Multivariate Analysis of Schizophrenic Dimensions In The Sudan

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Abstract

Multivariate analysis of eleven dimensions of schizophrenia with Sudanese patients were carried out. Multiple regression and factor analysis supported the "cumulative biological risk" conceptualization of Park, Templer, Canfield and Cappelletty[1]. Visual hallucinations and febrile illness at onset were associated with more unfavorable prognosis. The findings were related to the Russian literature on "febrile schizophrenia".

Introduction

The purpose of the present study was to determine the interrelationships of schizophrenic dimensions in the Sudan. Although there is a voluminous literature on symptom, historical, behavioral, demographic, and typology characteristics of schizophrenic patients, the preponderance of the studies have employed no more than 1 or 2 variables. And, there has been a dearth of research using multivariate statistics. An exception to this generalization is the study of Park, Templer, Canfield and Cappelletty[1] who formulated their study around the Templer and Cappelletty [2] conceptualization in which primary schizophrenia has more genetic and other endogenous etiology and secondary schizophrenia more assault to the brain etiology. Park et al correlated age of first hospitalization, education, neurological problems, psychosocial stressors, paranoid vs. non-paranoid subtype, drug/alcohol problems, presence or absence of epilepsy, presence of affective disorders, gender and number of schizophrenic relatives. The highest factor loadings for Factor 1, which was called "process vs. reactive", were age at first hospitalization and education. The highest loadings on Factor 2 were non-paranoid type, female gender, and presence of affective disorder. Factor 2 was called "paranoid vs. non-paranoid. In multiple regression, age of first hospitalization was used as the dependent variable as an index of severity of the disorder. It has long been recognized that earlier onset of schizophrenia tends to be associated with a more unfavorable prognoses. In the multiple regression, a history of alcohol and drug abuse and a history of neurological problems combined to predict earlier age of schizophrenia onset. Park et al [1] proposed their cumulative biological risk model in which biological etiological elements combine is an additive or multiplicative fashion. They suggest some combination of these etiological variables is related to probability of becoming schizophrenic and to severity of schizophrenia in persons who become schizophrenic.

The present study was primarily an exploratory study because there has been insufficient schizophrenia research in the Sudan to form hypotheses. Nevertheless, the Park et al [1] study methods and findings and formulations are viewed as providing the foundation for this study in the Sudan. There are overlaps in variables selected for univariate and multivariate analyses. And, in both studies age of first hospitalization has been selected for the dependent variable in the multiple regression pertaining to the concept of "cumulative biological risk."

Method

The subject records employed for the present study were those of 221 schizophrenic patients who were inpatients at Khartoum Teaching Hospital (psychiatric unit) and El-Tigani El-Mahi Psychiatric Hospital in Omdurman during the year 1992.

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For the correlation matrix and factor analysis with the 221 schizophrenic patients, 11 variables were included. Eight of these were based on the Park et al's[1] cumulative biological risk conceptualization. These variables are history of head injury, history of seizure, alcohol abuse, cannabis abuse, family history of schizophrenia, age of onset, gender and education. Three variables were based not only upon the two above conceptualizations but upon inspection of the data under consideration. Thirty-three patients had onset beginning with a febrile illness. Febrile illness would appear to fit the conceptualization criteria of secondary schizophrenia and of cumulative biological risk. Such conceptualization also permits the inclusion of cannabis use which was reported for 17 patients, and for visual hallucinations which were reported for 23 patients and could be viewed as constituting atypical schizophrenia.

Results

Table 1 contains the frequency distribution for the bivariates. The age of onset has a mean of 25.64 and a standard deviation of 8.42. The mean and standard deviation for education are 8.38 and 5.33 respectively. Table 2 contains the product moment correlation matrix for the following variables: age of onset, alcohol abuse, cannabis abuse, education, febrile illness at onset of schizophrenia, gender, visual hallucinations, and family history of schizophrenia. An orthogonal factor analysis with varimax rotation was carried out. The summary is contained in table 3. Factor 1 has an eigenvalue of 1.65 and accounts for 20.7% of the variance. The highest loadings were male gender, cannabis abuse, and education. After consideration of the label "Westernization" the probably more parsimonious label of "male gender" was given. Factor 2 has an eigenvalue of 1.41 and accounts for 17.7% of the variance. Its highest factor loadings were with visual hallucinations and schizophrenic relatives. It was labeled "severity of disorder". Factor 3 has an eigenvalue of 1.29 and accounts for 16.1% of the variance. Its highest factor loadings were with age of onset, febrile illness, and education. It was labeled "time of onset". Step-wise multiple regression with age of onset as the dependent variable was carried out and the summary is contained in table 4.

