



# Prevalence Of Mentally Retarded Syndrome and It's Genetically Variation Among the Children of District Vehari Punjab Pakistan

Alia Hussain<sup>1</sup>, Muhammad Farhan Nasir<sup>2\*</sup>, Kashif Ali<sup>3</sup>, Abir Ishtiaq<sup>4</sup>, Zeeshan haider<sup>5</sup>, Asma Ashraf<sup>6</sup>, Hira Ashfaq<sup>7</sup>, Ume Aiman<sup>8</sup>

## Abstract

The aim of this study was to rule out to found the prevalence of mentally retarded syndrome and it's genetically variation in children from Vehari district (Punjab, Pakistan). Mental retardation is a common intellectual execution that begin during the growth time of the child and associated with injury in adaptive behavior. Mental retardation is an assorted disease due to deformity and reduced functioning of brain. The study was focused on the mentally retarded children and different genetic character of mentally retarded children and its prevalence was noted by observing different characters from the studied region. A questionnaire was developed to conduct the study and in that these studied characters were monitored by observing their height, earlobe structure, heart rate, palm structure, shortness in finger, hair line, facial dimple, PTC (Phenylthiocarbamide) test, color blindness, hair direction, cleft chin, tongue roll, and thumb direction. The findings indicate that 43% were color blind among the mentally retarded children and 61% showed high rate of heart beat, and 39% were with low heartbeat. 37.5% samples were Rh positive with A+ve and AB+ve blood group. Alleles of PTC genes were found positive in 82% of the total male samples while 17% of total female samples. Significant correlation was found among the different studied characters. This study will be helpful to know the prevalence of mentally retardation syndrome in the studied region with its proper identification by using the clinical symptoms.

**Keywords;** Mental, Retardation, Population, Disease, Treatment, Diagnosis

<sup>1,5,7,8</sup>Institute of Molecular Biology and Biotechnology, The University of Lahore, Pakistan.

<sup>2\*,3,6</sup>Department of Zoology, Division of Science and Technology, University of Education, Lahore, Pakistan.

<sup>4</sup>Department of Zoology, The Islamia University Bahawalpur, Pakistan (Bahawalnagar Campus)

**\*Corresponding Author:** Muhammad Farhan Nasir

<sup>\*</sup>Department of Zoology, Division of Science and Technology, University of Education, Lahore, Pakistan.

Email: farhan.nasir@ue.edu.pk, Contact No: +92-300-7374014

## INTRODUCTION

In population genetics the focus is always on the group of population rather than individuals. The amount of allele and rate of recurrence of genotype from one generation to another generation slightly on distribution of genotype resultant from a single mating (Armates et al., 2009). Mental retardation (MR) is a frequently occurring disorder with a major impact on the life of the affected person, the family, and society (Van Karnebeek et al., 2005). Mental retardation is a common intellectual execution that begin during the growth time of the child and associated with injury in adaptive behavior (El-Marroun et al., 2012). It produces deficiency in adaptive manners like it enhances the periodontal problems in mentally disordered children. In Mental retarded (MR) numbers of periodontal issues are commonly very high. MR people face many issues during the treatment of periodontal disease (Solanki et al., 2015).

Mental retardation is an assorted disease due to deformity and poor functioning of brain. Peoples suffering with mental retardation have less than 70% IQ level (Wing, 1981). There are many factors which causes mental retardation including environment and genetics factors (Iqbal et al., 2016). The most prominent risk element that can cause mental retardation are also the less availability of food, cousin marriages, low health care facilities, cultural impoverishment (Aslam et al., 2011). In European countries the most general reason of Mental retardation is intake of alcohol throughout gestation period and it can be preventable cause if the mothers show little concern (Steenbergen et al., 2017). The most serious kind of mental retardation reasons are genetic disorders (Curry et al., 1997). One cause of MR is also the age of mother, if mother age is above 40 years then the chances of this disease is double (Ditchman et al., 2013).

