

ORIGINAL PAPER

Paulo R. Menezes · Laura C. Rodrigues
Anthony H. Mann

Predictors of clinical and social outcomes after hospitalization in schizophrenia

Received: 10 December 1996 / Accepted: 17 January 1997

Abstract A prospective cohort study of schizophrenia was carried out in São Paulo, Brazil, in order to investigate clinical and social outcomes in schizophrenia and related psychoses after hospitalization. A sample of 124 individuals who were living in a defined catchment area and had been consecutively admitted to psychiatric hospitals in that area with clinical diagnoses of non-affective functional psychoses was followed up for 2 years. Assessments of clinical status and social adjustment at inclusion and at 2-year follow-up were carried out by means of standardized instruments, the PSE and the DAS. At the end of the follow-up period, 120 subjects (96.8%) were traced, and 103 (83.1%) were re-assessed. At the second assessment, the proportion of subjects with a nuclear syndrome of schizophrenia had halved (from 68.3% to 32.7%), 23.8% were symptom free and 60.2% showed at least one psychotic symptom. Presence of psychotic symptoms at follow-up was best predicted by educational level (less than 4 years of formal education) and an initial DSM-III-R diagnosis of schizophrenia. The distribution of global social adjustment levels at 2-year follow-up was similar to that observed at the outset, with approximately one third of subjects showing good, one third showing intermediate and one third showing poor global social adjustment. Social disability was best predicted by longer duration of illness, worse social adjustment levels at inclusion and lower educational level.

Key words Schizophrenia · Outcome and process assessment · Social adjustment · Longitudinal studies · Psychotic disorders · Brazil

Introduction

A great proportion of patients with schizophrenia remain continuously symptomatic or have frequent relapses, and develop marked social disabilities, thus being socially disadvantaged and in continuous need of psychiatric care (Westermeyer and Harrow 1988; Harrison and Mason 1993). The changes in mental health care principles and service provision observed in many countries around the World have led to a decrease in psychiatric beds, and the provision of care to the severely mentally ill in the community (Raftery 1992; Rössler and Salize 1994), with the result that patients suffering from schizophrenia are now admitted to hospital when in acute crises, and discharged back to the community when they show some improvement. Melzer et al. (1991) found that 55% of a sample of patients with schizophrenia discharged from hospital in London had a psychotic mental state 1 year after discharge. Moreover, 22% of such patients were functioning socially at very poor or severely maladjusted levels. In another study, 2.5 years after discharge from hospital only 10% of the patients who had been admitted with a DSM-III diagnosis of schizophrenia were in full remission (Carone et al. 1991). Knowledge of the clinical and social outcomes after hospitalization, and of predictors of such outcomes, is necessary for adequate service planning and provision to people suffering from schizophrenia.

In Brazil, psychiatric care was almost exclusively hospital based until the early 1980s, when initiatives and changes in the mental health policy towards a community-based approach started to happen (Menezes and Mann 1993). As a consequence, a 25% reduction in the number of psychiatric beds was observed from 1987 to 1991 (Alves et al. 1992). In São Paulo, psychiatric services of the public sector for patients with psychotic disorders comprise in-patient facilities, emergency services, psychi-

P. R. Menezes (✉)¹ · A. H. Mann
Section of Epidemiology and General Practice,
Institute of Psychiatry, London, UK

L. C. Rodrigues
Communicable Disease Epidemiology Unit,
London School of Hygiene and Tropical Medicine, London, UK

¹ Present address:
Departamento de Medicina Social,
Faculdade de Medicina da Universidade de São Paulo,
Av. Dr. Arnaldo 455, São Paulo-SP,
CEP 01246-903, Brazil

atric out-patient clinics and mental health teams in primary care centres. Most people have access to services delivered by the public sector when they need psychiatric care, since private health care is very expensive for the bulk of the population and most private health care plans do not cover psychiatric care, particularly in-patient care (Menezes and Mann 1993).

The objectives of this investigation were to examine the clinical and social outcomes of patients with schizophrenia 2 years after they were admitted to psychiatric hospitals, and to study predictors of such outcomes. Recent changes in the organization of the Brazilian health system led to regional delivery of mental health care to a larger proportion of the population, and made conditions more favourable to the undertaking of longitudinal studies of patients with schizophrenia.

Method

The study was carried out in a defined catchment area of the city of São Paulo, Brazil. It included consecutive admissions to psychiatric hospitals, had a prospective design with a follow-up period of 2 years from inclusion and used standardized instruments for the assessment of psychopathological status and social adjustment levels. A detailed description of selection of subjects as well as characteristics of the area where the study was carried out and of the sample is given elsewhere (Menezes and Mann 1993).

Selection of subjects

Candidates for inclusion in the study were all patients aged between 15 and 44 years resident in the study area, who were admitted to the three psychiatric hospitals or to the psychiatric ward in the general hospital of that area during the period between 1 June and 22 August 1991, and received an admission diagnosis of schizophrenia, paranoid psychosis or other functional psychoses, recorded according to the ninth edition of the International Classification of Diseases (WHO 1975). Medical records were checked for these subjects, and exclusion and inclusion criteria were applied. Exclusion criteria were: alcohol or drug dependence in the past year, severe mental retardation, organic psychoses (including drug-induced psychoses), epilepsy, and hearing or speech difficulties that could impede the administration of interviews. Inclusion criteria were at least one of the following symptoms: mood-incongruent delusions, definitely inappropriate or unusual behaviour (such as talking or laughing on his/her own, collecting rubbish), hallucinations, disorders of thinking or language (other than acceleration or retardation); or at least two of the following: psychomotor disturbance (such as excitement, posturing, waxy flexibility, stupor), social withdrawal, overwhelming fear and self-neglect.

