

## RESEARCH ARTICLE

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## Biosocial characteristics of patients with paranoid schizophrenia

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### ABSTRACT

Schizophrenia is known as a complex disorder that combines both genetic and environmental factors. Different genes have been tested as candidates for association with schizophrenia and different environmental factors have been examined in many studies on epidemiology of schizophrenia. Specific environmental factors, such as nonspecific stress, mental and physical abuse, maternal diet during pregnancy, drug use, living in an urban setting, migration, seasonal effects on birth and exposure to infections, have been discussed as possible risk for schizophrenia. The present preliminary study is focused on the relations between biological and social characteristics of patients with paranoid schizophrenia with different cognitive levels, emotional and creative styles. Descriptive statistics, the Student's t-test and SPSS software, were used to analyse the relations mentioned. Differences between sexes and these concerning age of individuals (risk level of inheritance, ABO blood group distribution, triggering factors, aggressive behavior, single or multiple suicide attempts, levels of education and creative talents) were indicated and discussed.

The study identifies important trends and discusses essential biosocial relations in context of the knowledge for schizophrenia in Bulgaria. Future comparative investigations, including genetic markers and psychogenetic approaches, should be used in complex, in order to characterize the reasons for developing paranoid schizophrenia and the possible relations between biological, psychological and social factors better.

**Key words:** schizophrenia, biosocial factors, heredity, environment

## Introduction

About 1% of the human population is affected by schizophrenia which is known as a heterogeneous syndrome (Jablensky *et al.*, 1992) with highly varied psychotic and negative symptoms and clinical manifestations (McCormick & Flaum, 2005). Many studies based on different approaches show a high significance of heritability, presence of large number of candidate genes and complex genetic factors for schizophrenia (Cardno & Gottesman, 2000; Straub & Weinberger, 2006; Crow, 2008; Sullivan, 2008; O'Donovan *et al.*, 2008, 2009). At the same time there are many evidences for the importance of the environmental factors in the developmental pathway to schizophrenia and for gene – environment interactions in expression of this syndrome (Winkel *et al.*, 2010).

The present study is focused on the relations between biological and social characteristics of patients with paranoid schizophrenia with different cognitive levels, emotional and creative styles from a hospital for mental diseases in Bulgaria.

## Materials and Methods

This study was approved by the local Ethics Committee of the Medical University Plovdiv and the local Ethics Committee of the State Psychiatry Hospital in Radnevo in 2015 and all studied subjects gave their written informed consent for participation before starting the investigation.

Totally 72 inpatients (51.4% female and 48.6% male) with diagnosis of paranoid schizophrenia, consecutively admitted in the State Psychiatryc Hospital in Radnevo, have been included in this study. All diagnoses were established

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by psychiatrists using DSM-IV criteria.

The age of the studied patients was between 23 and 64 years (mean age  $48.65 \pm 8.46$  and  $43.81 \pm 12.65$  for male and female, respectively). The mean duration of the illness was calculated as  $17.47 \pm 10.57$  years.

An inquiry form with specific questions and anamnesis information (a medical history) were used for collecting data concerning different characteristics included in the study.

ABO blood groups were expressed by the routine technic and usage of test serums (Moss, 1910).

Descriptive statistics, the Student's t-test and SPSS software, version 19.0k (SPSS Inc., Chicago, IL, USA) were used to analyse the relations mentioned.

## Results

Data for inheriting the schizophrenia were found for 48.5% of the studied patients by the usage of the medical history. In this aspect, a difference between both sexes was indicated. Our results showed that for 38.7% of men and for 56.8% of women schizophrenia was with genealogical relations. This presented a connection with higher risk level of inheritance for the women than for the men. The mean calculated risk was 2.078 (0.786 – 5.494).

Information about number of studied individuals and some of characteristics included in the investigation are presented in Table 1.

Data concerning the ABO blood group distribution, the sex distribution, possible triggering factors and levels of education for the schizophrenia patients included in this investigation are presented in Figure 1, Table 2 and Figure 2, respectively.

There were found data for aggressive behavior, including causation of physical traumas on other person, for 7.4% of the studied patients and data for single or multiple suicide

attempts for 17.6% of them (Table 3 and Table 4).

Registered creative occupations including musical, poetical and fine artistic talent were reported for 7.2% of the tested patients (Table 5).

The relations between the unlocking age of schizophrenia and ABO blood group belonging is presented in Table 6.

## Discussion

The results received in this investigation showed interesting differences between both sexes and relations between the characteristics studied.

The difference found concerning age of individuals included in the study showed that the women were 4.84 years elder than men ( $t=1.818$ ,  $p=0.075$ ).

The mean age difference between the father and the mother up to the moment of the patient's birth was about 4 years. Concerning the triggering moment of schizophrenia the mean age of parents was similar which showed no impact on the illness.