In genetic disorders included cytogenetically diagnosable disorder and sub-microscopic rearrangement of chromosome account almost 25 percent of all the patients. The recent research about Mental retardation is that the defected genes producing mental retardation

located on X-linked chromosome. So far, less than 80 genes are elaborate in X-linked chromosome (Ropers et al., 2008). Mental retardation cause by X-linked genes of chromosome affected 10-12 percent of Male patient and 91 percent from them can be identifiable (Ropers et al., 2010). Diagnosis of Mental Retardation is mostly dependent on a complete individual and medical background of family, a whole physical assessment and an attentive developmental evaluation of the baby (Rutter, 2006). In young children diagnose of Mental retardation is mostly missed by doctors, because this situation is present in just 2 – 3 percent of people other than this mostly cases are found as a part of any broader syndrome (Armates et al., 2009). There is tier need of early identification of mental retardation syndrome and parents of the current era should take early steps for the prevention and control of the Mental retardation (Gull, 2015).

## MATERIAL AND METHOD

The studied area for the current study was Vehari district Punjab Pakistan. The GPS coordinates of the city is 30° 2' 42.8856" in the "N" and it is 72° 20' 55.9284" in the "E". The map of the studied region is mentioned Fig. 1. Different areas of the studied regions were visited to know about the prevalence of these samples. The age of studied samples were between 5 to 17 years. Total number of samples were 60 including 44 male and 16 females. All the individuals were properly informed about the purpose and nature of the study and written consent was collected from their guardians to complete the data.

Before taking finger prints, the children were requested to rinse and arid their hands. Next after 4 to 5 minutes, they were directed stepwise to give finger impressions. Stamp pads were saturated consistently by thumb imprint ink. While relaxing their arms, the children were requested to move their fingertips on the print pad and then wisely and gradually, in the selected places on the 10-digit finger-print identification sheet. Any external compression was avoided throughout the procedure to guarantee that no distorting of the prints happens. It was ensured that all finger prints were in use only in the provided spaces

given on the Performa. For the identification of finger prints the slides were labelled properly. The same process was repeated for all the children (Van Karnebeek et al., 2005).The blood sampling was also made for these samples for the hematology test. For blood sampling, finger of the individual was prick by sterile lancet after clear it with methylated spirit. Then the blood drops of each mentally retarded child examined with kit containing anti-A sera, anti-B sera and anti-D sera on a clear glass slide. Blood group is

determined on the bases of agglutination in blood if clotting is occurred then the blood groups named as i.e., A+, B+, AB+ and O+. Then after collecting the blood groups gender and age of every child are written on Performa. Different physical characters are observed in all samples like height, earlobe structure, heart rate, palm structure, shortness in finger, hair line, facial dimple, PTC (Phenylthiocarbamide) test, color blindness, hair direction, cleft chin, tongue roll, and thumb direction (Moeschler et al., 2006).

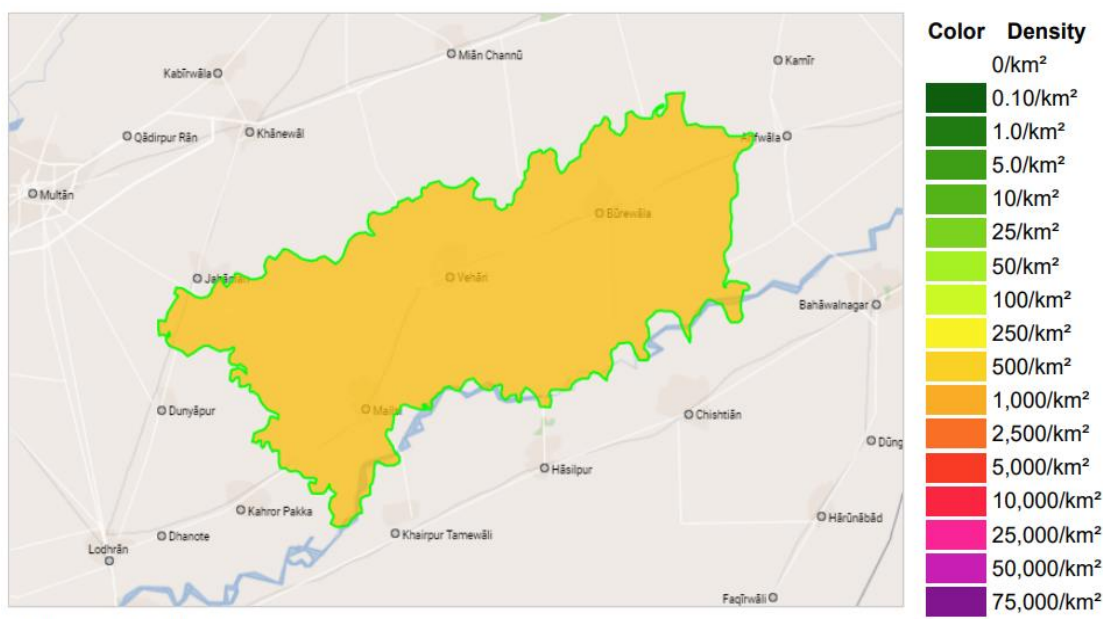


Fig. 1: The map of the studied area

**RESULTS**

For the analysis of genetically character of mentally retarded children of Vehari district, Punjab, Pakistan 60 children were studied of different age groups.