Assessments

The data gathered included

1. Socio-demographic data: gender, age, ethnic group, marital status, religion, educational level, occupational status, number of persons per room in the household and monthly per capita income (total income in the household divided by number of people).
2. Psychiatric history: information on age at onset, number of previous psychiatric admissions and the clinical diagnosis given by the psychiatrist in the emergency unit by the time of admission (coded according to the ICD-9) was obtained from medical case records and interviews with key informants.
3. Present State Examination: mental state was assessed using the ninth edition of the Present State Examination (PSE; Wing et al. 1974). The investigator was trained in the use of the instrument at the MRC Social Psychiatry Unit, London, and used a Portuguese translation of the instrument (Caetano and Gentil 1983). By addition of a 30-item questionnaire covering longitudinal aspects of the disorder, DSM-III-R diagnoses were obtained.
4. Social adjustment: a Portuguese translation (Chaves et al. 1990) of the Psychiatric Disability Assessment Schedule (DAS; WHO 1988) was administered to key informants. Sections 1 (Overall Behaviour), 2 (Social Role Performance) and 5 (Global Evaluation) of the schedule were used.

Procedures

Patients eligible for entry into the study were interviewed by the main investigator (P.R.M.) to assess their mental state within 2 weeks of admission. A subsequent interview with a 'key informant', generally a relative of the patient, was held within 2 weeks of admission and included the scale to assess social adjustment. Patients were then followed up 2 years after index admission, and re-assessed with the PSE-9, and their relatives were re-interviewed for the assessment of patients' social adjustment with the DAS. Follow-up assessments were carried out from May to September 1993.

Analysis

Data handling and analysis were carried out using the computer program Epi Info 5 (Dean et al. 1990). Frequency distributions of socio-demographic and socio-economic variables, psychopathological status and social disability levels were examined. Outcome variables – clinical status and social adjustment after 2 years – were first examined in a descriptive way and then coded in binary form for the analysis of associations with explanatory variables. Regarding clinical status, subjects were classified according to their PSE at follow-up as having psychotic symptoms or not. For social adjustment, subjects were divided into two groups, which corresponded approximately to 50% of the sample each: those with better adjustment at follow-up (global scores 0–2 on the DAS), and those with poorer outcome (global scores 3–5 on the DAS). Explanatory variables included socio-demographic variables (gender, age group, racial background, place of birth, religion, marital status, educational level, income per capita and number of persons per room), psychiatric variables (length of illness, number of previous admissions, DSM-III-R diagnosis, CATEGO class, depressive symptoms, age at onset), social adjustment (global scores on the DAS at inclusion, grouped as good, intermediate or poor) and use of out-patient clinic (irregular vs regular).

Statistical analyses included the calculation of χ^2 tests for categorical explanatory variables, and *t*-tests for comparisons of continuous variables between two groups. When the exposure variable had more than two levels of exposure and these were ordered, the statistical test used was the χ^2 for linear trend. Control for confounding effects was carried out by use of logistic regression. This statistical technique has the advantage of producing odds ratios (OR), thereby giving a quantification of risk for all explanatory variables included in the model at the same time that it controls for mutual confounding effects of each additional variable included in the model. Logistic regression was performed separately for clinical status and social adjustment using the statistical package EGRET, version 0.26.6 (SERC 1991).

Table 1 Socio-demographic characteristics of the study sample by gender ($n = 124$)

	Males (%; $n = 69$)	Females (%; $n = 55$)	Total (%; $n = 124$)
Age group (years)			
15–24	13 (18.8)	7 (12.5)	20 (16.1)
25–34	26 (37.7)	25 (45.5)	51 (41.1)
35–44	30 (53.5)	23 (41.8)	53 (42.7)
Place of birth			
SP capital	27 (39.1)	24 (43.6)	51 (41.1)
Marital status			
Married	9 (13.0)	12 (21.8)	21 (16.9)
Education			
Less than 4 years	13 (18.8)	22 (40.0)	35 (28.2)
Persons per room ^a			
1 or less	39 (56.5)	22 (40.7)	61 (49.6)
1.1–2.0	20 (29.0)	19 (34.5)	39 (31.5)
More than 2.0	10 (14.5)	13 (23.6)	23 (18.5)
Monthly per capita income (US\$) ^b			
60 or less	25 (36.2)	29 (52.7)	54 (43.5)

