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A cross-sectional study to investigate current social adjustment of offspring of patients with schizophrenia

■ **Abstract** *Objective* To investigate the impact of parental disorder in the life of adult offspring by evaluating education, current employment and marital status of a sample of offspring of patients with schizophrenia and comparing findings with population rates. *Methods* A sample of 489 patients with DSM-IV diagnoses of schizophrenia was identified in the public outpatient mental health services of the city of Cuiabá, Brazil. Of these patients, 294 had children, and a total of 828 offspring were identified. Data for 431 offspring aged 18 years or older were collected using a structured questionnaire answered by the patient-parent and a family member. *Results* The percentage of age-grade discrepancy for offspring aged 18 and 19 years was 59.2% (95%CI 45.4–73.0), not significantly different from the discrepancy rate for the same age group in the general population, which was 71.1%. Offspring of patients with schizophrenia had a significantly poorer employment situation than the general population (66.7% and 75.6%; 95%CI 62.1–71.3). Fewer male offspring were married than males in the general population (54.7% and 66.0%; 95%CI 48.2–61.2). *Conclusion* Adult offspring of patients with schizophrenia had social adjustment problems that were markedly reflected in employment and marital status.

■ **Key words** schizophrenia · child of impaired parents · social adjustment · cross-sectional studies

A cross-sectional study to investigate current social adjustment of offspring of patients with schizophrenia in a sample of patients from Cuiabá, Midwestern Brazil

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Introduction

Offspring of parents with schizophrenia are at an increased genetic risk of developing the same disorder [21]. Several studies have shown that the offspring of parents with schizophrenia develop the same disorder and other schizophrenia-spectrum disorders at a greater rate than control individuals [9, 16, 25, 29, 31, 34]. Also, they are at increased risk for a wide range of other psychiatric disorders in childhood, have more neurologic and motor problems, and often experience a range of disruptions in their educational and vocational development [8, 11, 28, 33 for a review see 24].

Many factors directly or indirectly contribute to adverse outcomes. Offspring of affected parents can be carriers of a trait that is a disease marker, which may affect their development [10] or make them more vulnerable to schizophrenia due to genetic-environmental interactions [40]. Having a parent with schizophrenia can trigger off a cascade of poverty and social isolation. Because of the lack of adequate services, many parents with schizophrenia struggle to

cope with family responsibilities, exposing offspring to an increased risk of suboptimal parenting [1, 3, 12, 14, 19, 27, 30, 32, 38].

A large number of studies with offspring of patients with schizophrenia focused on the identification of prevalence of mental disorders and changes in neurodevelopment. Their purpose was to understand the pathogenesis of schizophrenia, identify factors that may predict the development of the disorder, and establish early intervention strategies. However, over 80% of the offspring of patients with schizophrenia do not develop any serious mental disorder although they are exposed to the genetic and environmental factors associated with this disorder [7].

Previous studies have shown that individuals with schizophrenia, particularly male patients, are less likely to get married, and have fewer children than age- and gender-matched controls [26, 39]. However, recent studies showed that between 30 and 50% of patients with schizophrenia have at least one child [13, 22]. Over recent decades, many factors have contributed to the increased likelihood that individuals with schizophrenia will become parents. These include the availability of medication to reduce symptoms, de-institutionalization programs, and various types of rehabilitation programs that re-introduce people with schizophrenia back into the community [35]. Cultural factors also affect the likelihood that a person with schizophrenia will become a parent, pointing to the need to identify difficulties and risks for the offspring and their parents in different populations [4, 6, 15].

We have recently conducted a survey in Cuiabá, Midwestern Brazil, which found that, of a total of 489 patients with a diagnosis of schizophrenia, 91 (39.4%) of the men were fathers and 203 (78.7%) of the women were mothers. Mean number of children per patient was 3.33, which totaled 828 offspring [20]. Because of the genetic and environmental factors implicated in the genesis of schizophrenia, the psychosocial difficulties that patients with this disorder have to bear, the high fertility and fecundity rates found in our sample, and the several risks to which offspring of patients with schizophrenia are exposed, we conducted a study to identify and analyze the impact of parental disorder in the social adjustment of adult offspring.

