

## RESEARCH REGARDING THE FREQUENCY OF AB0 BLOOD GROUPS IN A POPULATION OF PUPILS FROM PIATRA NEAMȚ, NEAMȚ COUNTY

CSILLA IULIANA BĂRA<sup>1\*</sup>, CAMELIA GREȘANU<sup>2</sup>

**Keywords:** AB0 blood groups, frequency, population genetics.

**Abstract:** Part of a larger study regarding the genetic polymorphisms present in the human population of Romania, we have studied the frequency of AB0 blood groups in Piatra Neamț, Neamț county, at a population of 320 pupils, born between 1992-1997. As controls were used data obtained from Blood Transfusion Centre from Neamț county, determination made between 2008-2009. The obtained frequencies were concordant with values obtained at Blood Transfusion Centre, which are normal for the Romanian population and for Europe. We are discussing various reasons for the slight regional differences of the AB0 blood group frequencies registered between different Romanian regions.

### INTRODUCTION

It is known (Tudose et al., 2000) that AB0 blood groups are ones of the most studied pure inherited traits due to their monogenic determinism, high frequency, easy determination and statistically analysis.

In human genetics, specific working methods were elaborated for the study of heredity and analyses of genotype (populational studies, mono- and dizygote twins investigations).

Part of a larger study regarding the genetic polymorphisms present in the human population of Romania, we have studied the frequency and transmission of AB0 blood groups in a scholar population (children born between 1992-1997) from Piatra Neamț, Neamț County. As controls were used data obtained from Blood Transfusion Centre from Neamț county, determination made between 2008-2009.

The obtained frequencies (group 0 = 30%, group A = 42%, group B = 19%, group AB = 9%) and sex ratios were concordant with values obtained at Blood Transfusion Centre, which are normal for the Romanian population and for Europe. Regarding sex ratio, we observed that group 0 is more frequent at males and group A at females. For B and AB groups, the frequency is almost the same for both sexes.

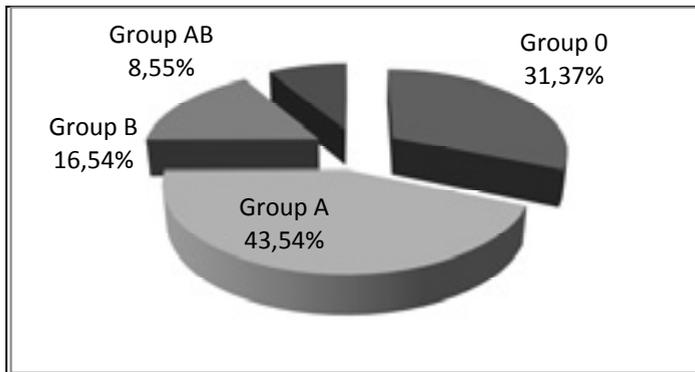
The motivation of the study resides in the need of a centralised and widespread research covering all Romanian regions, and also medical reasons (transfusions, certification of identity, paternity and filiation).

### MATERIAL AND METHODS

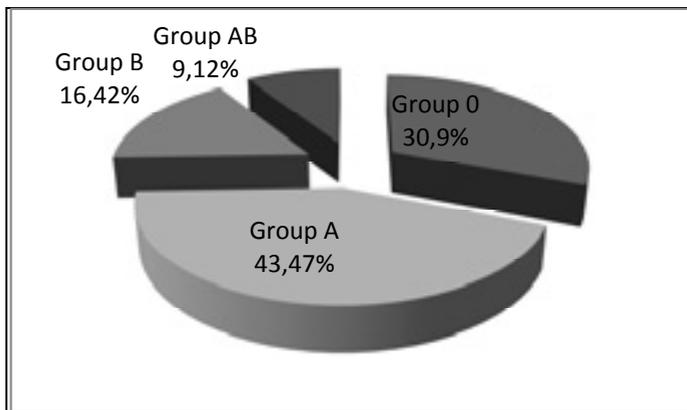
The data, regarding blood groups, were obtained from 320 pupils, 172 girls and 148 boys, born between 1992-1997, in matriculated in scholar year 2008-2009 at School „Dimitrie Leonida”, Piatra Neamț, as it follows: 19 fellows in the 5<sup>th</sup> class, 18 in the 6<sup>th</sup> class, 41 in the 7<sup>th</sup> class, 23 in the 8<sup>th</sup> class, 108 in the 9<sup>th</sup> and 111 in the 10<sup>th</sup>. Data were processed based on a filled out printed form, regarding the blood groups of them and of their families members (parents, brothers or sisters, grandparents). Results were grouped in 6 files, based on year of birth (1992, 1993, 1994, 1995, 1996, 1997), and then reported to recorded data from Blood Transfusions Center (CTS) Piatra Neamț, for 2008-2009.

