Study of blood groups among the Konnandur high school students of Karnataka

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ABSTRACT

Blood is the red viscous fluid that circulates in the body to supply oxygen and nutrients absorbed from the gastrointestinal tract, carries back carbon dioxide to the lungs and other products of metabolism to the kidneys, functions in the regulation of body temperature and distributes hormones and other agents that regulate cell function. ABO and Rh blood grouping system is up most important from human health aspect. Determination of blood group is important for medical operations. Nearly 25 types of blood groups are determined at present. Incompatibility between pregnant women and her embryo may pose difficulties. Some physiological problems are related to blood groups. Keeping all these points an attempt made to identify blood group nature among high school students of age group that is, 13 to 16 years. 400 students among which 210 boys and 190 girls were screened for blood groups with Rh factor and results of the same are presented. Here we noticed order of blood group as O>A>B>AB with high Rh+ factor.

Key words: Blood, ABO groups, Rhesus factor, human health.

INTRODUCTION

ABO blood groups were discovered by Landsteiner in 1901 (Landsteiner and Wiener, 1940). This ABO blood grouping of humans is the oldest and most popular clinical parameter considered for transfusion after the discovery of Rhesus factor. Blood group system classifies human blood based on the antigens present or absent on the surface of erythrocytes. Its role can be noticed in heredity, identification of the individual at every sector of life. From physiological point, ABO blood groups are linked with diseases (Levitan et al., 1959; Lewis et al., 1961; Strang, 1965; Maurer et al., 1969; Eriksson et al., 1980, Bai-Lin Zhang et al., 2014). Blood group is also related to suicide rate, obesity and genetic history (Mollison P L 1979; Hein H O 2005; and Sokolov R 1993). However many people of rural India are ignorant about the importance of blood groups. Among the school children majority of them are unaware of blood groups they have. Hence to observe the distribution pattern of ABO and create awareness among the school children regarding blood groups and its importance this work was carried out.

MATERIALS AND METHODS

Study area

Konnandur is a small town located in the Thirthahallitaluk, Shivamogga district of Karnataka state, India (Figure 1). The town lies between 13.8132°N 1 and 75.2440°E with about 2100 ft above the sea level. It is nearer to Thirthahalli city and approximately 72 km away from the Shivamogga. It has approximate population of about 4500–5000. Four hundred (400) children of age group 13 to 16 years studying atNational high school were selected for blood groups analyses. The study protocol was reviewed and approved by DDPI Shivamogga and before data collection an informal consent was obtained from respondents.

Methodology

The students were selected and grouped according to their
Figure 1: Study area

class and sections. Their ABO blood groups and Rhesus factor determination was done by employing the slide method (Sultana et al., 2013). With all aseptic conditions that is, cleaning the fingers of students with 70% alcohol and using the sterilized disposable lancets three drops of blood were obtained from each student's left hand ring finger tip by pricking. Blood samples were analysed on grease free slide and for every student separate slide was maintained. Each student's blood sample was placed on three different locations on the slide. Three types of sera were utilised to confirm the blood groups. Anti-A serum for blood group A, anti-B serum for blood group B and anti-D serum for rhesus factor determination. A drop of each blood serum was added to each drop of blood and allowed for a minute to observe agglutination. Agglutination or clumping of blood cells in anti-A serum indicates blood group A, and clumping of cells in anti-B serum indicates blood B. No clumping or agglutination of cells in both anti-A and anti-B sera indicate blood group O. Agglutination of cell in both anti-A and anti-B sera indicates blood group AB. Agglutination in anti-D serum indicates rhesus positive (+) and no agglutination indicates rhesus negative (-).

Data analysis

Observed and collected data was analysed utilising Microsoft Office Excel 2010. The frequency of each blood group expressed as percentage.

Percentage of Blood group = \( \frac{\text{Total members Blood group}}{\text{Total number of Students}} \times 100 \)
Table 1: Distribution of ABO blood group among the students of National High School

<table>
<thead>
<tr>
<th>Blood group → Students</th>
<th>A Group</th>
<th>B Group</th>
<th>AB Group</th>
<th>O Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>59</td>
<td>60</td>
<td>18</td>
<td>73</td>
</tr>
<tr>
<td>Girls</td>
<td>61</td>
<td>39</td>
<td>16</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>99</td>
<td>34</td>
<td>147</td>
</tr>
<tr>
<td>Percentage(%)</td>
<td>30</td>
<td>24.75</td>
<td>8.5</td>
<td>36.75</td>
</tr>
</tbody>
</table>

Figure 2: Percentage of ABO blood group among the students of National High School.

