

## BLOOD GROUPS IN ALCOHOLICS

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A study was carried out on two population cohorts during two years to differentiate alcoholics from the rest of population in respect of the incidence of blood groups. The subjects — alcoholics and nonalcoholics, were male workers aged 40—60 years who had retired as disabled during the current or previous year.

One cohort consisted of two groups of 34 subjects each, alcoholics and controls, in whom the blood groups of the ABO system and Rh blood groups were determined. The other cohort included two groups of 120 subjects each, who had their ABO, Rh, as well as Kell, P, MN, S, C and E blood groups determined. The criteria for entering the group of alcoholics were based on daily intake of alcohol and duration of alcohol abuse. The control group consisted of the workers who drank occasionally minor amounts of alcoholic beverages.

Data processing failed to reveal any statistically significant difference in the distribution of blood groups between alcoholics and control subjects.

Excessive intake of alcohol and addiction to it are among the most important medical and social problems of contemporary society. Numerous studies point out a major role of social factors in generation of alcoholism. Recently, two questions have been raised: do alcoholics differ genetically from the rest of population and can genetic conditioning of alcoholism be demonstrated?

The aim of this work was to investigate the incidence of some surface erythrocytic factors — blood groups as defined genetic markers in groups of alcoholics and nonalcoholics.

### SAMPLE AND METHODS

The study included male disabled workers aged 40—60 years who had retired with a first-grade disability pension during the current or previous year. They were selected from the records of Disability

Commissions of Pension and Disability Insurance Community of the Republic of Croatia, and came from different regions of SR Croatia. They were grouped into alcoholics and nonalcoholics. The alcoholics were workers disabled principally because of alcoholism, the non-alcoholics, i. e. the workers in whom alcoholism was not ascertained, served as controls.

Diagnoses were checked twice: on the basis of historical data, laboratory tests and clinical examinations, first by disability commissions and again in the course of the study. Clinical examination included the reports by the psychologist and the neuropsychiatrist. The following diagnoses, by frequency, were made in nonalcoholics: rheumatic, cardiovascular, psychiatric, respiratory and gastrointestinal diseases. The diagnoses in alcoholics, apart from psychiatric disorders (alcoholism), were: rheumatic, gastrointestinal and cardiorespiratory diseases. Data on daily alcohol intake, type of alcoholic beverage and duration of alcohol abuse were also taken. Later, data were expressed as grams of pure alcohol using declarations on percentage of alcohol in each sort of drink.

The study was done on two cohorts in an interval of two years. The first cohort consisted of 68 patients who were divided into two groups according to daily intake of alcohol and duration of alcohol abuse. The control group consisted of 34 men of whom three had never consumed alcohol while the others intermittently drank minor amounts of alcoholic beverages. The other group consisted of 34 men whose average daily alcohol consumption for the last 15-30 years exceeded 238 grams of alcohol.

The second cohort had a total of 240 men, who were divided into a group of 120 alcoholics, and a control group of 120 nonalcoholics. Nonalcoholics were those who only occasionally consumed not more than 50 grams of alcohol daily. The criterion for alcoholics was a daily intake of at least 200 grams of alcohol and a drinking history of at least ten years. In all groups the age was taken as the completed years of age of the subject on the day of examination. The length of education period was established on the basis of a questionnaire and by consulting medical records.

In the first cohort the blood groups of the ABO system and Rh blood groups were determined in all subjects. In the second cohort, blood groups MN, S, P, Kell, C and E were determined as well, but not for all subjects because of technical and organisational reasons. For the sake of statistical evaluation subgroups were formed. All determinations were done at the Institute for Blood Transfusion of SR Croatia according to the »Technical Handbook of Association of American Transfusiologists« (1).

For statistical evaluation of the results the Chi-squared test was used when two or more dependent or independent variables were considered.



When one of the variables was treated separately, Student's t-test was used. The result was considered significant when its p value was less than 0.05.

## RESULTS

The results for the first cohort are shown in Table 1. There is no statistically significant difference in the distribution of ABO blood groups and Rh blood groups between the studied groups.