Discussion

The multiple regression findings with the dependent variable of age of onset could be viewed as supporting the "cumulative biological risk" theory of Park, Templer, Canfield and Cappelletty[1] which postulates that with more biological risks the greater the probability of schizophrenia, and that in schizophrenic populations greater number of biological risks are associated with more severe schizophrenia. In this multiple regression, visual hallucinations (often caused by toxic conditions, at least in Western countries) and febrile illness at onset of schizophrenia were associated with younger age of schizophrenia onset, a factor long recognized as an

Table 1. Frequency distribution for the bivariates:

Variables	Yes (%)	No(%)
Visual hallucinations	23 (10.4%)	198 (89.6%)
Family history of schizophrenia	59 (26.7%)	162 (73.3%)
History of alcohol abuse	14 (6.3%)	207 (93.7%)
History of cannabis abuse	17 (7.7%)	204 (93.4%)
Febrile illness at schizophrenia onset	33 (14.9%)	188 (85.1%)

Table 2. Correlational Matrix

Variables	2	3	4	5	6	7	8
1. Age of onset	.03	.01	-.29**	-.13	.03	-.01	-.01
2. History of alcohol abuse (No=1, Yes=2)		.34***	.02	-.00	-.14*	-.09	.05
3. History of cannabis abuse (No=1, Yes=2)			.16	.02	.20**	.12	.06
4. Education				.11	-.38***	-.05	-.00
5. Febrile illness at onset (No=1, Yes=2)					.07	-.02	.03
6. Gender (F=1, M=2)						.09	.03
7. Visual hallucinations (No=1, Yes=2)							.06
8. Schizophrenia family history (No=1, Yes=2)							

*P<.05 **P<.01 ***P<.001

indication of more unfavorable prognosis.

The cumulative biological risk model is also given support from the factor analysis. Factor two was called "severity" and had factor loadings of .72 with family history of schizophrenia, and .76 with visual hallucinations. Schizophrenia tends to be more severe when there is a family history of schizophrenia. And, with visual hallucinations there are presumably pathological processes in addition to those that give rise to the more customary auditory hallucinations.

The fact that 33 (15%) of the schizophrenic patients had febrile illness at onset is certainly worthy of comment. A search was made in the English language literature about fever with the onset of schizophrenia and no relevant material could be located. There was, however, possibly relevant material in the Russian language literature for which English abstracts could be located. Moshchevitin, Isygankow and Malin [3] reviewed febrile attacks of schizophrenia and stated that ECT is useful in these attacks but is ineffective when the development of a febrile attack reaches the level of amentia dull consciousness. Zuev [4] reported on the autopsies of patients with febrile schizophrenia and in 11 cases there were extended infarction sites in the left ventricle myocardium. Avrutiskii, Isygankov, Samokhin, Raiskii and Kogan [5] reported, in patients with febrile attacks of schizophrenia, correlations between severity of the clinical picture and leukocyte index of intoxication, the NaK ratio, elevated level of dopamine in the urine, and belolipoproteins and creatine phosphokinase in the cerebrospinal fluid. The authors maintained their study showed anti brain antibodies and desensitization to antipsychotic drugs. They suggested a possible role of neural viral infection in etiology and pathogenesis. Avrutiskii, Isygankov, Raiskii and Enikeev [6] suggested

Table 3. Factor Analysis Summary.

Variable	Factor 1	Factor 2	Factor 3
Age of onset	-.12	-.23	.76
Alcohol abuse history (no=1,yes=2)	.47	-.32	.27
Cannabis abuse history (no=1,yes=2)	.61	.18	.14
Education	.59	-.03	-.52
Febrile illness at onset	-.30	-.33	-.61
Gender (1=M, 2=F)	-.74	.06	.19
Visual hallucinations(1=no,2=yes)	-.04	.76	-.11
Family history (1=no, 2=yes)	.04	.72	.07

Table 4. Multiple Regression with Age of Onset as Dependent Variable.

Independent Variable	r	R	R^2	F
Education	.29	.29	.08	8.43*
Visual hallucinations (no=1, yes=2)	-.01	.38	.14	7.72*
Febrile illness at onset(no=1, yes=2)	-.12	.42	.18	6.68*

*P< .01

a new treatment for febrile schizophrenia that minimizes the risk of fatal outcome. The authors also identified three variants of the time course of the febrile attacks.

The role of fever at the time of onset in the present Sudanese schizophrenics is less than perfectly clear. It is not certain whether this represents a type of schizophrenia with an atypical presentation and course, or a common sort of schizophrenia in which the fever was merely "the straw that broke the camel's back", or a disorder sufficiently different from schizophrenia that it should not be classified as such, or two different syndromes that by coincidence occur at the same time. It is suggested that in countries such as Sudan in which malaria and other febrile illnesses are common, clinicians and researchers should be alerted to the presence of schizophrenia onset with febrile illness.

References

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