^aInformation missing on 1 subject^bInformation missing on 4 subjects

Results

Characteristics of the sample

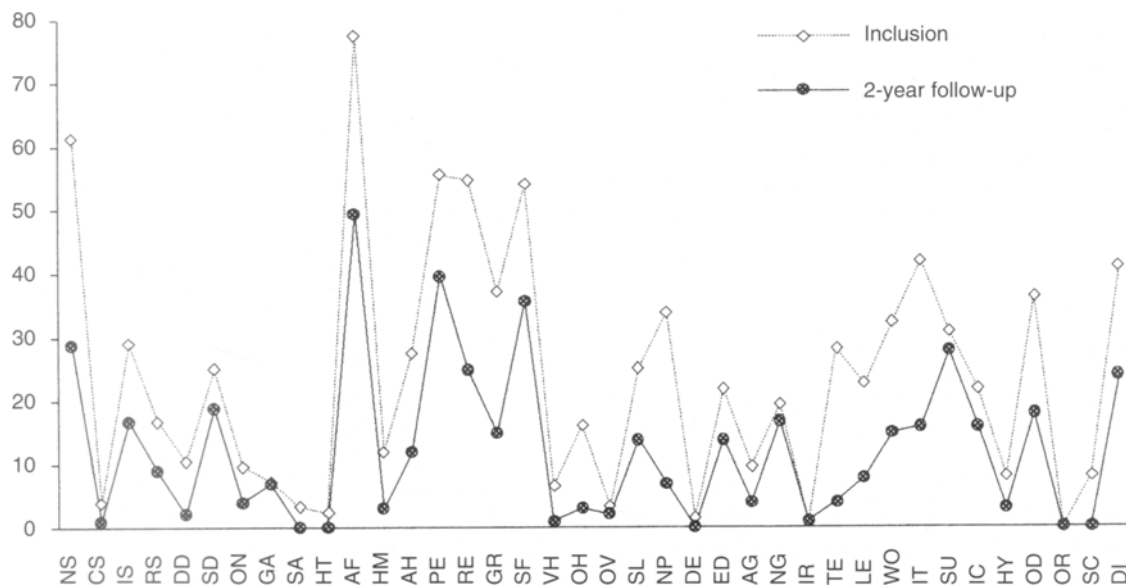
The sample was composed of 69 men and 55 women (Table 1). The mean age was 32.6 years ($SD = 6.9$ years). Fifty-one (41.1%) subjects had no source of income at the time of inclusion in the study, 33 (26.6%) had some occupation, either as registered employees or as self-employed; 27 (21.8%) were on social benefits due to illness. The monthly income per capita ranged from US\$ 16.50 to US\$ 750.00, with mean US\$ 94.30 ($SD = 93.72$).

The mean length of illness at inclusion was 8.3 years, and the median 7 years (range 0–27 years). Women were more represented in the first admission group ($\chi^2 = 5.78$, 1 df , $P = 0.016$). Eighty-six subjects (69.3%) fulfilled DSM-III-R criteria for schizophrenia, 15 (12.1%) were classified as schizophreniform psychosis and 7 (5.6%) as schizoaffective. Five subjects (4.0%) were classified as having affective disorders and 11 (8.9%) were classified as 'other psychoses'.

The PSE was applied to all subjects. The most frequent syndromes recognized were 'affective flattening' (77.4%), 'nuclear syndrome' (62.1%), 'non-specific psychoses' (63.7%), 'delusions of reference' (58.9%), 'delusions of persecution' (57.2%) and 'sexual and fantastic delusions' (57.2%; Fig. 1). The distribution of syndromes was very similar in both genders. Eighty-one subjects (65.3%) were classified as class S⁺ by the CATEGO program (class S⁺ means presence of thought broadcast, insertion or withdrawal, delusions of control or voices discussing the patient in the third person or commenting on thoughts or actions, or other delusions and auditory hallucinations not affectively based).

The Disability Assessment Schedule (DAS) was applied to 115 patients (92.7%). In 3 cases it was not possi-

Fig. 1 Proportion of subjects with PSE syndromes present at inclusion and at 2-year follow-up ($n = 101$) NS Nuclear syndrome, CS Catatonic syndrome, IS Incoherent speech, RS Residual syndrome, DD Depressive delusions and hallucinations, SD Simple depression, ON Obsessional neurosis, GA General anxiety, SA Situational anxiety, HT Hysteria, AF Affect flattening, HM Hypomania, AH Auditory hallucinations, PE Delusions of persecution, RE Delusions of reference, GR Grandiose and religious delusions, SF Sexual and fantastic delusions, VH Visual hallucinations, DI Doubtful interview, OH Olfactory hallucinations, OV Overactivity, SL Slowness, NP Non-specific psychosis, DE Depersonalization, ED Special features of depression, AG Agitation, NG Self-neglect, IR Ideas of reference, TE Tension, LE Lack of energy, WO Worrying, etc., IT Irritability, SU Social unease, IC Loss of interest and concentration, HY Hypochondriasis, OD Other symptoms of depression, OR Organic impairment, SC "Subcultural" delusions or hallucinations



ble to obtain information from the relatives because of lack of contact with the patient within the previous month. The remaining 6 cases had been at home less than 15 days between the index admission and a previous one, not sufficient time to complete schedule sections 1, 2 and 5. In section 5 of the schedule, global evaluation of social disability, 57 subjects were rated as 3 or 4 ('poor adjustment' and 'very poor adjustment', respectively), with the remaining 57 subjects evenly distributed between scores 0, 1 and 2 ('excellent or very good', 'good' and 'fair' adjustments). It was not possible to give a global evaluation score for one subject. These scores were grouped into three categories of global social adjustment for the remaining analyses as follows: good (scores 0 and 1), intermediate (scores 2 and 3) and poor (score 4).

Attrition rates at 2-year follow-up

Four subjects could not be traced, 6 were traced but could not be interviewed because they were living in other regions of the country (sometimes as far as 2000 miles from São Paulo) but were reported to be alive, and 7 had died by the time of follow-up. The mean length of follow-up for the remaining 107 subjects was 102.4 weeks (SD = 3.2), ranging from 97 to 113 weeks.

