey, Sunita Saxena, Epidemiology of breast cancer in Indian women, Asia-Pacific Journal of clinical oncology 2017:13:289-295. **https://doi.org/10.1111/ajco.12661**
4. Prathap L, Jagadeesan V, Suganthirababu P, Ganesan D, Association of Quantitative and qualitative dermatoglyphic variable and DNA polymorphism in female breast cancer population, Online journal of Health and Allied Sciences 2017:16(2):2. https://www.ojhas.org/issue62/2017-2-2.html
5. Persson I, Estrogen in the causation of breast, endometrial and ovarian cancer- evidence and hypotheses from epidemiological findings, The Journal of Steroid Biochemistry and Molecular Biology 2000:30:74(5):357-64 DOI:10.1016/s0960-0760(00)00113-8
6. Leena Hilakivi –Clarke, Maternal exposure to diethylstilbestrol during pregnancy and increased breast cancer risk in daughters, Breast cancer research 2014:16:208. DOI:10.1186/bcr3649

7. Julia Green Brody, Kirsten B.Moysich PhD, Oliver Humblet MS, Kathleen R. Attfield BS, Gregory P. Beehler MA, Ruthann A. Rudel MS, Environmental Pollutants and breast cancer, Cancer 2007: 109, (S12):2667-2711. **https://doi.org/10.1002/cncr.22655**
8. Kyung Hee Han, Mi-Kyung Kim, Hee Seung Kim, Hyun Hoon Chung, Yong Sang Song, Protective effect of progesterone during pregnancy against ovarian cancer, Journal of cancer prevention 2013:18:113-22 https://doi.org/10.15430/JCP.2013.18.2.113
9. Lavanya Prathap, Prathap Suganthirababu, Jagatheesan Alagesan, Digital and palmar dermal ridge patterns in population with breast carcinoma, Biomedicine 2014: 34(3):315-321.
10. Mohamed Khalis, Barbara Charbotel, Vernonique Chajes, Sabina Rinaldi, Aurelie Moskal, Carine Biessy, Laure Dossus, Inge Huybrechts, Emmanuel Fort, Nawfel Mellas, Samira Elfakir, Hafida Charaka, Chakib Nejjari, Isabelle Romieu, Karima El Rhazi, Menstrual and Reproductive factors and risk of breast cancer : a case control study in the Fez region, Morocco, Public library of science 2018:13(1):e0191333.
11. Kelsey JL, Gammon MD, John EM. Reproductive factors and breast cancer. Epidemiol Rev. 1993; 15 (1):36–47. PMID: 8405211
12. Parsa P, Parsa B. Effects of reproductive factors on risk of breast cancer: a literature review. Asian Pac J Cancer Prev. 2009 Dec; 10(4):545–50 PMID: 19827866
13. Key TJ, Verkasalo PK, Banks E. Epidemiology of breast cancer. The Lancet Oncology. 2001 Mar; 2 (3):133–40. https://doi.org/10.1016/S1470-2045(00)00254-0 PMID: 11902563.
14. Collaborative Group on Hormonal Factors in Breast Cancer. Menarche, menopause, and breast cancer risk: individual participant meta-analysis, including 118 964 women with breast cancer from 117 epide- miological studies. The Lancet Oncology. 2012 Nov; 13(11):1141–51. https://doi.org/10.1016/S1470-
15. Donato F Romagnolo, Kevin D. Daniels, Jonathan T.Guruwald, Stephen A. Ramos, Catherine R. Propper, Ornella I.Selmin, Epigenetics of breast cancer: Modifing role of environmental and bioactive food compounds, Molecular Nutrition and Food Research 2016:60(6): 1310 – 1329. doi:10.1002/mnfr.201501063
16. Seile Yohannes, Dermatoglyphic meta-analysis indicates early epigenetic outcomes and possible implications on genomic zygosity in type -2 diabetes, F1000Research 2015:4:617. doi: 10.12688/f1000research.6923.1
17. Annelie Johansson, Domenico Palli, Giovanna Masala, Sara Grioni, Claudia Agnoli, Rosario Tumino, Maria Concetta Giurdanella, Francesca Fasanelli, Carlotta Sacerdote, Salvatore Panico, Amalia Mattiello, Silvia Polidoro, Michael E. Jones, Minouk J. Schoemaker, Nick Orr, Katarzyna Tomczyk1, Nichola Johnson, Olivia Fletcher, Vittorio Perduca, Laura Baglietto, Pierre-Antoine Dugué, Melissa C. Southey,Graham G. Giles, Dallas R. English, Roger L. Milne, Gianluca Severi, Srikant Ambatipudi, Cyrille Cuenin Veronique Chajès, Isabelle Romieu, Zdenko Herceg, Anthony J. Swerdlow, Epigenome-wide association for estrogen exposure identifies an epigenetic signature associated with

