"Correlation between Dermatoglypic Pattern & ABO Blood Group With Obesity in School Going Children in Chennai "

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Abstract

We conducted present study to find out prevalence of in school going children and to see if there is anycorrelation between dermatoglypic pattern and ABO blood group with obesity. The first aim of the study observational of cross sectional study included totally 300 same age group children from each 75 children of males and females obesity children, compared with each 75 children of males and females normal children.The finger prints were collected from the subjects, after clearly explained the nature and purpose of the study. All the children were asked and got their palmer dermatoglyphic impression on plain white A4 paper used the ink method. The second aim of study obesity children of 150 blood samples were collected by finger prick method,and blood typing done by slide method using Anti sera- A and Anti sera- B.Normal healthy children males 7.3% were found to have Arches, 49.9% were found to have Radial loops,17.7%were found to have Ulnar loops and 25.1 % were found to have whorls, and obesity children males 42.7 % were found to Arches, 10.8 %were found to have Radial loops,28.3 % were found to have Ulnar loops and 18.2% were found to have whorls .The result obtained from the normal healthy females children of these 5.4 % were found to have Arches, 39.9% were found to have Radial loops, 24.9 %were found to have Ulnar loops and 29.8% were found to have whorls, and obesity children females 50.8 % were found to Arches,8.8 %were found to have Radial loops,21.4 % were found to have Ulnar loops and 19 % were found to have whorls.Compared to the health children with obesity children arches was found more in obesity children.Blood group estimation was done forobese children only 56.7% were found blood group O, 17.5% were found group A and 25.8%were found group B, nobody had blood group AB. Dermatoglyphic patterns can be used as a marker to detect the obesity. An increased number of arches may be considered in identifying individuals at high risk for obesity. Obesity was found more prevalent in O blood group children.So necessary preventive and promotive health measures can be adopted in such identified high-risk individuals.

***Key Words*:** Arches, Obesity, School Children, ABO blood groups.

INTRODUCTION

Dermatoglyphics is a scientific method of reading lines and ridges of finger, palm and sole. The term Dermatoglyphics was first introduced in 1926 by Cummin and Midlo. The skin on the palmar and plantar surface is grooved by curious ridges, which form a variety of configurations.Each individual's ridge configurations are unique. The dermal ridge differentiations are genetically determined and influenced by environmental factors. It provides a simple ,useful and inexpensive means for diagnostic value in several medical disorders for the last several decades.[(1)]Many articles have been published in medical journals around the world, and dermatoglyphics has been used in such diverse field as pediatric medicine, genetic research, criminology , psychiatry, and anthropology.

Dermatoglyphics and Various Diseases

In clinical medicine, chromosomal anomalies such as the trisomies 13–15 (Patau's syndrome), 18 (Edwards' syndrome), 21 (Down's syndrome) and the sex chromosomes (Turner's syndrome X0 and Kleinfelter's syndrome 47, XXY) and deletion of the short arm of chromosome 5 (Cri du Chat syndrome) are recognized as having abnormal dermatoglyphic patterns.[(2)]These observations suggested that hereditary or environmental factors acting in early gestation may have played a role in the genesis of the disease.

Dermatoglyphics is one of the new and advancing branches of medical science, which studies cornified layer of epidermis and dermal papillae. It is situated and used in the prediction of genetic disorders.[(3)]Traditionally, a deficiency in macro- and micro nutrients has been the major problem among children in low income countries. Childhood obesity is recently becoming one of

major issue in many developing countries. There has been a rapid rise in the number of overweight and obese childrendespite a persistently high burden of under nutrition.[4]Playing indoor games & computer games, watching TV and sedentary life style leads to energy imbalance between energy intake and work output.[5]

Obesity is a multifactorial condition (polygenic and environmental). Factors determining obesity in utero may influence dermatoglyphic patterns. Dermatoglyphic patterns can be used as a marker to detect obesity. Hence, this study was undertaken to detect the any possible relationship between the dermatoglyphic pattern and obesity.