### RESULTS AND DISCUSSIONS

In Romania, for AB0 blood groups, the repartition for determinations made in 2000, was: **0 Group= 34%; A Group= 41%; B Group= 19%; AB Group= 6%** (Băra *et al.*, 2007). For Neamț County, Roman region, Băra *et al.*, 2007, noticed the next frequency repartition: **0 Group= 33%; A Group= 43%; B Group= 16%; AB Group= 8%**



**Figure 1.** The AB0 blood groups frequency at CTS Piatra Neamț, 2008



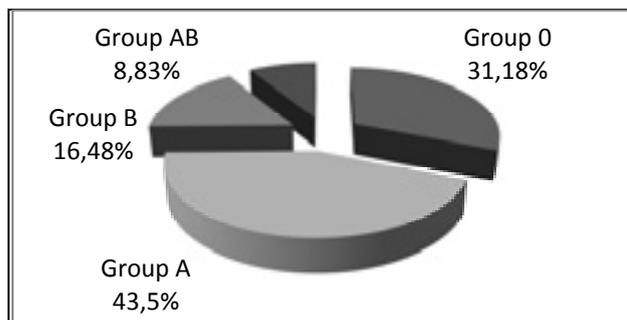
**Figure 2.** The AB0 blood groups frequency at CTS Piatra Neamț, 2009

The arithmetical mean for established AB0 blood system percent, in Piatra Neamț, for period 2008-2009, is shown in table 1.

Comparing this data with AB0 blood system frequency at the level of whole country, established for year 2000 (O – 34%; A – 41%; B – 19% și AB – 6%) it can be concluded that, for Piatra Neamț, blood groups frequency in normal limits, characteristic for Romanian population, and very similar to results showed by Băra *et al*, 2007, for Neamț County after a similar study made in Roman (O – 32,32%, A – 43,07%, B – 16,12%, AB – 6,52%).

**Table 1.** The AB0 blood groups frequency at CTS Piatra Neamț, during 2008-2009.

Blood Group (%)	2008	2009	Mean (%)
<b>Group O</b>	31,37	30,99	31,18
<b>Group A</b>	43,54	43,47	43,50
<b>Group B</b>	16,54	16,42	16,48
<b>Group AB</b>	8,55	9,12	8,83



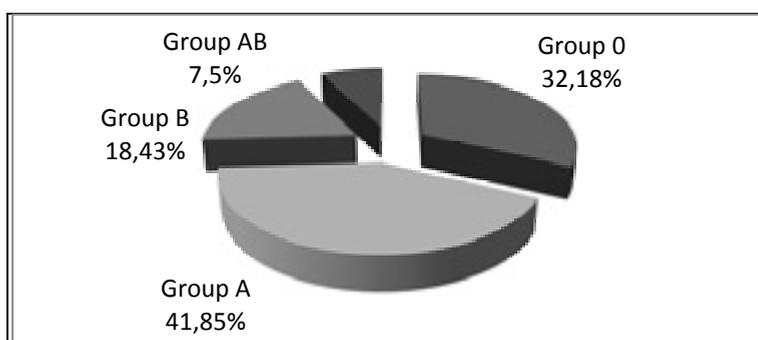
**Figure 3.** The ABO blood groups mean frequency at CTS Piatra Neamț, for 2008 - 2009

### THE FREQUENCY OF ABO BLOOD GROUP SYSTEM, IN THE INVESTIGATED SCHOLAR POPULATION

From the total of 320 investigated pupils, 103 belonged to O blood group (32,18%), 134 (41,85%) to A blood group, 59 (18,43%) to B group and 24 (7,5%) to AB group (table 2). The percentage is shown in figure 4.

