



Finding the average abundance of ABO and Rh blood groups in all 3 Tehsil of District Karak, KP, Pakistan

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Abstract

The present study was conducted to find out the relative abundance of ABO blood groups and Rh factor in male population in three tehsil of district Karak namely Tehsil Karak, Tehsil Takht E Nasrati and Tehsil Banda Daud Shah. The blood groups and Rh factor ascertainment was find out through antigen-antibody clotting test. Total of 645 blood groups were checked of unknown people in a blood checking camp. The blood group B⁺ was found to be most abundant in the whole district with relative abundance of 207 donors and percentage of 32.09% followed by O⁺ (159, 24.65%), A⁺ (141, 21.86%) and AB⁺ (63, 9.76%). The Rh⁺ was more abundant with 570 donors and percentage of 88.37% and Rh⁻ has 75 donors and percentage of 11.62%. The blood groups with Rh- are A⁻ (26, 4.03%), B⁻ (25, 3.87%), AB⁻ (12, 1.86%) and O⁻ (12, 1.86%).

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Introduction

ABO and Rh (Rhesus) blood group systems are of significant importance regarding blood transfusion and organ transplantation. These blood groups have a role in genetic markers in anthropological studies and in population genetics. Red blood cells have glycoprotein and glycolipid on their surface which forms the blood group antigens.

The antigen production is genetically controlled. The ABO system has four main groups that as A, B, AB and O and these are due to the presence of antigens A and B, for O there is no antigen. These antigens are controlled by three allelic genes A, B, and O that are present on the long arm of chromosome 9 (Conteras, 2001; Knowles, 2002). In addition, there is also present antigen H which is a precursor to A and B antigen but not stated as recognizable antigen on red blood cells (Brown *et al*, 1992). Blood group antigens are inherited from parents in a Mendelian fashion that express early inside the mother uterus and remain unchanged for the whole life (Firkin *et al*, 1989). About 700 red blood cell antigens are studied that are arranged into 30 blood group systems by the International Society of Blood Transfusion (International Society of Blood Transfusion (ISBT), 2008).

Although lots of blood groups are discovered but ABO blood group system is still the most important blood group system in transfusion medicines (Yamamoto, 2000). Another importance of such studies is that some diseases are more common in one type blood group donor (Brecher *et al*, 2011). People having blood group O are at high risk of peptic ulcer (Alkout *et al*, 2000). Women having A blood group are found to have endometrial and ovarian cancers more commonly than women of other blood groups (Marinaccio *et al*, 1995). People with A blood group usually they have significant risk for coronary heart disease (CHD) (Wazirali *et al*, 2005). The main goal of the work is to perform a survey of the frequency of clinically important blood group antigen in donor population to:

First, ease the blood transfusion service.

Second, compare the data of this donor population group with other regions.

Third, make a way easy for Future genetic research.

Material and methods

The present study was carried out in three tehsil of district Karak i.e. Tehsil Karak, tehsil takht e nasrati and tehsil banda daud shah, where we arrange blood checking camp in different areas, especially in colleges for volunteers students for blood bank of Karak and in the present study we checked 645 unknown blood donors. This work takes about 6 month's time from January 1st to July 1st.

All the volunteer students and peoples coming for blood checking and donation were selected as per NACO (National AIDS Control Organization guidelines) (which were physically and mentally fit for blood donation. After blood checking and donation the donors Data were than recorded in a record book for again donation when ever eligible that as his Name, Blood group, Address and contact number.

The blood samples were collected by finger prick on a slide and than blood groups and Rh factor were checked through antigen-antibody agglutination test. The blood phenotypes were checked by putting the corresponding antisera on a blood e.g antisera B to be putted on a blood sample if it clot than it means the blood is B and so on with antisera A and D.

Results and discussion

In the current study total of 645 blood groups were checked. The blood group B⁺ was found to be most abundant in the whole district with relative abundance of 207 donors and percentage of 32.09% followed by O⁺ (159, 24.65%), A⁺ (141, 21.86%) and AB⁺ (63, 9.76%). The Rh⁺ was more abundant with 570 donors and percentage of 88.37% and Rh⁻ has 75 donors and percentage of 11.62%.