Subjects not traced or not interviewed were considered lost to follow-up ($n = 17$) and were compared with those who were re-assessed after 2 years ($n = 107$) for socio-demographic characteristics, psychiatric variables and levels of social adjustment at inclusion to the study. There were fewer men among those lost to follow-up (35.3 vs 58.9%; $P = 0.07$), and 64.7% of those lost to follow-up were not born in São Paulo, as compared with 40.2% among those not lost to follow-up ($n = 0.06$). Seven (41%) subjects lost to follow-up had been ill for 1 year or less, compared with 17 (15.9%) of those found after 2 years, a statistically significant difference ($\chi^2 = 6.03$, 2 *df*, $P = 0.049$). Seven (41.2%) subjects lost to follow-up and 28 (26.2%) of those re-assessed at 2 years had poor global social adjustment at inclusion.

Four subjects were excluded from the remaining analyses after being assessed at 2-year follow-up, because when their notes were re-checked no history or symptom suggestive of schizophrenia either before inclusion to the study or during the 2-year follow-up was discovered. Two had a clear clinical picture of bipolar disorder without psychotic symptoms, and the other 2 subjects had a history and symptoms of depressive disorder without psychotic symptoms.

Clinical status at 2-year follow-up

Two subjects were not reassessed with the PSE. One subject refused to be interviewed, and the relative of another subject did not allow the PSE interview with the patient. In both cases informants were asked about the mental status of the patients and provided evidence that both were

showing psychotic symptoms. The remaining 101 subjects were re-interviewed with the PSE at 2-year follow-up. There was a reduction in the proportion of subjects presenting any CATEGO syndromes as compared with the first assessment (Fig. 1), 33 subjects (32.7%) being allocated to class S⁺ by the CATEGO program, half the proportion observed at the outset of the study. Twenty-four subjects (23.8%) had no psychiatric symptoms at the 2-year follow-up assessment.

Sixty-two subjects (60.2%) were considered to be psychotic at the 2-year follow-up assessment according to the presence of specific PSE symptoms. In the univariate analysis, none of the socio-demographic variables were associated with presence of psychotic symptoms at 2-year follow-up at a statistically significant level. Patients with three or more previous admissions were 58% more likely to present with psychotic symptoms at 2-year follow-up than first-admission patients (χ^2 for linear trend = 4.02, 1 *df*, $P = 0.045$). Those who had a diagnosis of schizophrenia according to DSM-III-R criteria at index assessment were 2.3 times more likely to present with psychotic symptoms at 2-year follow-up than those who did not; the association was statistically significant ($\chi^2 = 12.57$, 1 *df*, $P < 0.001$). Presence of 'nuclear syndrome' at inclusion, presence of depressive symptoms at inclusion and age at onset of illness were not associated with presence of psychotic symptoms at 2-year follow-up. Those who had intermediate or poor social adjustment levels at the outset were 50% more likely to have psychotic symptoms at the 2-year follow-up assessment than those who had good social adjustment, but the difference was not statistically significant (χ^2 for linear trend = 2.37, 1 *df*, $P = 0.09$). Using logistic regression, the model with best goodness of fit included only two variables: educational level and DSM-III diagnosis (Table 2). After adjusting for each additional variable effect, the ORs for lower level of education relative to higher level, and for a DSM-III-R diagnosis of schizophrenia relative to other DSM-III-R diagnoses, were both higher than the crude ones. The ORs for both variables were even higher when additional variables were included in the model for control of confounding.

Social functioning at 2-year follow-up

The DAS was applied to all 103 subjects seen at 2-year follow-up, and 96 subjects had their social adjustment levels assessed both at the outset and at 2-year follow-up. At 2-year follow-up, 38 subjects (36.9%) had global scores 0 or 1, 33 (32.0%) had scores 2 or 3, and 32 (31.1%) had scores 4 or 5. These figures are similar to those observed at index assessment (34, 35.7 and 29.6%, respectively). The areas of social functioning where the cohort showed greater proportions of improvement from the index assessment to the 2-year follow-up assessment were 'social withdrawal' (from 74.3 to 54.3%), 'self-care' (from 55.7 to 37.0%) and 'interest and information' (from 68.2 to 52.2%; Fig. 2). At 2-year follow-up, the majority of subjects (57.3%) remained with the same level of global so-