The number of the students in each group is given below

- 1-to- 5-year age 06 children
- 5-to-10-year age 23 children

- 10-to-15-year age 23 children
- 15-to -20- year age 07 children
- 20-to -25- year age 01 children

These are the different age groups studied during research work. Subjects belong to mentally retarded institute of Vehari district of south Punjab, Pakistan. Percentage of each blood group and fingerprints types is also calculated.

**Table 01: Distribution of subjects according to color blindness:**

	Individuals	Male	Female
<b>Total</b>	60	44	16
<b>Color Blind</b>	26	16	10
<b>Percentages</b>	43.33 %	36.36 %	62.5 %

The results were analyzed among 60 children. The ratio of male and female was 44 and 16 respectively. During this work it was found that the 26 out of 60 children were having color

blindness. The ratio of male and female in these color blindness sample was 16 and 10 respectively. The 43% children.

**Table 2. Distribution of Other studied genetically disorders and their prevalence**

Genetic Character	Male	Prevalence	Female	Prevalence
High Heart Rate	17	38.63	06	37.5
Low Heart Rate	10	22.72	05	31.25
Normal Heart Rate	17	38.63	05	31.25
Widow's Peak hair Line	Total		21 / 60	35
Straight Peak hair Line	Total		39 / 60	65
Widow's Peak hair Line	16	36.36	5	31.25
Straight Peak hair Line	32	72.72	7	43.75
Facial Dimples	8	18.18	1	6.25
Attached Ear Lobe	22	50	7	43.75
Unattached Ear Lobe	22	50	9	53.25
PTC test Positive	37	84.09	11	68.75
PTC test Negative	7	15.91	5	31.25
Clock wise Hair Direction	27	61.36	5	31.25
Anti-Clock wise Hair Direction	17	38.63	11	68.75
Having Cleft Chin	06	13.63	02	12.5
Not Having Chin Negative	38	86.36	14	87.5
Having Roll Tongue Ability	20	45.45	6	37.5
Not Having Tongue Ability	24	54.54	10	62.5
Straight Thumb	26	59.09	10	62.5
Hitchhiker's Thumb	18	40.90	6	37.5
Flat Palm	8	18.18	0	0
No Flat Palm	36	81.81	16	100
Normal Height	38	86.36	15	93.75
Abnormal Height	06	13.63	01	6.25

Results show that the 21 out of 60 have widow's peak and 39 have straight hair line. As a result, Ratio of widow's peak and straight hair line in mentally retarded children is 35% and 65% respectively. According the results the Ratio of Widow's peak is about 76% in male and 25% in female of mentally retarded children in Vehari district. For collecting the results of character facial dimples, 60 mentally retarded children were observed carefully in which 44 male and 16 female and according to result 8 out of 44 from male and 1 out of 16 from female have facial dimple (Table 2). Character of ear lobe was observed in mentally retarded children (Table 2). Results show the ratio of clock wise and anti-clock wise hair direction that is 84% in male and 15% in female (Table 2). Children were observed

carefully for the better results. After analyzing children having cleft chin and the individual's number not having cleft chin was reported (Table 2). The analysis of character named as ability to roll tongue was observed and the Children were asked to show their tongue and roll it. Their abilities were observed phenotypically and individually.

All mentally retarded children were observed for seeking the character that they have straight thumb or hitchhiker's thumb. Thumbs of children observed carefully by moving the thumb. Palm of each student observe carefully for better results. Ratio of abnormal height in male and female is 85% in male and 14% in females (Table 2).