The blood groups with Rh⁻ are A⁻ (26, 4.03%), B⁻ (25, 3.87%), AB⁻ (12, 1.86%) and O⁻ (12, 1.86%).

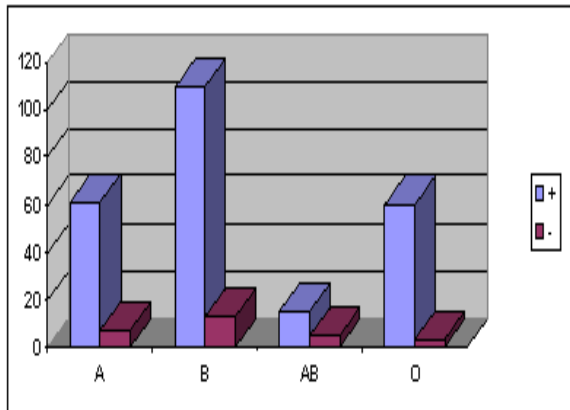


Fig. 1. Distribution of donor's blood groups and Rh factors in Tehsil Karak.

The present trend is B>O>A>AB this is not unique but is usual result according to Asia as over all research done on abundance of blood groups and Rh factors in asia shows the trend B≥O>A>AB.

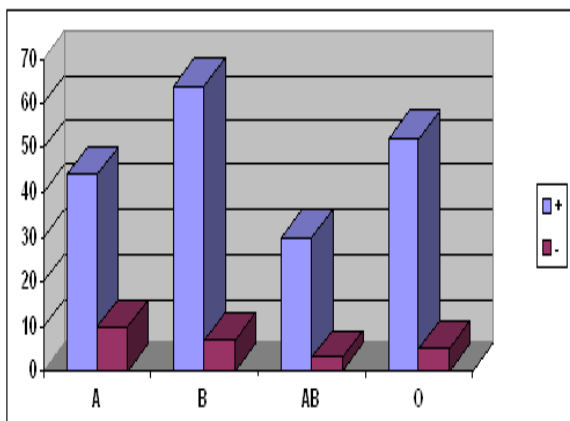


Fig. 2. Distribution of donor's blood groups and Rh factors in Tehsil Takht E Nasrati.

The same trend of B≥O>A>AB is found in many areas of Pakistan, Punjab(Afzal *et al.*,1977), Swat (Khattak *et al.*,2008), Rawalakot (Poonch) (AJ&K), Rawalpindi/Islamabad (Khan *et al.*, 2009 and 2006), Gilgit (Islam & Robert,2010), Mirpur (AJ & K) (Chishti *et al.*, 2012) and Khalid & Qureshi (2006), Lahore (Parveen (1987) and Siddiqui *et al.* (2011), Rawalpindi/Islamabad (Shakir *et al.* (2012)), Multan (Mahmood *et al.* (2005) and Lodhi (1960)), Faisalabad (Hameed *et al.* (2002)), the trend is different in some areas having A>B≥O>AB in Sakardu and Peshawar (Alam (2005) and PMRC (1982)) here A blood group is abundant in the adjacent areas too that is Kalam, Kafirs, Kalash and Chitral and also this trend persist in the Hindukush

region of Afghanistan and Pakistan. In Bannu (Khan *et al.* (2004)) the trend is B>A>O>AB and in most areas including Sindh (Bhatti & Sheikh, (1999)), Abbotabad/Hazara (Khaliq *et al.* (1984)), Baluchistan (Hussain *et al.* (2001)), Gujrat (Anees & Shabbir (2005)), Bahawalpur (Yousaf *et al.* (1988)), Mandi Bahaudin (Anees *et al.* (2007)) and Punjab (Bahawalpur, Multan, Faisalabad, Lahore and Rawalpindi) (Rahman & Lodhi (2004)).

