

Association of Finger Ridge Pattern and E-Beta-Thalassemia: A Study on Bengalee Population of West Bengal, India

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Received 10 January 2015; accepted 30 January 2015; published 3 February 2015

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Abstract

There is well documented relationship between dermatoglyphics and specific syndromes of genetic origins. Since beta-thalassemia is a major genetic disorder in West Bengal, India, therefore, rapid diagnosis of major beta thalassemia along with certain preventive measures is of utmost significance. The aim of the present study was to understand the association of the finger prints patterns among the E-beta thalassemia patients of Bengalee Hindu Caste population of West Bengal, India. To achieve the purpose, bilateral fingerprints have been collected from 100 (Male-50, Female-50) diagnosed E-beta thalassemia patients from Bengalee population in West Bengal using standard ink roller technique. Examination on finger pattern type revealed significantly ($p < 0.05$) higher Whorls among the male patients in comparison to their female counter part. On the other hand, significant ($p < 0.05$) excess of Arches has been found among the female patients compared to the male patients. Present study envisaged that these finger dermatoglyphics patterns might be helpful for the diagnosis and screening of E-beta thalassemia in Bengalee population.

Keywords

Dermatoglyphics, E-Beta Thalassemia, Bengalee Hindu Caste Population, Finger Pattern Type

1. Introduction

Dermatoglyphics attracted a great number of scientists from all sections of biology, medicine and biological

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How to cite this paper: Das, P., Ghosh, J. R., & Bandyopadhyay, A. R. (2015). Association of Finger Ridge Pattern and E-Beta-Thalassemia: A Study on Bengalee Population of West Bengal, India. *Advances in Anthropology*, 5, 19-21.

<http://dx.doi.org/10.4236/aa.2015.51002>

anthropology (Chen et al., 2008) and greater association between dermatoglyphics and diseases or congenital abnormalities has also been extensively studied (Miličić et al., 2003). Dermatoglyphics have also been used as one of the accessible tools to assess genetically determined diseases (Penrose, 1968; Miličić et al., 2003; Temaj et al., 2009). Findings from the earlier studies regarding intrinsic patterns of dermatoglyphics and chromosomal aberrations (Schauman & Alter, 1976) for example Down's syndrome (Banerjee et al., 1992), Klinefelter's syndrome (Komatz & Yoshid, 1976), Turner syndrome (Reed et al., 1977), Cri-du-chat syndrome (Suzumari, 1980) have also been reported. In addition to that, dermatoglyphics has been subject matter of many studies regarding complex and non communicable disease like breast cancer (Chintamani et al., 2007), carcinoma cervix (Vaishali et al., 2006), and diabetes (Vadgaonkar et al., 2006).

Dermatoglyphics was helpful for diagnosis of the beta-thalassemia patients worldwide (Dogramarci et al., 2009; Solhi et al., 2010). About 10% of total world thalassemia patients belong to Indian subcontinent, among them 3% - 4% are carriers (Sinha et al., 2009). However, only few attempts have been conducted to study the dermatoglyphic patterns of the beta thalassemia patients (Saha et al., 1973; Bhalla et al., 2004; Rashida et al., 2012) in India. Eventually, general population has a prevalence of beta-thalassemia 3.60% - 5.95% in West Bengal (Mohanty et al., 2013) and to best of the knowledge the present study is the first attempt to study the dermatoglyphics (finger print) patterns of the Bengalee E-beta-thalassemia patients in West Bengal.

2. Materials and Methods

The study was conducted among 100 (Male-50, Female-50) diagnosed E-beta-thalassemia patients from Bengalee Hindu Caste population of West Bengal. Before collecting the fingerprints written and/or verbal consent has been taken from each of the participants and the present work has obtained ethical committee clearance from University of Calcutta. Analyses of the finger prints have been classified mainly in four categories, viz. Whorl (W), Radial Loop (Lr), Ulnar Loop (Lu) and Arch (A) following standard method (Schaumann & Alter, 1976). The cut off for statistical significance level was set on $p = 0.05$.

3. Result and Discussion

Examination on finger print pattern revealed (Table 1) significant ($p < 0.05$) excess of Whorls in male E-beta-thalassemia patients in comparison to their female counterparts. In contrast, female E-beta-thalassemia patients demonstrated significantly higher ($p < 0.05$) prevalence of Arches and as well as Loop patterns compared to the male E-beta-thalassemia patients. Consequently a trend of higher Pattern Intensity Index (PII) has been observed in male E-beta thalassemia (13.64) than the female E-beta-thalassemia (12.54) patients due to significantly ($p < 0.05$) higher Arches and Ulnar Loops (Lu) in female E-beta-thalassemia patients.

The present study corroborated with the earlier study (Solhi et al., 2010) from Iran in terms of significant excess of the Whorl in thalassemia patients in comparison to the controls. On the other hand, significant ($p < 0.05$) excess of Loops among the female E-beta-thalassemia patients was found to be in corroboration with the earlier study from Turkey (Dogramarci et al., 2009). In Indian context, significant increase in Whorls among the thalassemia patients was also found in the different studies (Saha et al., 1973; Mahato et al., 2006; Dehankar et al., 2006) which is also evident in the present study as well. However, present study also vindicated significant ($p < 0.05$) sexual dimorphism in terms of increased Loops and Arches among the female E-beta-thalassemia patients.

4. Conclusion

The present study, therefore, envisaged distinctive dermatoglyphic features specifically excess of Whorl in male E-beta-thalassemia patients including significant excess of Loops and Arches as well can be used to reinforce clinical judgment through effective, inexpensive and non-invasive diagnosis and screening of E-beta-thalassemia patients of Eastern parts of India.

Table 1. Finger pattern types in male and female E-beta-thalassemia patients.

	Male	Female
Whorl (W)	185 (18.50)%	153 (15.30)%
Ulnar Loop (L ^u)	9 (0.90)%	8 (0.80)%
Radial Loop (L ^r)	303 (30.30)%	313 (31.30)%
Arch (A)	3 (0.30)%	26 (2.60)%

Acknowledgements

Authors are indebted to the participants for their cooperation. Financial support for the present work by the UGC is gratefully acknowledged.

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