Each individual's genetic background remains an important determinant of susceptibility to obesity. Discovery of genes involved in development of common forms of obesity, thereby identifying pathways that are casual in patients, will guide clinicians and scientists in designing more effective therapies and in identifying high-risk individuals for early interventions.[6][7]

MATERIALS AND METHODS

Ethical clearance was obtained from the institutional ethical committee at Madras Medical College - Rajiv Gandhi Government General Hospital, Chennai. Study protocol was explained to the school principal and got letter of permission for conduction of this study was obtained. The study design was communicated to students and their parents, a informed consent form was given and got for their parents consent. The fingerprints were obtained by the method as suggested in Home office 1960.[8]This particular study is an observational of cross sectional study included totally 300 same age group children from each 75 children of males and females obesity childrencompared with each 75 children of males and females normal children. Body weight and height was measured and body mass index was calculated. The finger prints were collected from the subjects, after clearly explained the nature and purpose of the study. All the children were asked and got their palmer dermatoglyphic impression on plain white A4 paper used the ink method. In this method ink was applied on the children fingers .The prints pattern of the fingers were taken by roll on technique, where the coated fingers were rolled from the one edge of the finger to the other end on a A4 paper.[9]The children fingers patterns can be documented on the sheet for further analysis. Each finger print was examined with a hand lens to identify the finger print pattern.[10] This ink on the palm can easily be washed off with water.
Totally150 obesity children blood samples were collected by finger prick method, and blood typing done by slide method used by Anti sera- A and Anti sera- B.[11]Data collection was done within the period of January 2018 to march 2018 in private school in Chennai.

Body mass index (BMI) was calculated as weight in kilograms/(height in meter).[12]The following reference criteria for Asian population were used to calculate BMI:

CRITERIA	BMI
Normal	18.5 – 22.99
Over weight	23.0 – 24.99
Obesity	≥25

RESULTS

The study was carried out on 150 normal healthy children(75 males and 75 females) and 150 obese children (75 females and 75 males) were analyzed for the general prevalence of different finder print patterns, of these normal healthy children males 7.3% were found to have Arches, 49.9% were found to have Radial loops, 17.7%were found to have Ulnar loops and 25.1% were found to have whorls, and obesity children males 42.7 % were found to Arches, 10.8%were found to have Radial loops , 28.3 %were found to have Ulnar loops and 18.2% were found to have whorls (figure- 1)(Table-1).The result obtained from the normal healthy females children of these 5.4 % were found to have Arches, 39.9% were found to have Radial loops, 24.9 %were found to have Ulnar loops and 29.8% were found to have whorls, and obesity children females 50.8 % were found to Arches,8.8 %were found to have Radial loops,21.4 % were found to have Ulnar loop and 19 % were found to have whorls (Figure- 2)(Table-2).Compared to the health children with obesity children arches was found more in obesity children.

Blood group estimation was done for obesity childrenonly, 56.7% found blood group O, 17.5% were found group Aand 25.8%were found group B, nobody had blood group AB.(Figure-3) (Table- 3)

TABLE – 1

FREQUENCIES OF DIGITAL PATTERNS IN THE MALE OBESE AND NORMAL SUBJECTS

FINGER PATTERNS	OBESITY SUBJECTS	NORMAL SUBJECTS
ARCHES	42.7%	7.3%
RADIAL LOOPS	10.8%	49.9%
ULNAR LOOPS	28.3%	17.7%
WHORLS	18.2%	25.1%

TABLE –2

FREQUENCIES OF DIGITAL PATTERNS IN THE FEMALE OBESE AND NORMAL SUBJECTS

FINGER PATTERNS	OBESITY SUBJECTS	NORMAL SUBJECTS
ARCHES	50.8 %	5.4 %
RADIAL LOOPS	8.8 %	39.9 %
ULNAR LOOPS	21.4 %	24.9 %
WHORLS	19 %	29.8 %