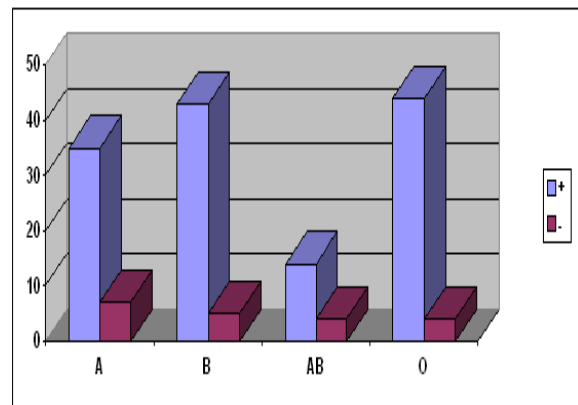


Fig. 3. Distribution of donor's blood groups and Rh factors in Banda Daud Shah.

These differences in the trend are due to various factors such as external environment, genetic variations, racial background, genetic variations and mother-child compatibility (Bernhard, 1980; Onde & Kensee, 1995). Besides the transfusions, cardiovascular diseases, organ transplantation, erthroblastosis in neonates the ABO blood system also help in prediction of national suicide rate and indicates genetic marker of obesity (Mollison PL (1979) and Hein HO *et al* (2005)). A person genetic history can be known by studying their blood groups (Sokolov R (1993)).

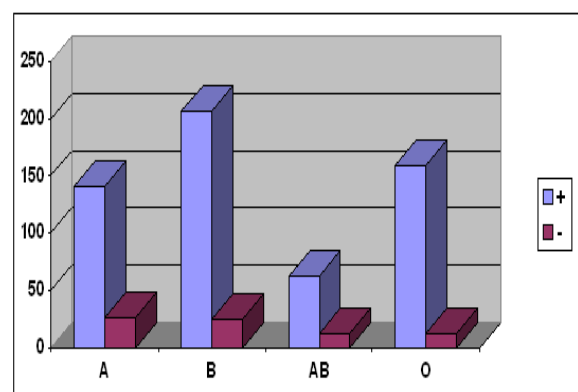


Fig. 4. Whole district Distribution of donor's blood groups and Rh factors.

In our study of ABO blood groups and Rh positivity samples showed that the blood group B positive was most prevalent followed by group O, A and AB. Opposite to this the blood group O is the most prevalent group in Egypt (Bahaj AA (2003)). Likewise blood group a in Russia (Tomilin VV, Gurtovaia SV (1999)).

In Australians O and A while in Africans B group is commonest (Mollison PL, Engelfriet CP (1993)).

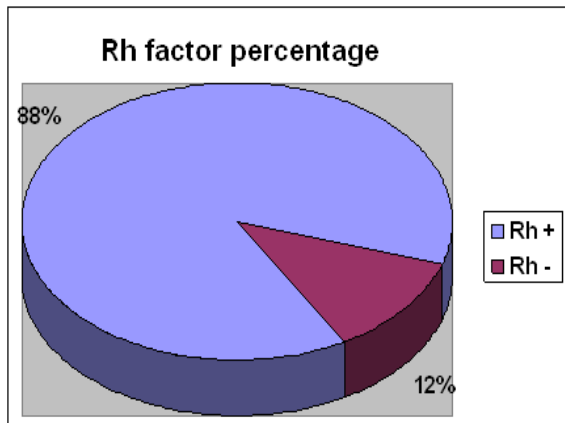


Fig. 5. Rh factor percentage of a whole district.

Rh negative blood group percentage in the whole district is 12% however little higher percentage is reported by other studies (Khattak ID *et al* (2008), Frances TF *et al* (2002)).

The study of blood group frequency helps in case of blood bank and patient in emergency so it is the need of the time that person blood group should be written on his/her identity card or licenses.

More research work is needed on the mentioned topic so to overcome the problem of blood transfusion.

Conclusion

The trend of the present study is B>O>A>AB. So it is clear from the trend that Karak is very rich in case of B and O blood groups and also the Rh positive dominates the Rh negative as usual.

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