

# Medico-legal Aspects of Colour Blindness and Correlation of the same to Blood Groups

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## Abstract

A study of colour blindness and its correlation with different blood groups was undertaken in 384 medical students (219 males and 165 females). Colour blindness was studied by using Ishihara's chart. In blood group AB, in males, and group B in females, the incidence of colour blindness was significantly higher. We also observed a slightly higher incidence of colour blindness in females.

**Key Words:** Colour Blindness, Blood Group.

## Introduction

It is now well established that perception of colour is a function of the cones. A defect in this function would lead to a defect in colour recognition. Abnormal colour vision is usually present as an inherited anomaly<sup>(1)</sup>. Colour blindness could rarely be of the acquired type<sup>(2)</sup> due to damage to the retina &/ or optic nerve following intoxication and hypoxia.

In the Caucasian population, the incidence of colour blindness is reported to about 8% in males, and 0.4% in females (1, 3) while Seal has reported a slightly lower incidence of 3-4% in males<sup>(2)</sup>.

It is now shown that people possessing a specific blood group do show preponderance towards particular diseases,<sup>(4)</sup> namely; group A people showing an increased susceptibility to gall stones, liver cirrhosis, tumours of salivary glands, stomach, pancreas and ovaries. Duodenal ulcers are more common in Group 'O' people. An increased incidence of myocardial infarction and diabetes mellitus is found in group A individuals.

This study undertaken to investigate, if there was a preponderance of colour blindness in

people belonging to a specific blood group, as both entities are genetically determined.

## Material and methods

384 student volunteers of this college were tested for colour blindness, using Ishihara's Chart. and following the procedure laid down in the chart. Of these, 219 were males and 165 were females. Their age group was 17 years to 22 years, with a mean age of 18.6 years (S.D.± 1.54). The blood groups of these volunteers were determined by the standard tile method, using standard Antisera manufactured by Span Diagnostics Ltd. (Surat - Gujarat).

## Results

In the present study we tested 384 volunteers for color blindness.

Table 1 & Fig. 1 show the percentage distribution of these volunteers into different blood groups. Table 2 & Fig. 2 show the incidence, in percentage of colour blindness in the different blood groups. The incidence of colour blindness as detected in this study was 6.0% in the total population. The incidence in males was 9.1% and in females it was 0.6%. The observed defect in the colour vision was red green blindness. Blue blindness was not found. Table 3 shows a comparison of the percentage distribution of blood groups, as reported by other workers and in the present study<sup>(1, 7, & 8)</sup>.

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## Discussion

The percentage distribution of blood groups is different from that reported by other workers (1, 7, & 8). This could be possibly due to the fact that the students of this institution come from all parts of the country, and therefore, represent a mixed ethnic group.

The total incidence of colour blindness is similar to that reported by Katti et al,<sup>(5)</sup> but in our study we have surprisingly found a slightly higher incidence in females as compared to other studies. This is our observation. We have carried out the test for colour blindness as given in the Ishihara's chart.

A further study (which is planned) of this same parameter may help to confirm this finding.

The second very interesting point brought to light in this study was that the percentage incidence of colour blindness was higher in male subjects belonging to blood group AB as compared to the total incidence. In females, the incidence was higher in subjects of blood group B and O. On statistical analysis, (using X<sup>2</sup> test) it was found that this difference was statistically significant. (P<0.01). in group AB males and group B females. It has been shown in various studies that 2% of colour blind males are dichromats who have protanopia or deuteranopia, and about 6% are anomalous dichromats in whom the red sensitive or green sensitive pigment is shifted in its spectral sensitivity. These abnormalities are X-linked recessive characteristics.

## Medico-legal aspects

This study was carried out on medical students. Colour blindness will affect their future to some extent e.g. Colour blind students will have difficulty in Histopathology as they will not be able to distinguish the staining properties of different cells.