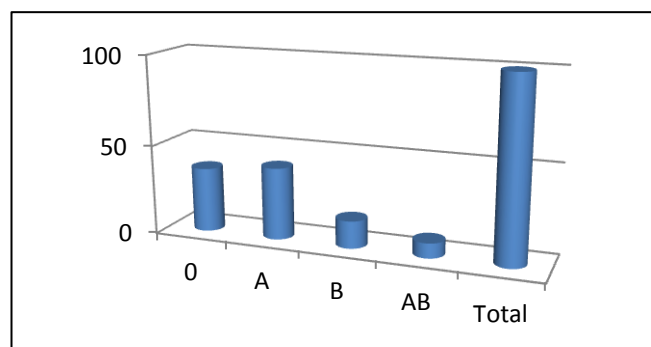
Data received in this investigation demonstrated that about half of the studied patients has hereditary history, which was less than results reported in other studies (McGue *et al.*, 1983; McGuffin *et al.*, 1984; Farmer *et al.*, 1987; Onstad *et al.*, 1991; Cardno & Gottesman, 2000; Collier, 2008).

Results from studies of schizophrenia in adopted persons have been reported by different authors in order to isolate genetic influences from the other causes of familial aggregation (Wender *et al.*, 1974; Kety *et al.*, 1994; Kendler *et al.*, 1994). In our study we found that about 10% of patients have been adopted or nurtured in a social care home. Their characteristics were used for comparisons with those of patients with familial aggregation.

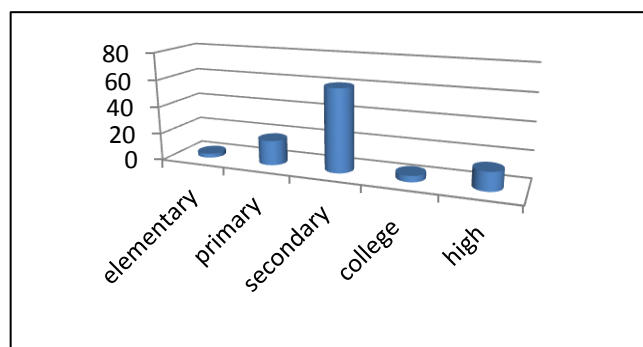
**Table 1.** Number of the studied individuals and information concerning their mother's and father's age, age of unlocking the disease and diploma success

Characteristics	Number of patients	Minimum	Maximum	Mean	Std. Deviation
Duration	68	1	40	17.47	10.568
Diploma success	64	2.00	6.00	4.458	0.91291
Father age at the birth moment	57	14	45	28.67	5.626
Mother age at the birth moment	56	12	35	24.82	5.580
Age of unlocking the disease	65	14	53	28.43	10.576

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**Figure 1.** ABO blood group type distribution (%) in the studied patients with paranoid schizophrenia.



**Figure 2.** Data (%) concerning educational level of the studied patients.

**Table 2.** Sex distribution according to the triggering factors.

		Type of the triggering factor			Total	
		Birth	Physical trauma	Stress factor		
Sex	Male	Count	0	2	6	8
		% within sex	0.0	25.0	75.0	100.0
	Female	Count	2	1	1	4
		% within sex	50.0	25.0	25.0	100.0
Total		Count	2	3	7	12
		% within sex	16.7	25.0	58.3	100.0

Comparative data of this investigation showed that the diploma success of the tested patients is  $4.46 \pm 0.91$ . Approximately 21% of them were with elementary and primary education level. About half of the patients of this group has been adopted or nurtured in a social care home and the individual success in school for them respectively was lower. For the others, more educated individuals, increasing in the diploma success was established.

As a tendency, for patients with lower level of education the starting moment of schizophrenia was 4 years earlier. There was found a correlation between the level of education and documented triggers. Stress was a major triggering factor for people with higher education. This factor was registered especially in patients with higher diploma success ( $4.99 \pm 0.73817$ ). Data from this investigation showed that for patients with primary and secondary education, the disease could be unlocked also because of a physical trauma or a birth. According to the data received, patients with lower diploma success were more likely to express auto-aggression.

There were differences detected, between both sexes, concerning aggressive and suicidal behavior. Evidences for aggressive behavior, including causing physical traumas to

another person, were found for 12.9% of the studied men and only for 2.7% of the women. Suicide attempts were documented for 3.2% of men and for 29.7% of women, which showed about 10 times more expressed self-aggressive behavior for female individuals. In addition to this result, most of the registered suicide attempts were repeated in the medical history of women.

Regarding the suicide attempts, a relation between the low educational level, the earlier age of the mother and the earlier unlocking age of the disease were established for most of the self-aggressive manifestations. Data from our investigation showed that all female schizophrenic patients, who have unlocked the disease after childbirth, have also attempted suicide, while the percentage of suicidal attempts in those patients who have unlocked the disease after stress, was much lower.