Methods

A total of 828 children were identified for all the patients with schizophrenia seen in all the public outpatient mental health services in the city of Cuiabá, Brazil, in a period of 3 months. The city of Cuiabá has just one short acute in-patient admission of 80 psychiatric beds. There are 08 out-patient units in the city, and most of the psychotic patients are under treatment in these services, including the most severally patients. Data about offspring education, employment and marital status were collected from the patient and from other family members by means of a structured questionnaire developed by the authors. The interviews were carried out at their homes and data was collected from two members

of the family, either the diseased mother or the father of the offspring, plus another healthy member of the family wherever possible. Data were obtained for 824 individuals; 431 were 18 years or older and were thus included in the study. Informed consent was obtained from all subjects, after the approval of the study by the ethics committees of the institutions involved.

■ Characteristics of parents with schizophrenia

In the initial phase of this study, 489 patients with a DSM-IV diagnosis of schizophrenia were identified; 232 (47.4%) were men. Mean current age was 41.5 years (SD = 11.6), 196 (40.2%) of the patients were migrants, and 290 (59.3%) had been married at least once. Ninety-two (39.7%) of the male patients were fathers and 202 (78.6%) of the female patients had at least one live-born infant, and this difference was statistically significant ($\chi^2 = 77.131$; df = 1; $P < 0.001$). Fecundity (mean number of children per patient that had at least one child) was 3.2 for men and 3.4 for women [20]. All patients that had at least one live-born infant were invited to participate in a new phase of the study. Of all eligible patients, 247 were interviewed about their children (84.6% of the initial sample).

■ Statistical analysis

Sample characteristics were described according to gender, and the following variables were analyzed: mean current age, reported mental disorder, primary caregiver, current employment, marital status (ever married or single) and mean number of schooling years. Variables about the affected parents were also analyzed: gender, mean number of schooling years, family income, and number of psychiatric admissions. The Student t test was used to compare continuous variables, and the chi-square test, to compare categorical variables.

The variables number of schooling years, current employment and marital status were compared with census data for the general population in Cuiabá [37]; 95%CI was calculated for the sample according to gender. For the comparison with population data, education was evaluated according to age-grade discrepancy at age 18 and 19 years. This variable was defined according to the Brazilian educational system, in which complete formal education requires a minimum 15 years of schooling: 8 years of primary school, 3 years of secondary school, and 4 years of higher education. Therefore, there is no age-grade discrepancy for 18-year-old individuals if they have finished secondary school (11 years of schooling) [17].

The association of current employment and marital status with the variables associated with parents with schizophrenia and their offspring were analyzed using six models of logistic regression. Three of these models analyzed current employment in the total sample and by gender, and the three others analyzed marital status in the total sample and by gender.

Results

The characteristics of offspring of patients with schizophrenia were analyzed by comparisons according to gender (Table 1). Female offspring were significantly older and more often married, and had a greater mean number of schooling years than male offspring. Female offspring stayed under the care of the parent with schizophrenia for a longer time, whereas male offspring were more often under the care of the healthy parent. This difference was statistically significant ($\chi^2 = 7.961$; df = 2; $P < 0.05$). A mental disorder was reported by 24.8% of the male offspring and 16.5% of the female offspring ($\chi^2 = 4.216$; df = 1; $P < 0.05$). The rate of employment for male offspring at the time of the