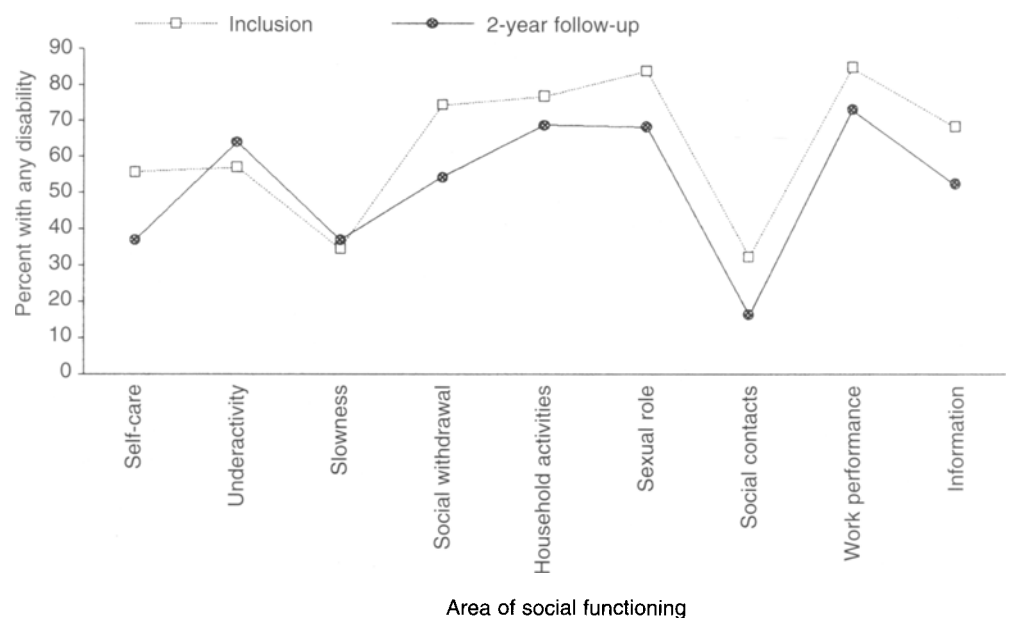
Table 2 Crude and adjusted odds ratios (OR) for outcome 'psychotic' ($n = 96$). LRS Likelihood ratio statistics

		Crude		Best goodness of fit ^a		Controlling for confounding ^b	
		OR	P	OR	P	OR	P
Educational level:	0–3 years	2.22	0.099	2.95	0.044	3.32	0.047
DSM-III-R diagnosis:	295	4.44	0.002	5.36	0.002	8.09	0.008
LRS				14.092 (2 df)		28.173 (7 df)	
P				< 0.001		< 0.001	

^a Variables included: DSM-III-R diagnosis and education

^b Variables included: DSM-III-R diagnosis, education, first admission, social adjustment at inclusion and interaction term social adjustment x first admission

Fig. 2 Proportion of subjects with any level of social disability by area of social functioning, at inclusion and at 2-year follow-up ($n = 96$)



cial adjustment that they had at index assessment. However, there were subjects who improved their social adjustment level during this period (21.9%), and a similar number of subjects who showed worsened global social adjustment levels at the 2-year follow-up assessment (20.8%).

In the univariate analysis, subjects who had had less than 4 years of formal education were 1.6 times more likely to be in the group of worse global social functioning than those who had had 4 or more years of formal education ($\chi^2 = 4.40$, 1 df, $P = 0.036$), and subjects with a monthly income per capita of US\$ 60.00 or less were twice as likely to be in the worse outcome group as those who had a monthly per capita income of more than US\$ 60.00 ($\chi^2 = 9.90$, 1 df, $P = 0.002$). Length of illness was statistically associated with global social adjustment at 2-year follow-up, those with 2–5 years of illness being 80% more likely and those with 4 or more years of illness were 3.5 times more likely to be in the worse outcome group than those who had been ill for 1 year or less (χ^2 for linear trend = 12.90, 1 df, $P < 0.001$). A similar association was observed for number of previous admissions, with relative risks (RR) for being in the worse outcome group of 1.44 and 2.31 for subjects with one to three previous admissions and four or more admissions, respec-

tively, as compared with those with no previous admissions (χ^2 for linear trend = 8.26, 1 df, $P = 0.004$). The RR for being in the worse social outcome group for subjects presenting with nuclear syndrome at index assessment compared with those without the syndrome was 0.58 ($\chi^2 = 6.34$, 1 df, $P = 0.012$), and the RR for subjects presenting with depressive symptoms compared with those without them was 0.60 ($\chi^2 = 4.55$, 1 df, $P = 0.033$). Levels of global social adjustment at index assessment were also statistically associated with levels of global social adjustment at 2-year follow-up: compared with those with a good global social functioning at the outset, those who were assessed as having an intermediate level of global social functioning at that point were almost three times more likely to be in the worse outcome group, and those who had poor global scores in the initial evaluation were 3.7 times more likely to be in that outcome group (χ^2 for linear trend = 15.29, 1 df, $P < 0.001$).

Logistic regression analysis was carried out with the 96 subjects who had complete data in all variables included in the model. The model that best explained the data was obtained by including length of illness, social adjustment at inclusion and educational level (Table 3). The best model for control of confounding effects was obtained by adding the variables 'presence of nuclear syn-

Table 3 Crude and adjusted odds ratios (OR) for explanatory variables included in the multivariate model for outcome 'worse global social adjustment at 2-year follow-up' ($n = 96$)

^a Variables included: length of illness, social adjustment at inclusion and education

^b Variables included: length of illness, social adjustment at inclusion, education, presence of nuclear syndrome, presence of depression and income

^c P -values in this row refer to the contribution of the term to the model

	Crude		Best goodness of fit ^a		Controlling for confounding ^b	
	OR	P	OR	P	OR	P
Length of illness ^c		0.002		0.010		0.080
0–1	1.00		1.00		1.00	
2–5	1.96	0.38	1.23	0.81	0.92	0.93
6+	6.89	0.006	5.15	0.04	3.13	0.15
Social adjustment at inclusion ^c		< 0.001		< 0.001		< 0.001
0–1	1.00		1.00		1.00	
2–3	4.50	0.007	6.02	0.006	7.56	0.004
4–5	9.00	< 0.001	9.59	0.001	9.41	0.002
Education ^c	2.66	0.032	4.54	0.009	3.52	0.041
LRS			32.089 (5 df)		39.417 (8 df)	
P			< 0.001		< 0.001	

drome', 'presence of depressive symptoms' and 'income' to the previous model. The ORs for social adjustment at inclusion and for education in both models became higher than the respective crude ORs. In contrast, the adjusted ORs for length of illness became smaller and statistically non-significant.