Privileged Communication "This is a bonafide communication given by a doctor, to the authorities, by virtue of his duty to protect the interest of community or society". Thus, if it is known that a student is colour blind, it may become necessary to inform some authorities, if required, in the future. Colour blindness can be one of the identity measures of a person.

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**Table 1: Percentage (No.384) distribution of different blood groups**

Blood Group	A	B	AB	O
Males (No.219)	25.11	26.02	10.04	38.81
Females (No.165)	29.69	26.06	3.63	40.60

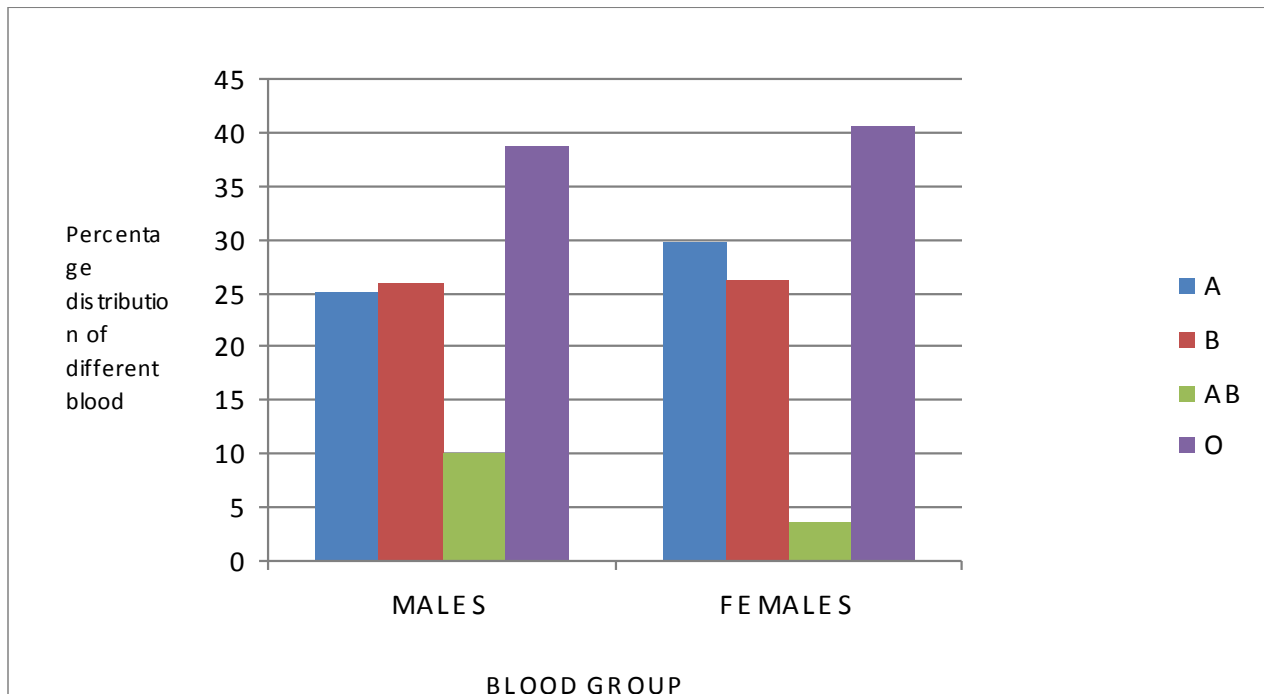
**Table 2: Percentage (No.384) incidence of colour blindness**

Blood Group	A	B	AB	O
Males (No.219)	5.45	3.53	22.7	11.76
Females (No. 165)	0.00	2.3	0.00	0.8

**Table 3: Percentage distribution of blood groups as per textbooks**

Author/Book	Blood Groups			
	O	A	B	AB
1. Guyton, A. C. (6)	47	41	9	3
2. Ganong W. I. (1)	45	41	10	4
3. Samson Wright. (7)	46	42	9	3
4. Present Study.	40	27	26	7

**Fig. No.1. Percentage distribution of different blood groups**



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