Table 1  
*Incidence of ABO and Rh blood groups in alcoholics and controls (the first cohort)*

Blood groups	Alcoholics		Controls		$\chi^2$	P
	n	%	n	%		
A	14	41.3	8	23.5	0.27	n. s.
B	6	17.6	6	17.6		
AB	1	2.9	4	11.7		
O	13	38.2	16	47.2		
<b>Total:</b>	34	100%	34	100%		
Rh +(D)	32	94.1	26	76.5	0.32	n. s.
Rh -(d)	2	5.9	8	23.5		
<b>Total:</b>	34	100%	34	100%		

Tables 2, 3, 4 and 5 show the results for the second cohort. Although this cohort was four times larger than the first, there was no statistically significant difference in the distribution of blood groups ABO, Rh, C, E, MN, Kell and P between the alcoholics and nonalcoholics. In this case we also compared the incidence of combinations of groups C, D and E and, also of M and N, because genetic loci which determine them are closely situated on the same chromosome. The results failed to reveal any statistically significant differences. As in the first cohort blood group A had a slightly greater incidence in alcoholics and blood group O showed a higher incidence in nonalcoholics.

The average period of education in years was significantly shorter in alcoholics than in controls in both cohorts. The average age of the subjects did not differ significantly among the groups and ranged from 52.5 to 53.5 years.

Table 2.  
*Incidence of ABO and Rh blood groups in alcoholics and controls  
(the second cohort)*

Variable	Alcoholics		Controls		$\chi^2$	P
	n	%	n	%		
A	44	36.7	40	33.3	3.03	n. s.
B	24	20.0	30	25.0		
AB	15	12.5	11	9.2		
O	37	30.8	39	32.5		
Total:	120	100%	120	100%		
Rh +(D)	99	82.5	100	83.3	0.12	n. s.
Rh -(d)	21	17.5	20	16.7		
Total:	120	100%	120	100%		

Table 3.  
*Incidence of MN and S surface erythrocytic factors  
in the second cohort*

Variable	Alcoholics		Controls		$\chi^2$	P
	n	%	n	%		
MM	15	15.2	14	15.4	0.004	n. s.
MN	74	74.7	68	74.7		
NN	10	10.1	9	9.9		
Total	99	100%	91	100%		
SS	15	17.0	12	17.4	0.71	n. s.
Ss	33	37.5	30	43.5		
ss	40	45.5	27	39.1		
Total	88	100%	69	100%		

Table 4.

*Incidence of Kell and P surface erythrocytic factors in the second cohort*

Variable	Alcoholics		Controls		$\chi^2$	P
	n	%	n	%		
Kell (+)	8	8.2	9	10.0	0.21	n. s.
Kell (-)	90	91.8	81	90.0		
Total	98	100%	90	100%		
P (+)	77	78.6	67	73.6	1.08	n. s.
P (-)	21	21.4	24	26.4		
Total	98	100%	91	100%		

Table 5.

*Incidence of C and E surface erythrocytic factors in the second cohort*

Variable	Alcoholics		Controls		$\chi^2$	P
	n	%	n	%		
CC	16	14.3	10	9.0	1.51	n. s.
Cc	63	56.2	66	59.5		
cc	33	29.5	35	31.5		
Total	112	100%	111	100%		
EE	1	0.9	4	3.6	1.90	n. s.
Ee	29	25.9	29	26.1		
ee	82	73.2	78	70.3		
Total	112	100%	111	100%		

## DISCUSSION

Although social factors are known to be among the main causative factors of alcoholism, the question whether alcoholics differ from the rest of population with respect to certain genetic factors is still unanswered. The factors among the most frequently considered in this connection are the blood groups of the ABO system and the Rh blood groups.

The relevant literature data are of three types. They either exclude any significant linkage between the blood groups and alcoholism (2-6) or report among alcoholics a significantly greater (7, 8) or, on the contrary, a significantly lower incidence of blood group A (9).