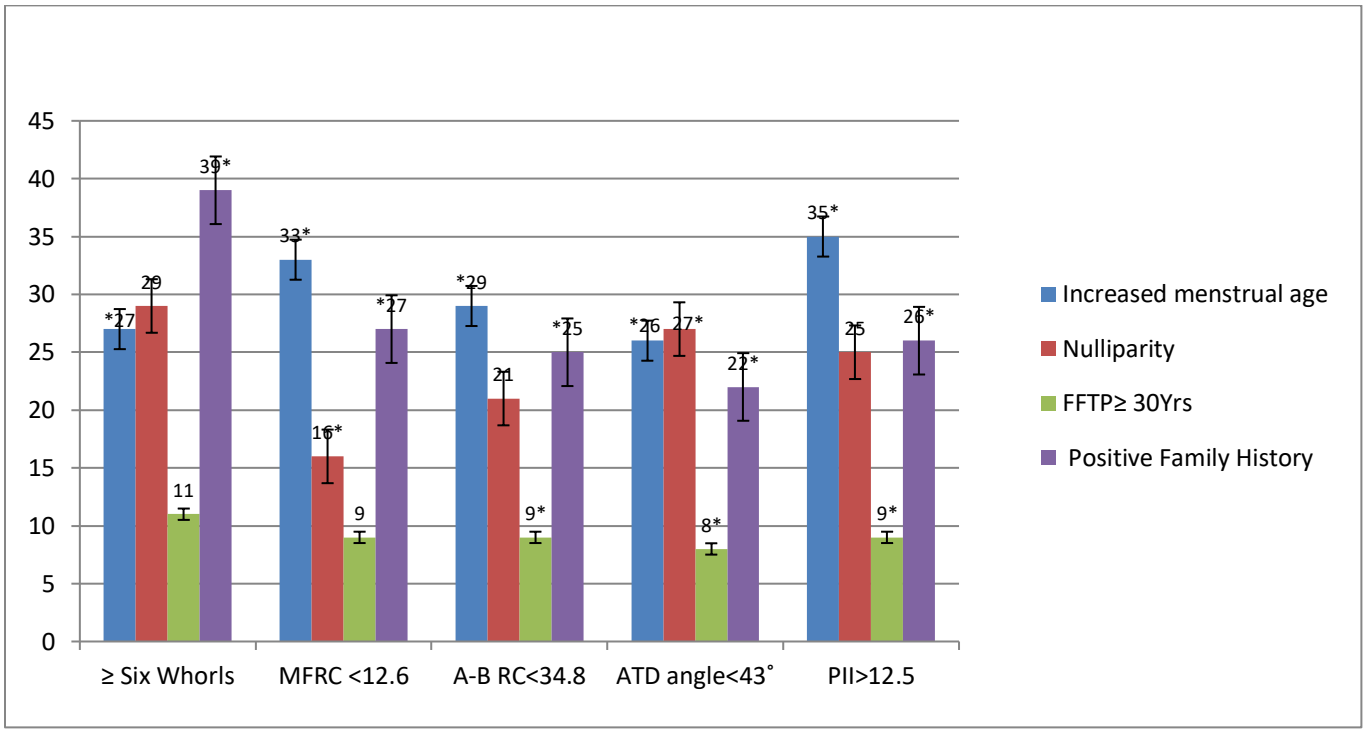
breast cancer risk, Clinical Epigenetics 2019:11:66.DOIhttps://doi.org/10.1186/s13148-019-0664-7

18. Shizhao Li, Min Chen, Yuanyuan Li, Trygve O, Tollefsbol, Prenatal epigenetics diets play protective roles against environment pollution, Clinical Epigenetics 2019:11,82. DOIhttps://doi.org/10.1186/s13148-019-0659-4.
19. Azra Metovic, Jasmin Musanovic, Selma Alicelebic, Esad Pepic, Senad Slijuka, Maida Mulic, Predictive analysis of palmar dermatoglyphics in patients with breast cancer for small bosanian – Herzegovinian population, Medical Archives 2018:72(5):357-361.doi: 10.5455/medarh.2018.72.357-361
20. Prathap L, Suganthirababu P, Ganesan D, Fluctuating asymmetry of dermatoglyphics and DNA polymorphism in breast cancer population, Indian journal of public health research and development.2019; 10 (11):3574-3579. DOI: 10.5958/0976-5506.2019.04141.X
21. Prathap L, Jagadeesan V, Suganthirababu P, Ganesh D. Association of quantitative and qualitative dermatoglyphic variable and DNA polymorphism in female breast cancer population. Online J Health Allied Scs. 2017;16(2):2.

Table- 1: Association of Distinct Dermatoglyphic Variable with Reproductive and hereditary factors.

Risk Factors	OR(CI)	Dermatoglyphic Variables				
		Six or more whorls N=63(42%)	MFRC <12.6, N= 105(70%)	A-B ridge count<34.8-n=67(45%)	Atd angle <43°, n= 123(82%)	PII-D >12.5 N=78(52%)
Increased menstrual age	OR(95% CI)	0.17(0.08-0.3)	0.46 (0.21-0.98)	0.13 (0.06-0.27)	13.46 (4.38-41.32)	0.08 (0.03-0.18)
	P Value	**0.0001**	**0.04**	**0.0001**	**0.0001**	**0.0001**
Nulliparity	OR(95% CI)	0.82 (0.43-1.59)	34.59 (11.25-106.36)	0.59 (0.30-1.14)	16.00 (4.55-56.26)	1.13 (0.56-2.29)
	P Value	0.57	**0.0001**	0.11	**0.0001**	0.72
FFTP >30Years	OR(95% CI)	0.47 (0.18-1.27)	1.01 (0.36-2.82)	0.28 (0.10-0.79)	3.23 (1.13-9.22)	0.34 (0.11-1.00)
	P Value	0.13	0.98	**0.01**	**0.02**	**0.05**
Positive Family History	OR(95% CI)	0.06 (0.02-0.15)	0.24 (0.093-0.61)	0.09 (0.03-0.20)	2.93 (1.25-6.89)	0.12 (0.05-0.29)
	P Value	**0.0001**	**0.003**	**0.0001**	**0.01**	**0.0001**

Figure I - Association of Distinct Dermatoglyphic Variable with Reproductive and hereditary factors.



*****Statistically significant