Table 1 Characteristics of offspring ≥18 years old or older by gender

	Male N = 233	Female N = 198	Total N = 431	P
Offspring variables				
Mean current age (SD)	26.9 (7.5)	28.5 (8.5)	27.6 (7.9)	<0.05
Reported mental disorder (%)	55 (24.8)	31 (16.5)	86 (21.0)	<0.05
Primary caregiver (%)				
Patient	72 (30.9)	76 (38.4)	148 (34.3)	<0.05
Other parent	59 (25.3)	29 (14.6)	88 (20.4)	
Foster care	102 (43.8)	93 (47.0)	195 (45.2)	
Mean number of schooling years (SD)	7.5 (3.5)	8.3 (3.1)	7.9 (3.3)	<0.05
Employment (%)	173 (79.7)	91 (50.8)	264 (66.7)	<0.001
Marital status (% ever married)	123 (54.7)	132 (69.5)	255 (61.4)	<0.01
Parent-patient variables				
Parent gender (%)				
Father patient	71 (30.5)	51 (25.8)	122 (28.3)	ns
Mother patient	162 (69.5)	147 (74.2)	309 (71.7)	
Parent mean number of schooling years (SD)	3.7 (3.5)	3.6 (3.3)	3.6 (3.4)	ns
Parent family income[a] (%)				
≤ US$ 420	143 (76.5)	125 (73.5)	268 (75.1)	ns
> US$ 420	44 (23.5)	45 (26.5)	89 (24.9)	
Number of parental admissions[b] (%)				
None	66 (28.3)	60 (30.5)	126 (29.3)	ns
1–4 admissions	102 (43.8)	81 (41.1)	183 (42.6)	
5 or more admissions	65 (27.9)	56 (28.4)	121 (28.1)	

[a] US$ 420 corresponds to 3 Brazilian minimal monthly wages
[b] Psychiatric admission of father/mother with schizophrenia

interview was significantly greater than for female offspring (79.7% and 50.8%; $\chi^2 = 36.829$; df = 1; $P < 0.001$). There was no statistically significant difference between genders in the variables describing characteristics of the affected parent.

The comparison of variables correlated with social adjustment revealed that education of offspring of patients with schizophrenia, according to the percentage of age-grade discrepancy, was not statistically different from that of the general population in the study catchment area. The percentage of offspring currently employed was significantly lower than that of the general population, both for the entire sample and according to gender. Male offspring were significantly less frequently married than same-age males in the general population (Table 2).

Employment was examined by univariate analysis and logistic regression, and the dependent variable was "being employed" at the time of the study (Table 3). Mean age of offspring with a job was significantly greater than that of unemployed individuals (28.3 and 26.6; $t = 2.118$; $P < 0.05$), and the rate of employed male offspring was significantly greater than that of female offspring who had a job (65.5%

and 33.3%; $\chi^2 = 36.829$; $P < 0.001$). Logistic regression revealed that the effect of age was not significant, and that the covariables gender and education were associated with being currently employed (male: OR = 5.2, $P < 0.001$; more schooling years: OR = 1.2, $P < 0.05$). The analysis controlling for gender revealed that employment was significantly associated with marital status for male offspring (ever married: OR = 4.3, $P < 0.01$), and more schooling years was significantly associated with being currently employed for female offspring (more schooling years: OR = 1.2, $P < 0.05$).

In Table 4, results of univariate analysis show that marital status was significantly associated with current age, gender and education of offspring and of parent with schizophrenia, as well as with primary caregiver. Multivariate analysis showed that marital status was significantly associated only with current offspring age and reported mental disorder. Older individuals and those without a mental disorder were more likely to be married (older age: OR = 1.2, $P < 0.001$; no mental disorder: OR = 2.5, $P < 0.05$). In logistic regression controlling for gender, current age remained significantly associated with marital

Table 2 Gender, education, employment and marital status of offspring and general population

	Male offspring (95%CI)	Female offspring (95%CI)	Total offspring (95%CI)	Male population	Female population	General population[a]
% age-grade discrepancy (offspring 18/19 years old)	63.3 (46.1–80.1)	52.6 (30.1–75.1)	59.2 (45.4–73.0)	75.8	66.7	71.1
% employment (offspring 18–55 years old)	79.7 (74.4–85.0)	50.8 (43.5–58.1)	66.7 (62.1–71.3)	89.7	62.4	75.6
% ever married (offspring 18–55 years old)	54.7 (48.2–61.2)	69.5 (62.9–76.1)	61.4 (56.7–66.1)	66.0	70.5	68.3

[a] Source: Sistema IBGE de Recuperação Automática, Censo Demográfico (2000)