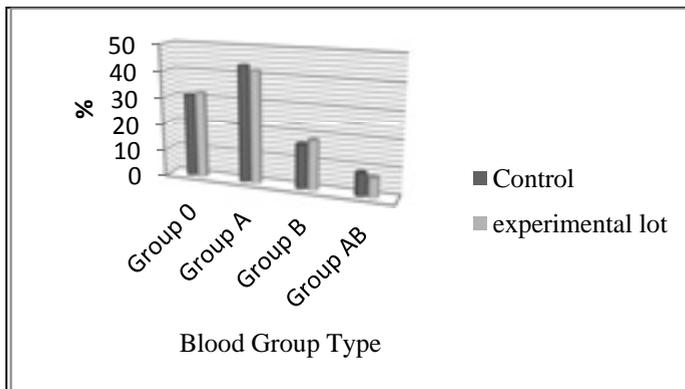
**Table 2.** Number of investigated pupils belonging to each blood group type

Years of birth	Blood Group Type			
	Group O	Group A	Group B	Group AB
1992-1993	71	96	35	17
1994-1995	20	26	17	1
1996-1997	12	12	7	6
Total	103	134	59	24



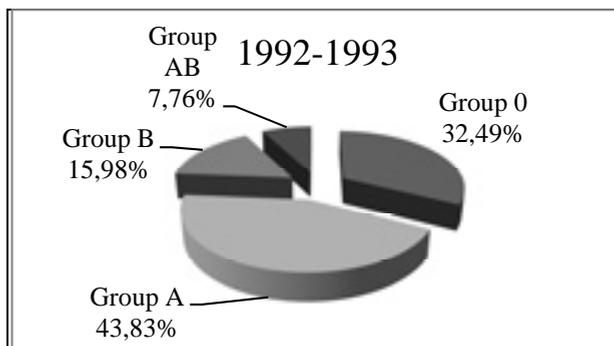
**Figure 4:** General frequency of ABO blood groups in the studied group

Results regarding ABO blood groups frequency in the investigated scholar population (experimental lot), are very similar with the mean of results obtained from CTS Piatra Neamț (Controle), for period 2008-2009 (Fig.5).

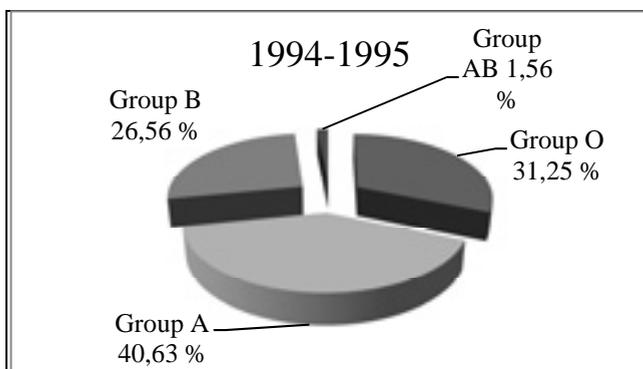


**Figure 5:** General frequency of AB0 blood groups in the studied group compared with mean frequency at CTS Piatra Neamț, for 2008 – 2009 (Controle)

Comparing blood group types depending of year of birth, it was noticed that results do not differ very much. So, for the 219 childrens born in 1992-1993, determinations showed that 71 have O group, 96 have A group, 35 B group, 17 AB group. (figure 6, table 2).



**Figure 6:** Frequency of AB0 blood groups for the group of pupils born in 1992-1993

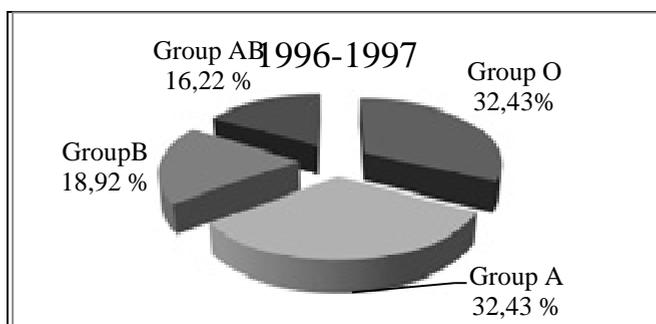


**Figure 7:** Frequency of AB0 blood groups for the group of pupils born in 1994-1995

For those born in 1994-1995, results showed that: 20 have 0 group, 26 have A group, 17 B group, 1 AB group (figure 7, table 2).