Table 2: Distribution of Rh factor among the students of National High School

<table>
<thead>
<tr>
<th>Rh Factor → Students</th>
<th>A+</th>
<th>A-</th>
<th>B+</th>
<th>B-</th>
<th>AB+</th>
<th>AB-</th>
<th>O+</th>
<th>O-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>56</td>
<td>03</td>
<td>60</td>
<td>00</td>
<td>18</td>
<td>00</td>
<td>71</td>
<td>02</td>
</tr>
<tr>
<td>Girls</td>
<td>58</td>
<td>03</td>
<td>38</td>
<td>01</td>
<td>13</td>
<td>03</td>
<td>69</td>
<td>05</td>
</tr>
<tr>
<td>Total</td>
<td>114</td>
<td>06</td>
<td>98</td>
<td>01</td>
<td>31</td>
<td>03</td>
<td>140</td>
<td>07</td>
</tr>
<tr>
<td>Percentage(%)</td>
<td>28.5</td>
<td>1.5</td>
<td>24.5</td>
<td>0.5</td>
<td>7.75</td>
<td>0.75</td>
<td>35</td>
<td>1.75</td>
</tr>
</tbody>
</table>

RESULTS

A total of 400 students were screened for their blood groups analyses. 52.5% were boys and 47.5% were girls. Data in Table 1 shows the ABO blood group distribution in the students. We can see that the number of students with A group is 120 and 99 respectively. Figure 2 reveals the blood group percentage distribution. A group 30%, B group 24.75%, AB group 8.5% and O group 36.75%. Table 2 depicts the Rh factor distributed in the student group. O+ strength is 140 followed by A+ of 114, B+ with 98 and AB+ with 31. The remaining Rh factors O-, A-, AB- and B- documented as 07, 06, 03 and 01 respectively. Figure 3 percentage distribution of Rh factor is represented. Figure 4 explains the percentage of ABO blood group distribution within boys and girls. The percentage of AB blood group is less, boys with 4.5% and girls with 4.0%. Similarly, Figure 5 represents the Rh factors nature of spreading. A+ factor, B+ and O+ are 14%, 15% and 17.75% among boys. Girls have 14.5% of A+, 9.5% of B+ and 17.25% of O+. Among boys B- and AB- factor is zero. Girls have 0.25% of B- and 0.75% of AB- factor.

DISCUSSION

In the study we tried to determine the distribution of ABO and Rh factor among the students of selected area. Here boys and girls are nearly equal in number. According to Dzieczkowski and Anderson (1998) a good number of blood groups involving over hundreds antigens are known and ABO is the most studied group in the humans. Obtained data revealed O group is high (36.75%) followed by A group (30%) and B group (24.75%). AB group is 8.5% which is lowest compared to others. This is in par with the findings of Tiwari et al. (2014); Akanmu et al. (2015); Bodmer (2015) and Jahanpour (2017). Available literature shows the order of blood groups (ABO) studied in different
Figure 3: Percentage of Rh factor among the students of National High School.

Figure 4: ABO blood groups percentage of the boys and girls of National High School.

Figure 5: Rh factor percentage of the boys and girls of National High School.
populations across the world as O>A>B>AB. Genetic and environment influence the blood group frequency in humans. In the Indo-Pak sub-continent group B and O are almost equal (Khan et al., 2004). B blood group predominated in many regions of Punjab and Multan, Swat, Gilgit, and Rawalpindi/Islamabad but O group predominant in Sindh and in Baluchistan, (Sultana et al., 2013; Khattak et al., 2008). India showed the predominant of O followed by B, A and AB (Das et al., 2001; Reddy and Sudha, 2009; Periyavan et al., 2010). Chandra and Gupta (2012); Nanu and Thapliyal, (1997); Rashaduz et al. (2015) in their observation pointed group B is more in population followed by group O, A, and AB. In students, distribution of Rh+ is more and Rh− is less. A+ (28.5%), B+ (24.5%), AB+ (7.75%) and O+ (35%), compared to A− (1.5%), B− (0.5%), AB− (0.75%) and O− (1.75%). This is in accordance with the findings of Anees et al. (2007).

CONCLUSION

The study on school students revealed more number of group O followed by group A, B and AB. It is similar to the earlier findings across the world by many people. Rh factor is also in accordance with their result. Blood grouping among the students generates a database by this they will acquainting knowledge their blood group. In case of emergency they can involve involuntary blood donation activity for a social cause.

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