**Table 3: Distribution of subjects according to blood group and gender:**

Gender	A blood group Rh+	Blood group ARh-	B blood group Rh+	Blood group BRh-	Blood group AB Rh+	Blood group AB Rh-	Blood group OR+	Blood group ORh-	Total Count
Female	6(37.5%)	1(6.25%)	1(6.25%)	1(6.25%)	3(18.75%)	2(12.5%)	2(12.5%)	0	16
Male	8(18.18%)	0	7(15.9%)	1(2.27%)	9(20.45%)	5(11.36%)	10(22.72%)	4(9.09%)	44
Total	14(23.34%)	1(1.64%)	8(13.34%)	2(3.34%)	12(20%)	7(11.64%)	12(20%)	4(6.64%)	60

This table shows that the percentage of different blood groups in mentally retarded children who were study. Obtained percentage is 6(37.5%) are A+ females, 1(6.25%) are A- female, 1(6.25%) are B- female, 1(6.25%) are B+ females, 3(18.75%) are AB+ females, 2(12.5%) are AB- females, 2(12.5%) are O+ females and no any O- female is found in our research.

Similarly the percentage of different blood group in males is 8(18.18%) are A+, 7(15.9%) are B+, 1(2.27%) are B-, 9(20.45%) are AB+, 5(11.36%) are AB-, 10(22.72%) are O+, 4(9.09%) are Majority of individuals having A+(23.34%) blood group while others blood group percentage is AB+(20%) and O+(20%), B+(13.34%), AB-(11.64%), O-(6.64%), B-(3.34%), A-(6.64%) respectively (Table 3).

**Table 4. Distribution of subjects according to fingerprints**

	Female	Percentage	Male	Percentage
Whorl	7	11.67%	17	28.34%
Loop	4	6.67%	15	25%
Arches	5	8.34%	12	20%

## DISCUSSION

For the analysis of results of genetic character of mentally retarded children of Vehari district. According to the Results of these genetic characters in mentally retarded are color blindness is found in 43% are color blindness. According to the results we determine heart rate of male mentally retarded children 61% has high heart rate and 59% males have low heart rate. 41% females have high heart rate and 38% have low high heart rate.

In given study 60 mentally retarded children studied. Finger prints of individuals carefully observed. After observing the results 19 children have loop type of finger print, 24 children had whorl type finger print and 17 children have arch type of finger print. The most prominent type of finger print is whorl next is loops and then arches.

Kanchan et al (2006) described about Human finger prints fall into three main group: loops, whorls and arches. Loops are the most common type, accounting for approximately 65% of all fingerprints. They are formed by ridges lines that flow in form one side of the print., sweep

up in the center like a tented Arch and then curve back around and flow out on the side where they entered. Loops are designated as being either radial or ulnar, depending on which side of the finger the lines enter. Whorls account for approximately 30%.

According to Krishnan et al (2016) the common features are that they have at least two deltas and one or more ridge line curves around the core to form a circle or spiral. The accidental whorl can be any pattern or combination of pattern that do not fit into any of the above classifications.

Blood group system was discovered was black in 1901 by Karl Landsteiner. The 'ABO' system is further classified as A, B, AB and O blood group types according to presence of corresponding antigen in plasma. Rhesus' system is classified into Rhesus positive (Rh +ve) and Rhesus negative (Rh -ve) according to the presence or absence of 'D' antigen (Bhavana et al.,2013)

Similar findings observe for the percentage of Rh factor of mentally retarded children and

blood groups were recorded. The maximum occurrence of Rh factor was observed in blood group A+ 6(37.5%) , AB+ 3(18.75%) followed by O+ 2(12.5%), B+ 1( 6.25%) and O- is 0. A- Subjects were 1(6.25%), A+ 14(23.34%), B- 2(3.34%), B+ 8(13.34%), AB- 7(11.64%), AB+ 12(20%), O- 4(6.64%) and O+ 12(20%) (Wright et al., 2019). The study of Raloti et al, (2013) showed that in Maiduguri metropolis, Rhesus +ve have the highest number of individuals with blood group O +ve having more than 50% of the population. The general distribution of blood groups was the same order with that of present study population. That is highest frequency of Rh +ve and lowest frequency of Rh -ve; highest frequency of blood group O and lowest blood group AB (Boman and Bernhardsson, 2023).

## CONCLUSION

Mentally retarded children in our society are not considered as helping hands, rather as a burden. More than half of the mentally retarded children belonged to families in lowest income groups. One big reason of MR is depended on the age of mother if mother age is above 40 the chance of this disease is double. Suffering with mentally retardation during the pre-natal period was common among cases.