Data from the study also showed that the duration of schizophrenia is in relation with the intensity of expression of aggressive behaviour – patients with lower duration of the disease were found to be more aggressive and have more documented cases of inflicting injuries on others. It was also

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**Table 3.** Data concerning aggressive behavior, including causing physical traumas to another person.

			Aggressive behavior with data for causing physical traumas to another person		Total
			No	Yes	
Sex	Male	Count	27	4	31
			87.1%	12.9%	100.0%
	Female	Count	36	1	37
			97.3%	2.7%	100.0%
Total	Count		63	5	68
			92.6%	7.4%	100.0%

detected that the percent of the patients with 0 blood group with aggressive manifestations was the highest.

Table 5 demonstrates some relations between characteristics of patients with expressed and without expressed creative talent. The illness duration was about 10 years longer for patients with some kind of talent than for those without any. The diploma success was higher for individuals with expressed creative talent (poetic, musical, artistic). It should be noted greater age of both parents at the time of birth in patients with expressed creative characteristics.

It was also found that the age of unlocking the disease has an impact on the mentioned creative characteristics. As a tendency, as earlier the disease is unlocked and the greater is its duration, it is more likely a patient with schizophrenia to manifest a creative talent.

Many authors have discussed a possible association between schizophrenia and AB0 blood groups (Irvin & Miyashita, 1965; Mourant et al., 1975; Rinieris et al., 1982; McGuffin & Sturt, 1986) with no significant findings. In our study the AB0 blood group distribution was not much

different than reported in the revised literature.

The differences found were as follows: 40.3% (39.5%), 15.3% (11.2%), 36.1% (44.4%) and 8.3% (4.9%) for A, B, 0 and AB groups in our study and this of Irvin & Miyashita (1965), respectively. The most of the patients in our study were A blood group type, in difference with the other mentioned above studies, where the highest percent of schizophrenia was reported for individuals with 0 blood group type.

The data from Table 6 showed that the patients with AB blood group type unlock schizophrenia earlier ( $23.25 \pm 9.743$  years) in comparison with others. It was also found that the individuals with 0 blood group type were with the highest mean age for unlocking the disease ( $31.32 \pm 11.390$  years).

A presence of a triggering (unlocking) factor was documented in 17.6% of the surveyed patients. Among the reasons reported in our study as unlocking the disease, 75% of the men appointed stress as a triggering factor. As a main triggering factor for schizophrenia 50% of the women appointed giving birth. More rarely they reported stress (25%) or physical trauma (25%) as such factor. A correlation

**Table 4.** Data concerning suicide attempts.

			Suicide attempts		Total
			No	Yes	
Sex	Male	Count	30	1	31
		% within Sex	96.8%	3.2%	100.0%
	Female	Count	26	11	37
		% within Sex	70.3%	29.7%	100.0%
Total	Count		56	12	68
	% within Sex		82.4%	17.6%	100.0%

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**Table 5.** Information concerning creative characteristics in relation with other studied factors.

	Creative characteristics	N	Mean	Std. Deviation	T	P
Duration of schizophrenia	Yes	5	26.40	11.675	2.007	0.049
	No	63	16.76	10.245		
Diploma success	Yes	5	5.04	0.95289	1.499	0.139
	No	59	4.4086	0.90052		
Father age at the birth moment	Yes	5	31.20	7.759	1.055	0.296
	No	52	28.42	5.417		
Mother age at the birth moment	Yes	5	27.40	6.189	1.085	0.283
	No	51	24.57	5.518		
Age of unlocking the disease	Yes	5	19.00	2.646	-5.643	0.000
	No	60	29.22	10.615		

**Table 6.** Unlocking age of schizophrenia and correlation with the belonging to ABO blood group for the patients studied.

	ABO	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Age of unlocking the disease	0	25	31.32	11.390	2.278	26.62	36.02	16	53
	A	26	26.42	9.458	1.855	22.60	30.24	14	53
	B	10	28.50	11.068	3.500	20.58	36.42	15	51
	AB	4	23.25	9.743	4.871	7.75	38.75	15	37

between the presence of activating factor and the earlier mother age was also found. Our investigation demonstrated that stress is a major triggering factor for patients with no evidence of heredity, while injuries, childbirth or stress were equally found as activating factors for patients with a family history of schizophrenia.

Although the study identifies important trends and discusses essential biosocial relations in context of the knowledge for schizophrenia in Bulgaria, future comparative investigations including genetic markers and psychogenetic approaches should be used in complex, in order to characterize better the reasons for developing paranoid schizophrenia and the possible relations between biological, psychological and social factors.

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