Discussion

Methodological limitations

The sample in the present study was a prevalent sample of admissions, and only one quarter of subjects were in their first psychiatric hospitalization. The choice for a prevalent sample in the present study was mainly based on feasibility aspects, for the recruitment of first-admission subjects would require a long period of time. Studies based on prevalent samples tend to have an over-representation of subjects with previous psychiatric admissions and poorer prognosis. Selection bias might have occurred if subjects were referred to psychiatric admissions in a non-random way. Individuals with high socio-economic status are less likely to be admitted to public psychiatric hospital care, at least at the beginning of their illness, but as they develop an unfavourable course they start using the services provided by the public sector (Craig and Kovasznay 1988). In fact, in the present study subjects from better socio-economic background were over-represented among those who had poor outcome, but this confounding effect was controlled in the analysis. Although a proportion of the population in Brazil has private health care plans, most of these plans do not cover psychiatric in-patient treatment, and when those individuals need such care they have to use the public health system. In fact, a proportion of those subjects classified as receiving out-patient care by private psychiatrists were attending psychiatric clinics from private health care plans. However, they would be admitted to the hospitals from the public sector if that was needed.

Shortage of beds might also influence psychiatrists in the way they choose which patients should go to hospital. This was not the case in the study catchment area, where there was an excess of psychiatric beds, and priority was given for patients resident in the catchment area. The upper age limit at inclusion was 44 years; those who are older and are admitted to the hospitals in the catchment area represent 20% of the total number of admissions with diagnoses of schizophrenia or other non-affective psychoses. This group of patients includes late-onset and chronic cases. Finally, homeless patients and patients with alcohol or drug dependence were excluded from the study. They might have represented a special group of patients in terms of prognosis. These exclusions do not invalidate the results of this study, because of its prospective cohort design, but limit the generalizability of findings. In the present study, there were no refusals at inclusion, and only two refusals in the second PSE interview; therefore, bias due to non-participation was not a concern. The inclusion criteria favoured the selection of patients with schizophrenia in a broad sense. This limits comparisons with other studies, but expands generalizability to a larger group of patients who are admitted to psychiatric hospitals.

Psychopathological status and social adjustment levels were assessed through standardized instruments applied by trained interviewers. Although not all assessments of social adjustment were made blind to psychiatric status, high reliability coefficients (Menezes and Scazufca 1993) favour unbiased assessments. The strategies developed to keep losses to follow-up to a minimum were very successful, and a follow-up rate of 83.2% was obtained. Subjects lost to follow-up differed from those found at 2-year follow-up in terms of place of birth, subjects lost to follow-up being more likely to be born in other states of Brazil. Subjects lost to follow-up also tended to have been older at onset of illness, to have had a shorter duration of illness and to have been over-represented among first admissions. Thus, they probably represented a group of subjects that would have more favourable outcomes. However, there are no reasons to suppose that they would have

behaved in a particular way regarding their explanatory variables and the development of the outcomes investigated. Moreover, the number of subjects lost to follow-up was small, therefore minimizing any influence in the observed results.

The clinical importance of presence of psychotic symptoms at 2-year follow-up is uncertain, because data were based on a single cross-sectional assessment of whether psychiatric symptoms were present in the month prior to the interview, not differentiating between those who had been psychotic for the entire follow-up period and those who had psychotic symptoms only in that month. Moreover, for the evaluation of predictor variables, the binary classification did not differentiate between those who had severe delusional and hallucinatory states and those who had an isolated psychotic symptom. Nevertheless, it was preferable to use a standardized direct assessment of subjects at 2-year follow-up than to try to gather information about the course during the entire period of the study from informants or case notes, which might be of doubtful validity.

Clinical status at 2-year follow-up

At 2-year follow-up, one quarter of the subjects were symptom free, but another 60.2% showed at least one psychotic symptom at the second assessment. The proportion of subjects with psychotic symptoms found in other studies has varied widely depending on the method of each study. In the IPSS (WHO 1979), 37% of the sample had at least one psychotic symptom at 2-year follow-up, varying from 25 to 61% between the participating centres. In the 'determinants of outcome of severe mental disorders' (Jablensky et al 1992), 10% of the schizophrenic patients showed 'nuclear syndrome' at 2-year follow-up. The IPSS sample included prevalent cases, as is the case in the present study, whereas the other WHO study included only first-contact subjects. Carone et al. (1991) followed up a prevalent sample of DSM-III schizophrenics for 2.5 years after hospital discharge. At follow-up, 63% presented with at least one psychotic symptom. Thus, the results of the present study are in line with the evidence that a large proportion of schizophrenic patients discharged from hospital show psychotic symptoms at any point in time.