## REFERENCES

Armates, V., (2009) Mental retardation: definitions, etiology, epistemology and diagnosis. *Journal of sports & health research*. 1(2), 112-122.

Aslam, T., Batool, Z., Hashmi, N., & Aslam, K. (2011). Sociopsychological problems and needs of mentally retarded children in districts Faisalabad and Islamabad, *Pakistan. J. Anim. Plant Sci*, 21, 111-113.

Bhavana, D., Ruchi, J., Prakash, T., Kalyan, J., (2013). Study of fingerprint patterns in relationship with blood group and gender-a-statistical review. *Res J Forensic Sci*, 1(1),12-17.

Boman, C. and Bernhardsson, S. (2023) Exploring needs, barriers, and facilitators for promoting physical activity for children with intellectual developmental disorders: A qualitative focus group

study: *Journal of Intellectual Disabilities* 27(1): 5-23.

Curry, C. J., Stevenson, R. E., Aughton, D., Byrne, J., Carey, J. C., Cassidy, S., ... & Opitz, J. (1997). Evaluation of mental retardation: recommendations of a consensus conference. *American journal of medical genetics*, 72(4), 468-477.

Ditchman, N., Werner, S., Kosyluk, K., Jones, N., Elg, B., & Corrigan, P. W. (2013). Stigma and intellectual disability: Potential application of mental illness research. *Rehabilitation. Psychology*, 58, 206-216.

El-Marroun, H., Zeegers, M., Steegers, E. A., Ende, J. V. D., Schenk, J. J., Hofman, A., Jaddoe, V. W., Verhulst, F. C., Tiemeier, H., (2012). Post-term birth and the risk behavioral and emotional problems in early childhood. *International Journal of Epidemiology*; 41: 773–781.

Gull, M. (2015) Mental retardation: Early identification and prevention. *The International J Indian psychology*, 2(3), 5-9

Iqbal, M., Baig, A.M., Bhinder, A.M., and Zahoor, Y. M.,(2016) Factors causing Mental retardation. *Asian journal of Natural & Applied sciences*. 5(3), 28-37.

Kanchan, T. Chattopadhyay, S. (2006). Distribution of fingerprint patterns among medical students. *Journal of India Academy of forensic Medicine*, 28(2), 65-68.

Krishnan, R.P., Thangavelu, R., Rathnavelu, V., Narasimhan, M., (2016). Gender determination: Role of lip prints, finger prints and mandibular canine index. *Experimental and therapeutic medicine*, 11(6), 2329-2332.

Moeschler, J. B., Shevell, M., & Committee on Genetics. (2006). Clinical genetic evaluation of the child with mental retardation or developmental delays. *Pediatrics*, 117(6), 2304-2316.

Raloti, S.K., Shah, K., Patel, V., Menat, A., Mori, R., Chaudhari, N., (2013). An Effort to Determine Blood Group and Gender from Pattern of fingerprints. *National Journal of Communities* 21:235-345

- Ropers, H. H., (2008). Genetics Of Intellectual Disability. *Current Opinion in Genetics & Development*, 18:241–250.
- Rutter, L.Q. (2006) First Diagnosis of severe Mental retardation and physical Disability: a study of Doctor-parent communication. *Journal of child psychology & psychiatry*, 35(7): 1273-1287.
- Steenbergen, H. A, van der Schans, C. P, van Wijck, R. (2017) Lifestyle approaches for people with intellectual disabilities: A systematic multiple case analysis. *Journal of American Medical Directors Association* 18: 980–987, e3.
- Solanki, J., Khetan, J., Gupta, S., Tomar, D., & Singh, M. (2015) Oral rehabilitation & management of mentally retarded. *Journal of clinical & diagnostic research*, 9(1). 1-6.
- Van Karnebeek, C. D., Jansweijer, M. C., Leenders, A. G., Offringa, M., & Hennekam, R. (2005). Diagnostic investigations in individuals with mental retardation: a systematic literature review of their usefulness. *European journal of human genetics*, 13(1), 6-25.
- Wing, L. (1981). Sex ratios in early childhood autism and related conditions. *Psychiatry research*, 5(2), 129-137.
- Wright, A. Roberts, R. Bowman, G. & Crettenden, A (2019) Barriers and facilitators to physical activity participation for children with physical disability: comparing and contrasting the views of children, young people, and their clinicians. *Disability and Rehabilitation* 41:1499–1507