Table 3 Association of current employment and sociodemographic and clinical variables in a sample of ≥18-year-old offspring of patients with schizophrenia

	Employed $N = 264$	Unemployed $N = 132$	Univariate analysis		Logistic regression		
			Test	P	OR	95%CI	P
Offspring variables							
Mean current age (SD)	28.3 (8.1)	26.6 (7.7)	$t = 2.118$	<0.05	1.0	0.9–1.1	ns
Gender (%)							
Male	173 (65.5)	44 (33.3)					
Female	91 (34.5)	88 (66.7)	$\chi^2 = 36.829$	<0.001	5.2	2.9–9.3	<0.001
Reported mental disorder (%)	54 (20.7)	31 (23.5)	$\chi^2 = 0.404$	ns	0.9	0.4–1.7	ns
Primary caregiver (%)							
Patient	100 (37.9)	42 (31.8)					ns
Other parent	49 (18.6)	27 (20.5)			1.3	0.7–2.4	ns
Foster care	115 (43.5)	63 (47.7)	$\chi^2 = 1.406$	ns	0.9	0.4–2.4	ns
Mean number of schooling years (SD)	8.1 (3.3)	7.6 (3.3)	$t = 1.547$	ns	1.2	1.1–1.3	<0.05
Marital status							
(%) ever married	165 (62.7)	75 (56.8)	$\chi^2 = 1.292$	ns	1.6	0.9–2.9	ns
Parent-patient variables							
Parent sex (%)							
Father patient	67 (25.4)	44 (33.3)					
Mother patient	197 (74.6)	88 (66.7)	$\chi^2 = 2.76$	ns	0.5	0.2–1.1	ns
Parent mean number of schooling years (SD)	3.8 (3.4)	3.7 (3.4)	$t = 0.051$	ns	1.0	0.9–1.1	ns
Parent family income (%)							
≤US\$ 420	156 (75.0)	93 (78.2)					
>US\$ 420	52 (25.0)	26 (21.8)	$\chi^2 = 0.414$	ns	0.8	0.4–1.4	ns
Parent admission (%)							
None	88 (33.3)	35 (26.5)					ns
1–4 admissions	107 (40.5)	57 (43.2)			0.7	0.4–1.4	ns
5 or more admissions	69 (26.1)	40 (30.3)	$\chi^2 = 2.022$	ns	0.7	0.3–1.3	ns

status both for male (older age: OR = 1.3, $P < 0.001$) and female offspring (older age: OR = 1.2, $P < 0.001$). Marital status was significantly associated with being employed only for male offspring, who were 4 times more likely to be married when currently employed.

Discussion

Although previous studies showed that patients with schizophrenia marry less frequently and have a smaller number of children than control individuals

Table 4 Association of marital status and sociodemographic and clinical variables in a sample of ≥18-year-old offspring of patients with schizophrenia

	Ever married $N = 255$	Single $N = 160$	Univariate analysis		Logistic regression		
			Test	P	OR	95%CI	P
Offspring variables							
Mean current age (SD)	30.7 (8.3)	22.9 (4.7)	$t = 10.918$	<0.001	1.2	1.2–1.3	<0.001
Gender (%)							
Male	123 (48.2)	102 (63.8)					
Female	132 (51.8)	58 (36.8)	$\chi^2 = 9.534$	<0.01	0.6	0.3–1.2	ns
Reported mental disorder (%)	47 (18.7)	39 (24.8)	$\chi^2 = 2.172$	ns	2.5	1.2–5.3	<0.05
Primary caregiver (%)							
Patient	98 (38.4)	50 (31.3)					ns
Other parent	41 (16.1)	41 (25.6)			0.8	0.4–1.6	ns
Foster care	116 (45.5)	69 (43.1)	$\chi^2 = 6.08$	<0.05	1.1	0.4–2.8	ns
Mean no. of schooling years (SD)	7.4 (3.4)	8.7 (3.1)	$t = -3.801$	<0.001	0.9	0.8–1.1	ns
Employment (%)	165 (68.8)	98 (63.2)	$\chi^2 = 1.292$	ns	1.6	0.8–2.9	ns
Parent-patient variables							
Parent gender (%)							
Father patient	60 (23.5)	54 (33.8)					
Mother patient	195 (76.5)	106 (66.2)	$\chi^2 = 5.155$	<0.05	1.2	0.5–2.6	ns
Parent mean no. of schooling years (SD)	3.4 (3.2)	4.2 (3.6)	$t = -2.194$	<0.05	1.1	0.9–1.1	ns
Parent family income (%)							
≤US\$ 420	163 (78.7)	99 (72.3)					
>US\$ 420	44 (21.3)	38 (27.7)	$\chi^2 = 1.907$	ns	1.2	0.6–2.3	ns
Parent admission (%)							
None	78 (30.7)	47 (29.4)					ns
1–4 admissions	115 (45.3)	60 (37.5)			1.3	0.7–2.7	ns
5 or more admissions	61 (24.0)	53 (33.1)	$\chi^2 = 4.42$	ns	1.2	0.6–2.5	ns