Presence of psychotic symptoms at follow-up was best predicted by poor educational level (less than 4 years of formal education) and an initial DSM-III-R diagnosis of schizophrenia. Other studies have shown that patients diagnosed as having schizophrenia according to the DSM-III-R are more likely to show poorer psychopathological prognosis than those diagnosed as having schizoaffective or affective disorders (Tsuang and Fleming 1987; Marnaros et al. 1990). An interesting finding was that this association increased after controlling for the effects of number of previous admissions and social adjustment at inclusion, suggesting that these aspects, which are included in the set of criteria necessary for a DSM-III-R diagnosis of schizophrenia, had an independent effect on that outcome,

and that other characteristics of this diagnostic criterion were powerful in discriminating between those who presented with psychotic symptoms at follow-up and those who did not.

Social functioning at 2-year follow-up

The distribution of global social adjustment levels at 2-year follow-up was similar to that observed at the outset, but there were changes at the individual level. Over half the subjects showed at 2-year follow-up the same levels of social adjustment they had at the outset of the study, and among the remaining subjects half had improved and half had deteriorated in their social adjustment. These results are in line with findings from other studies. Melzer et al. (1991) carried out a 1-year follow-up study of schizophrenic patients discharged from psychiatric hospitals in London, and used the same instrument, the DAS, to assess social adjustment. They found that 29% of the sample had excellent or good social adjustment at follow-up, 50% had fair or poor and 22% had very poor or severe maladjustment. Four years later, 41% showed excellent or good levels of social functioning, another 41% was in the intermediate group and 18% had very poor or severe maladjustment (Conway et al. 1994). Schubart et al. (1986) followed up a cohort of recent-onset schizophrenic patients for 2 years, and at follow-up approximately 35% had good social functioning, another 35% had intermediate levels and 30% poor levels. They observed a tendency of subjects in the extreme categories to remain in such groups, and those in the intermediate category to drift towards better or poorer levels of functioning. Comparison with other studies is more difficult because of methodological differences, such as use of other instruments or other procedures to analyse data obtained with the same instrument.

In the univariate analysis, several explanatory variables were associated with social adjustment levels at 2-year follow-up at a statistically significant level. However, only three of them were present in the logistic regression model with best goodness of fit, and only social adjustment levels at inclusion and educational level remained associated with social adjustment levels at 2-year follow-up at a statistically significant level after adjusting for confounding effects of other variables. The data therefore showed that the strongest predictor of social adjustment at follow-up was the level of social adjustment at the outset, and that this association was independent of the duration of illness, DSM-III-R diagnosis or psychopathology (presence of nuclear syndrome or depressive symptoms). De Jong et al. (1985) followed up a cohort of schizophrenic patients with less than 2 years of psychiatric history, as one of the collaborative centres in a multicentre study coordinated by the WHO, and found only a few variables weakly associated with outcome: poor-prognosis subjects tended to be less educated, have lower levels of occupation, be more often unmarried and be living with their parents. In another participating centre, Biehl et al. (1986)

found that the best predictor for all cross-sectional assessments during a 5-year period was living situation: patients living alone or with their parents were more disabled than those living with spouse or in sheltered accommodation. However, the disability score at 6-month follow-up predicted scores in all subsequent assessments, suggesting that after the acute phase the social adjustment level at an initial assessment is a good predictor of subsequent assessments. In the IPSS (WHO 1979), the five best predictor variables were the study centres, physical illness or disability predicting good outcome, social isolation, long duration of the inclusion episode prior to initial assessment and history of past psychiatric treatment predicting impairment in social functioning.

The role of educational level

Educational level was found to be associated with both the presence of psychotic symptoms and social adjustment levels at 2-year follow-up. The fact that the adjusted ORs for education were always higher than the crude ones reinforces the idea that subjects from higher socio-economic backgrounds tend to use psychiatric facilities from the public sector when they show poorer prognosis, and this potential selection bias was transformed into confounding and controlled for in the analysis. The association of educational level with those outcomes was not linear, with subjects with very low levels of formal education showing higher risks of developing poor outcomes than those who had the minimal basic education (4 years) or more. Other studies also found an association between educational level and outcome of schizophrenia. Huber et al. (1975), in a long-term follow-up study of schizophrenic patients, found that higher educational level was associated with better psychopathological status at follow-up. Schubart et al. (1987) followed up a cohort of first-contact schizophrenics for 2 years, and observed better outcome in terms of social functioning and proportion of follow-up spent in psychotic episodes. Geddes et al. (1994) found an association between higher educational level and longer periods in the community between hospital admissions in a cohort of first-episode schizophrenics. Based on findings from the IPSS in Cali, Colombia (Leon 1989), it has been argued that in Third World countries schizophrenic patients with higher educational levels might have a worse prognosis than those less educated, due to higher social expectations and demands on those better educated. However, São Paulo is a large industrialized urban centre, where social expectations and stress are probably similar to that found in industrialized countries. In some developing countries, educational level may represent a better 'proxy' measure of social background than income per capita (Osis et al. 1993; Duncan et al. 1993). Moreover, income per capita, as assessed at the outset of the study, may be the result of a 'drifting' effect caused by the illness, rather than an indication of the socio-economic background of the patient. That might explain why, in the present cohort, the associations between educa-

tional level and some of the outcomes investigated became stronger after adjustment for confounding variables, whereas the associations between income per capita at the outset and outcome observed in the univariate analysis disappeared after adjusting for confounding variables. It is also possible that, in São Paulo, having not acquired the minimal educational background would leave the individual with fewer skills to deal with the complexity of living in a large industrialized urban centre. Studies carried out in urban centres in Brazil have shown that educational level, more than income, is associated with patterns of use of services, health-related behaviours, and ability to understand health education messages (Osis et al. 1993; Duncan et al. 1993). An alternative explanation that cannot be completely excluded is that those who could not complete the first 4 years of school did so due to the social adjustment problems manifesting early in the life of schizophrenic patients, therefore constituting a group of individuals with poorer prognosis due to the pathological process itself. There is some evidence that those at risk to develop schizophrenia have poorer adjustment at early school ages (Done et al. 1994), but whether this poor performance is associated with prognosis after the illness has developed is still a matter for investigation.