TAB LE - 3

CORRELATION BETWEEN OBESE CHILDREN AND BLOOD GROUP

BLOOD GROUPS	OBESITY CHILDREN
A	17.5 %
B	25.8 %
AB	NIL
O	56.7 %

FIGURE-1

CHART SHOWING COMPARISON OF OBESITY MALE & NORMAL MALE SUBJECTS

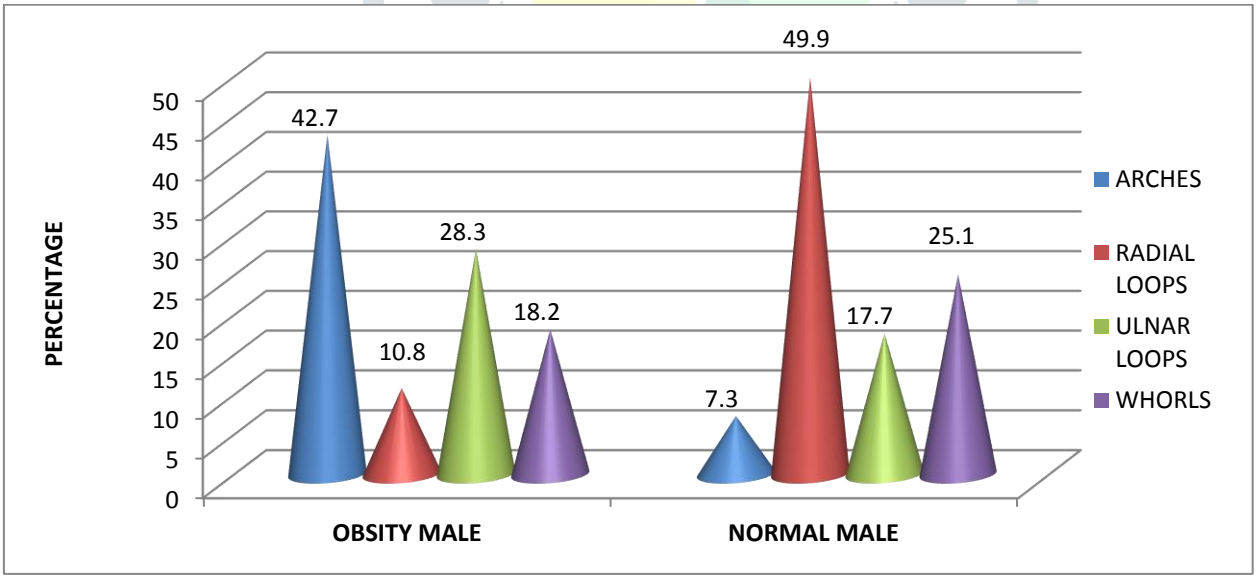


FIGURE -2

CHART SHOWING COMPARISON OF OBESITY FEMALE & NORMAL FEMALE SUBJECTS

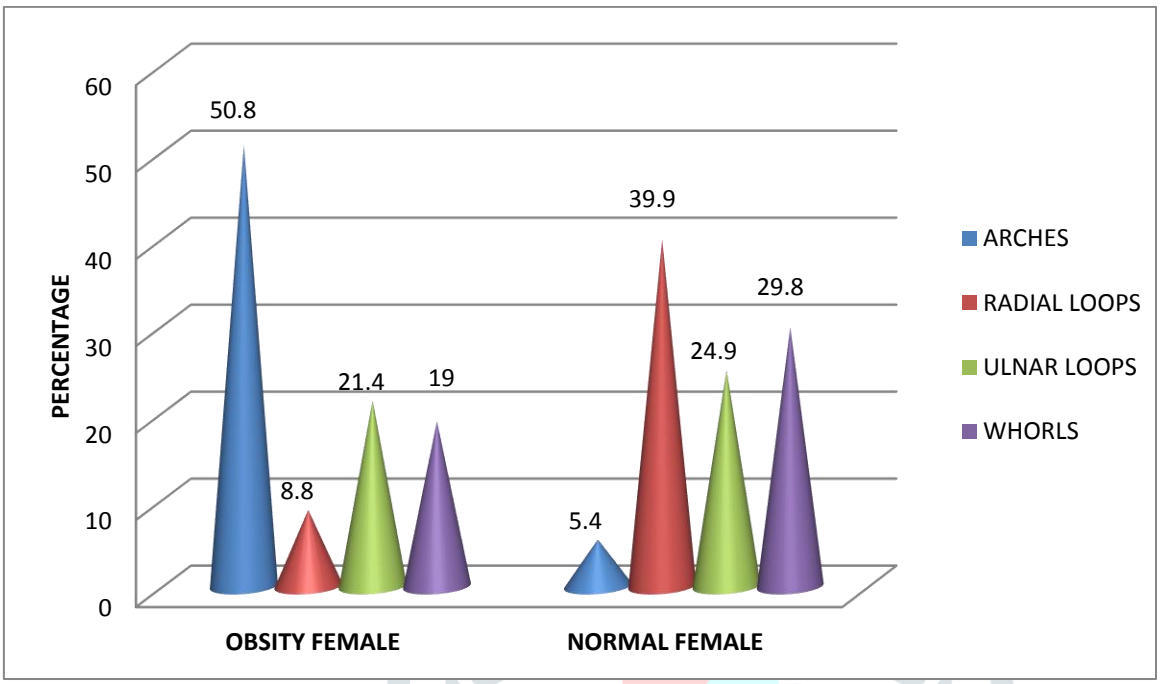
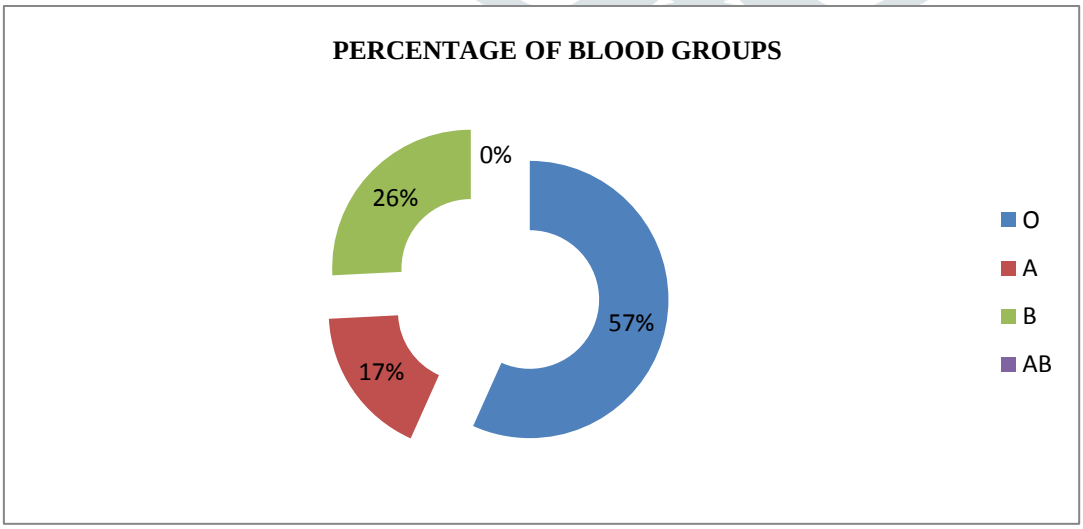


FIGURE – 3

CORRELATION BETWEEN OBESITY CHILDREN WITH BLOOD GROUPS



DISCUSSION

To the best of our knowledge, very few studies have been conducted to assess dermatoglyphic patterns and their possible relationship with obesity in children. Nevertheless, there are several studies available that show the association of dermatoglyphic patterns and prevalence of diabetes and hypertension, which are again the associated comorbid conditions with obesity.

A study was conducted by Gilligan *et al*.[13] to search for the major gene effects on palmer pattern ridge count to identify the dermatoglyphic traits in India. Similar results were shown by a study conducted by Kaladze *et al*.[14] in which dermatoglyphics were analyzed in 544 children with constitutional exogenous adiposity. The results showed dermatoglyphic changes that included papillary patterns intensified at the expense of loops and twists.

The other aim of this study was to find out if there is any correlation between ABO blood group system and overweight/obesity. There are many studies which found out correlation between ABO blood group and Smoking[15], pancreatic cancer.[16]Sharma G *et al*[17]foundmore prevalence of lung and oral cancer in males with blood group B, while prevalence of cervical cancer was also more in females with Blood group B. In our study we found that out of 23 students analyzed 13 were having O blood group, 7 were having blood group and only 3 were having blood group A, nobody had AB blood group. There are no studies done on this as of our knowledge. This was the normal distribution of blood group in Indian population i.e. about 45% Indians will have O blood group. This might be the reason for high prevalence of blood group Oin our study population but this study was carried out in small study group a study on larger sample size is advocated .

Rapidly and dangerously increasing trend of overweight and obesity are worrisome and need to be studied immediately and effectively so that we can stop this in time. First we have to limit undernourishment or underweight and on the other hand we have to decrease the uncontrolled weight gain which leads to obesity. we agree with the suggestions made by De Onis M and Blössner M[5] that there is great need of information on dietary pattern and prevalence of weight gain in school going children because these overweight and obese children will become obese adults.