Our results do not show any statistically significant differences in the distribution of blood groups between alcoholics and nonalcoholics. A slightly greater incidence of blood group 0 in our nonalcoholics is in accordance with most of the works published so far (2—6). Because of the existence of a great number of nonuniform results we consider it useful to continue these investigations on larger samples, using some other genetic markers such as dermatoglyphs and antigens of the HLA system.

The MN, Kell, P, S, C and E blood groups as genetic markers have been dealt with in alcoholism in only two investigations. The results of one of these investigations (4) are in accordance with our own results i. e. no statistically significant difference has been found in the distribution of blood groups MN, Kell, P, S, C and E or of some of their combinations between groups of alcoholics and nonalcoholics. Although one investigation (8) reports a statistically significant difference for a greater number of blood groups and their combinations these results can hardly be taken as valid for they are based on small and nonuniform samples.

Our investigation included only male disabled workers from Croatia. An approach involving subjects of the same sex only has proved useful because, evidently, the incidence of alcoholism differs between the sexes. We set two age limits to our subjects: the upper (60 years) and the lower (40 years) for two reasons: firstly, to make alcoholism, if present, sufficiently long lasting to be made diagnostically clear and recognizable as a characteristic disease and secondly, to make sure that the genotype of the subject belongs approximately to the same pool of genes.

#### References

1. *Widman, K.*: Technical Manual of the American Association of Blood Banks. J. B. Lipincott Company Philadelphia—Toronto, 1981.
2. *Camps, F. E.*: Genetics and alcoholism. Ann. N. Y. Acad. Sci., 197 (1972) 134—137.
3. *Camps, F. E.*: Increase in the Incidence of Nonsecretors of ABH Group Substances among Alcoholic Patients. Br. Med. J., 1 (1967) 30—31.
4. *Hill, S. Y.*: Association and Linkage between Alcoholism and Eleven Serological Markers. J. Stud. Alcohol, 36 (1975) 981—992.
5. *Akhimina, N. I.*: Alcoholism and genetic markers. Zh. Nevropathol. Psikiatr., 75 (1975) 573—574.
6. *Neukirchen, M.*: Blutgruppe Alkoholkrankheit und Leberschädigung. Munch. Med. Wochenschr., 123 (1981) 129—132.
7. *Nordmo, S. H.*: Blood groups in shizophrenia, alcoholism and mental deficiency. Am. J. Psychiatry, 116 (1959) 460—461.
8. *Kojić, S.*: Alkoholizam i nasljeđivanje, Zavod za udžbenike, Beograd, 1982.
9. *Swinson, R. P.*: Genetic polymorphism and alcoholism. Ann. N. Y. Acad. Sci., 197 (1972) 129—133.

*Sažetak*

**KRVNE GRUPE U ALKOHOLIČARA**

Ovo istraživanje, diferencijacija alkoholičara od ostale populacije s obzirom na zastupljenost krvnih grupa, sprovedeno je u dva dijela s vremenskim razmakom od dvije godine. U oba slučaja ispitivane skupine sačinjavali su alkoholičari i nealkoholičari, muškarci, u dobi od 40 do 60 godina, koji su u tekućoj ili prethodnoj godini stupili u invalidsku mirovinu.

U prvom dijelu formirane su dvije skupine od po 34 ispitanika, alkoholičari i poredbena skupina, kojima su određivane krvne grupe ABO sustava i Rh krvne grupe. U drugom dijelu obrađene su dvije skupine od po 120 ispitanika, te su im osim spomenutih krvnih grupa određivane i krvne grupe Kell, P, MN, S, C i E.

Kriteriji za formiranje skupina alkoholičara u oba slučaja bili su dnevna konzumacija alkohola i alkoholičarski staž. U poredbene skupine uzeti su samo oni koji su pili povremeno manje količine alkohola i nikad se nisu opijali.

Obradom dobivenih podataka nisu nađene statistički značajne razlike u distribuciji krvnih grupa u alkoholičara u odnosu na poredbenu skupinu.

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