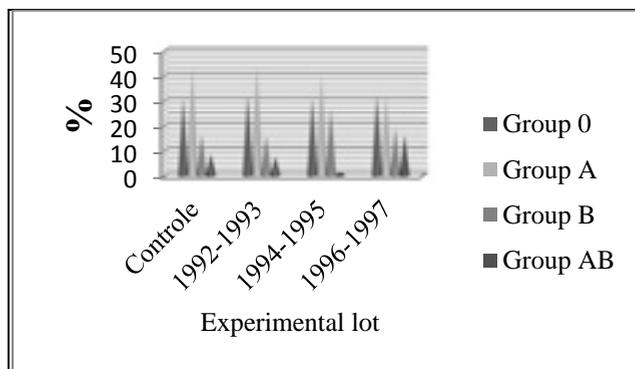
For pupils born between 1996-1997, results showed that: 12 have 0 Group (32,43%), 12 have A Group (32,43%), 7 B Group (18,92%), 6 AB Group (16,22%) (figure 8, table 2).

Blood groups frequency in the investigated populational sample, (grouped after year of birth in 3 experimental lots: 1992-1993; 1994-1995; 1996-1997) was similar to values obtained for the population of Piatra Neamț (mean of results obtained from CTS Piatra Neamț), for period 2008-2009 (Fig.9). So it can be observed that the predominant blood group is A, followed by Group 0, Group B, and on the last place Group AB. ABO system blood groups frequency for Piatra Neamț, joins the normal parameters characteristic for the Romanian population, which is also in accordance with the general European values, similar with results obtained for Neamț County, Roman region, by Băra *et al*, in 2007.



**Figure 8:** Frequency of ABO blood groups for the group of pupils born in 1996-1997

For the investigated population sample, there were 148 boys and 172 girls, belonging to one or other blood group. Even if number of boys were lower than of girls, regarding sex ratio, we observed that group 0 is more frequent at males. For B and AB groups, the frequency is almost the same for both sexes. Group A is more frequent at females, but because we have not investigated the same number of boys and girls, results are not conclusive.



**Figure 9:** Frequency of ABO blood groups for the 3 experimental lots compared with mean frequency at CTS Piatra Neamț, for 2008 – 2009 (Controle)

## CONCLUSIONS

The investigated populational sample was composed of 320 children, born between 1992-1997, learning at School „Dimitrie Leonida”, Piatra Neamț, which determined blood group type between 2008-2009.

Results regarding ABO blood groups frequency in the investigated scholar population, are very similar with the mean of results obtained from Transfusion Centre Piatra Neamț, for period 2008-2009

ABO system blood groups frequency for Piatra Neamț, joins the normal parameters characteristic for the Romanian population, which is also in accordance with the general European values

The predominant blood group is A, followed by Group 0, Group B, and on the last place Group AB, not depending on sex of investigated person.

Regarding sex ratio, we observed that group 0 is more frequent at males. For B and AB groups, the frequency is almost the same for both sexes.

## REFERENCES

- Băra, I.I. Câmpeanu, M.M.**, 2003- *Genetică*, Editura Corson, Iași, 139-183
- Băra, I.I., Ivaș, Manuela Gabriela, Tudose, Cr., Băra, Csilla Iuliana**, 2004. *A populational research regarding the frequency and transmission of ABO blood groups in the Romanian region Bârlad*. Analele Științifice ale Universității „Alexandru Ioan Cuza” din Iași, secțiunea II, GENETICĂ ȘI BIOLOGIE MOLECULARĂ, tomul VI, 91-93.
- Ion I. Băra, Emilia Rândunică, Cristian Tudose, Csilla Iuliana Băra**, 2007. *Research regarding the frequency and transmission of ABO blood groups in a population of pupils from Roman, Neamț county*. Analele Științifice ale Universității “Al.I.Cuza” din Iași (serie nouă), Secțiunea I, a.Genetică și Biologie Moleculară, tom VIII, Fasc. I 167-175.
- Raicu P.**, 1997 – *Genetica generală și umană*, Editura Humanitas, București.
- Stine J.**, 1999. *The new human genetics*. Wilkins and sons, New York
- Tudose C., Maniu M., Maniu C.L.**, 2000. *Genetica umana*, Ed. Corson, Iași.

1) Faculty of Biology, „Al.I.Cuza” University, Iassy

2) College “Dimitrie Leonida” Piatra Neamț, Department of Biology

\* csiulia@yahoo.com