Most of the children will take the dietary and exercisehabits from their parents, so routine parents counseling can beconducted by pediatricians, dieticians and school teachers.Parents can be taught about healthy diet and healthy weight,importance of physical activity and outdoor sports. Watchingtelevision for longer duration, playing video games or computergames, using internet for longer duration should be stronglydiscouraged as these are the major causes of childhoodobesity.[5][18][15]In the schools frequent health checkups should be carried out to diagnose obesity and overweight.

CONCLUSION

The study of dermatoglyphic patterns is a useful tool inearly diagnosis of certain illness.Dermatoglyphic patterns can be used as a marker to detect the obesity.Obesity is considered an epidemic of modern time. The most important factor with which is very effective impact in its control can be seen is to identify persons at risk and more, so ever during their childhood. As obesity is multifactorial disease,one such risk factor identification can be done through studying dermatoglyphic patterns. Children with these patterns may be considered at high risk for obesity. So, necessary preventive and promotive health measures should be adopted.

REFERENCE

1. Fuller IC. Dermatoglyphics: A Diagnostic Aid. Journal of Medical Genetics.1973; 10(165).

2. Stough TR, Seely JR. Dermatoglyphics in medicine. Clin Pediatr 1969;8:32–41.

3. Cummins H, Midlo C. Palmar and planter epidermal ridge configurations in European-Americans. American J Phy Anthropol 2005;9:471–502.

4. O'brien HS, Holubkov R and Reis EC. Identification, evaluation, and management of Obesity in an academic. Primary Care Center Pediatrics 2004;114:e154-e159.

5. De Onis M and Blössner M. Prevalence and trends of overweight among preschool children in developing countries Am J Clin Nutr 2000;72:1032–9.

6. Synder EE, Walts B, Perusse L, Chagnon YC, Weisnagel SJ, Rankinen T, et al. The human obesity gene map: the 2003 update. Obes Res 2004;12:369–439.

7. Bray MS. Genomics, genes and environmental interaction: the role of exercise. J Appl Physiol 2000;88:788–92 .

8. Home Office (1960). Instructions in the Method of Taking Finger and PalmPrints. London, H.M.S.O.

9. Cummins H.,& C. Midlo.(1961). Fingerprints, Palms and Soles, an Introduction to Dermatoglyphics 2nd edition (New York: Doves Publications Incorporated) pp: 121-124.

10. Babler W.J (1991). Embryonic development of epidermal ridges and their configurations.Birth Defects Original Article Series. 27:95-112.

11. Sharma G, Choudhary R , Bharti D. Studies Showing theRelationship between ABO Blood Groups and Major Types of Cancers. Asian J.Exp. Sci.2007;21(1): 129-13.

12. Alter M. Dermatoglyphic analysis as a diagnostic tool. Medicine 1967;46:35–56.

13. Gilligan SB, Borcki JB, Mathew S, Melhotra KC, Rao DC. A family study of dermatoglyphic traits in India: a search for majorgene effects on palmar pattern ridge counts. Am J Phys Anthropol 1985;68(3):409–16.

14. Kaladze NN, Chebanova NA, Doroshenko LK. [Dermatoglyphics in children withconstitutional exogenous obesity]. Probl Endokrinol (Mosk) 1992;38(3):23–4.

15.Geoffrey J. Bourke, John P. O'riordan. Distribution of ABO and rhesus blood groups In relation to smoking habit. *Brit. J.* Prev.Soc. Med. (1964); 18: 109-13

16.Wolpin BM, Chan AT, Hartge P, Chanock SJ , Kraft P, Hunter DJ , Giovannucci EL,Charles S. Fuchs,*et.al.* ABO Blood Group and the Risk of Pancreatic Cancer. J Natl Cancer Inst .2009;101(6) ;424 – 31

17.Sharma G, Choudhary R , Bharti D. Studies Showing the Relationship between ABO Blood Groups and Major Types of Cancers. Asian J. Exp. Sci.*2007;21(1): 129-13.*

18.Laxmaiah A, Nagalla B, Vijayaraghavan K, Nair M.. Factors Affecting Prevalence of Overweight Among 12- to 17-year-old Urban Adolescents in Hyderabad, India. Obesity 2007;15(6):1384-90.