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[4, 13, 22, 26, 39], 60% of the 489 patients with schizophrenia seen in public outpatient mental health services and included in our sample had children and the number of female patients in their reproductive years that were ever married, as well as their fertility and fecundity rates, was not statistically different from same-age female individuals in the general population [20]. This study enabled us to identify and evaluate the impact of parental disorder in a representative sample of adult offspring of patients with schizophrenia. The problems that offspring of patients with schizophrenia face in adult life may be evaluated by identifying the characteristics associated with social competence. For some authors, the identification of social adjustment impairment in offspring of patients with schizophrenia is a marker of vulnerability to the disorder [8, 11]. Other studies see problems in this area as consequences of changes in neurologic development, cognitive functioning or both [7, 23], or as an early symptom of the disorder. School adaptation, interpersonal relations with peers and family members, and leisure activities are the domains more frequently studied in the evaluation of social behavior [11].

Education, analyzed here as the percentage of age-grade discrepancy, was not significantly different between offspring of patients with schizophrenia and the general population. These findings differ from those reported in the St. Louis Risk Research Project and the Israel High Risk Study, whose researchers found more school adjustment problems among 13- to 19-year-old offspring of patients with schizophrenia than among control individuals [2, 18]. Results of the New York High Risk Study also revealed school adjustment problems, but findings were not specific for individuals at high risk for schizophrenia, and were also found for offspring at high risk for affective disorders [7, 8]. That no significant differences were found in offspring age-grade discrepancy in our study may be explained by the fact that, in Brazil, such discrepancy is very high in the general population—over 70% of the general population in the 18-to-19 age group does not reach the expected grade after completing 8 years of schooling [37]. Therefore, the identification of differences in a group of offspring of patients may require a larger sample than the one in our study. In spite of that, the analysis of the entire sample revealed that none of the offspring of patients completed higher education, whereas in the general population 9% of the individuals complete it [17]. Although multivariate analysis using age-grade discrepancy was not possible, we found a lower mean number of schooling years for male offspring and for individuals with a reported mental disorder. A higher number of schooling years was found for offspring of patients with higher family incomes and more education, which corresponds to the pattern found in the general population in our country. Offspring whose main caregiver was the healthy parent had a better age-grade performance than those under the care of

the affected parent or in foster care. Offspring of male patients had a lower age-grade discrepancy than those of female patients. Most of our parent-patient sample was composed of women with schizophrenia who remained the main caregivers of their offspring in spite of the disorder, which may partly explain their offspring's greater age-grade discrepancy. The effects of parental gender and their participation in taking care of offspring were studied in the Copenhagen High Risk Study, which demonstrated that the absence of a mother with the disorder may be beneficial to avoid the later development of schizophrenia when the offspring are under the care of a relative or foster parents without the disorder, whereas the absence of the affected father was associated with antisocial traits only for male offspring [41].

The analysis of the entire sample of offspring of parents with schizophrenia in our study showed that they had a lower employment rate at the time of data collection then the same age group in the general population. Similarly to what is found for the general population in our country, offspring gender was clearly associated with employment, and male offspring were five times more likely to have a job than female offspring. More schooling years was also significantly associated with having a job, a factor that is also seen to affect our general population. Because of the significant impact of gender in employment rates, we evaluated the current employment situation of offspring of patients with schizophrenia controlling for gender. For male offspring, chances of employment were significantly associated with ever being married and having more years of schooling. For female offspring, only number of schooling years was associated with being employed. In general, the pattern of employment of offspring of patients with schizophrenia follows the pattern seen in our general population, which point to the fact that the problems observed among offspring of patients may not occur only due to factors associated with parental disorder. However, the lack of an association between mental disorder and employment is unlikely. Our findings may be explained by the fact that the information about mental disorders was obtained as data reported in the interviews, and was not confirmed by diagnostic instruments. Personality disorders or less severe psychiatric problems, which are not usually identified as a disorder by family member and which may have been overlooked in this study, may complicate chances of employment. Although a standardized diagnostic control was not adopted, the prevalence of about 20% of mental disorders reported for the offspring of patients with schizophrenia was close to the prevalence of any mental disorder in offspring of mothers with schizophrenia evaluated in the Helsinki High Risk Study [25]. The occupational impairment found in our sample differs from what was found in the 25-year follow-up of the Israel High Risk Study and the study conducted by Caton and

colleagues, who showed that offspring of patients with schizophrenia developed adequate social competence in adult life [6, 16].

Results of the Jerusalem Infant Development Study showed that the offspring of patients with schizophrenia had more problems in relations with peers and in establishing heterosexual relationships, as well as more social problems characterized by immaturity and unpopularity than control individuals [11]. In our sample, offspring of patients with schizophrenia were significantly less often married than the general population, but this difference was assigned to the fact that a lower number of male offspring were ever married, whereas female offspring were married at a rate very close to that found in the general female population. The associations with marital status were similar to those for older individuals without a reported mental disorder who have been married at least once. However, the analysis of the marital status controlling for gender showed that the variable mental disorder loses significance and, for male offspring only, being employed becomes significantly associated with the marital status of individuals married at least once.

The complex interrelation between the social adjustment domains studied here should be emphasized. Education, employment and marital status showed results that were frequently associated, particularly for male offspring, who may experience greater problems in acquiring social competences and show greater differences from the general population. Differences between genders have been widely discussed when analyzing the main characteristics of individuals with schizophrenia [5] and their offspring. Greater rates of poor neurobehavioral functioning and problems in interpersonal behavior have been described for male offspring during school years [11], which may affect age-grade adequacy, employment, and the establishment of intimate affective relationships in adult life. However, these results, rather than being only indicators of gender differences in the social functioning of offspring of patients with schizophrenia, may be affected by cultural demands for social adequacy in adult life. In low income classes in our country, the social pressures to have a job are directed primarily towards the male population, whereas a more contained female behavior may be seen as favorable for a woman to get married [36].

Our study has limitations that restrict the generalization of its results. The impact of parental disorder in the education of offspring could not be adequately evaluated because of the small number of individuals in the age group corresponding to the end of secondary school and the great age-grade discrepancy found in the general population. Although it was not the objective of this study to identify the prevalence of psychiatric disorder among the offspring of patients with schizophrenia, the fact that a confirmed diagnosis was not established may limit the evaluation of the effect of mental disorders on the development of adequate social functioning. At the same time, more severe psychiatric disorders reported during data collection showed an association with the marital status of male offspring, but did not have sufficient explanatory power to account for the occupational impairment found for offspring at high risk.

Adult offspring of patients with schizophrenia had social adjustment problems that were markedly reflected in employment and marital status. Our results, obtained from the evaluation of every day life variables and population comparisons, showed that the offspring of patients with schizophrenia have social adjustment impairments in their adult lives, particularly in terms of employment, and, therefore, should be identified as a vulnerable group. For these individuals, early preventive strategies should be developed to minimize the unfavorable impact of having parents with schizophrenia.

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