Conclusion

It becomes clear from the present study that the majority of the patients admitted to hospital have many symptoms with high levels of social disability 2 years after admission. Therefore, they have many needs both in terms of health care and social security. In industrialized countries, people suffering from schizophrenia represent a very high cost to society, in direct and indirect terms (Kavanagh 1994; Davies and Drummond 1994). They need accommodation, income, health care, rehabilitation and social support. Community care can be at least as effective as hospital-based care, but it may also be as expensive or even more expensive than the latter for those patients requiring high levels of supervision (Hafner and an der Heiden 1991). There has been increasing awareness that community mental health care for the severely mentally ill have to be comprehensive and integrated, easily accessible, consumer oriented and routinely monitored (Strathdee and Thornicroft 1993). They should cover areas such as crisis response and acute care, continuing care and outreach, day care, respite care, dental care, housing, legal support, family education and support, and rehabilitation services. It may be unrealistic to expect that all such measures can be implemented at once to every patient, because economic resources are always limited. By identifying predictors of poorer outcome, it would be possible to identify high-risk groups and give them priority in terms of service provision in light of their increased need of care.

Acknowledgements Paulo R Menezes had a scholarship from the CNPq-Brasília, Brazil (proc. 203023/90-0). The field work was funded by FAPESP, São Paulo, Brazil (proc. 93/0384-8 Medicina). M. Scazufca helped with the DAS interviews.

References

- Alves DSN, Seidl EMF, Schechtman A, Silva RC (1992) Elementos para uma análise da assistência em saúde mental no Brasil. *J Bras Psiquiatria* 41:423-426
- American Psychiatric Association (1987) Diagnostic and statistical manual of mental disorders (DSM-III-R), 3rd edn, revised. American Psychiatric Association, Washington, DC
- Biehl H, Maurer K, Schubart C, Krumm B, Jung E de (1986) Prediction of outcome and utilization of medical services in a prospective study of first onset schizophrenics. *Eur Arch Psychiatry Neurol Sci* 236:139-147
- Caetano R, Gentil V (1983) Glossário das definições dos sintomas incluídos na 9a. edição do PSE. Instituto de Psiquiatria da FMUSP (mimeo), São Paulo
- Carone BJ, Harrow M, Westermeyer JF (1991) Posthospital course and outcome in schizophrenia. *Arch Gen Psychiatry* 48:247-253
- Chaves AC, Sarin LM, Mari JJ (1990) Escala de avaliação de incapacitação psiquiátrica (DAS). Escola Paulista de Medicina (mimeo), São Paulo
- Conway AS, Melzer D, Hale AS (1994) The outcome of targeting community mental health services: evidence from the West Lambeth schizophrenia cohort. *Br Med J* 308:627-630
- Craig TJ, Kovaszny B (1988) Utilization of services. In: Tsuang MT, Simpson JC (eds) *Handbook of schizophrenia*, vol 3. Nosology, epidemiology and genetics. Elsevier, Amsterdam, pp 399-436
- Davies LM, Drummond MF (1994) Economics and schizophrenia: the real cost. *Br J Psychiatry* 165 (Suppl 25):18-21
- Dean AG, Dean JA, Burton AH, Dicker RC (1990) Epi Info, Version 5.01: a word processing, database, and statistics program for epidemiology on microcomputers. USD Inc., Georgia
- Done DJ, Crow TJ, Johnstone EC, Sacker A (1994) Childhood antecedents of schizophrenia and affective illness: social adjustment at ages 7 and 11. *Br Med J* 309:699-703
- Duncan BB, Schmidt MI, Achutti AC, Polanczyk CA, Benia LR, Maia AA (1993) Socioeconomic distribution of noncommunicable disease risk factors in urban Brazil: the case of Porto Alegre. *Bull Pan Am Health Organ* 27:337-349
- Geddes J, Mercer G, Frith CD, MacMillan F, Owens DGC, Johnstone EC (1994) Prediction of outcome following a first episode of schizophrenia. *Br J Psychiatry* 165:664-668
- Hafner H, Heiden W an der (1991) Evaluating effectiveness and cost of community care for schizophrenic patients. *Schizophr Bull* 17:441-451
- Harrison G, Mason P (1993) Schizophrenia - falling incidence and better outcome? *Br J Psychiatry* 163:535-541
- Huber G, Gross G, Schuttler R (1975) A long-term follow-up study of schizophrenia: psychiatric course of illness and prognosis. *Acta Psychiatr Scand* 52:49-57
- Jablensky A, Sartorius N, Ernberg G, Anker M, Korten A, Cooper JE, Day R, Bertelsen A (1992) Schizophrenia: manifestations, incidence and course in different cultures. A World Health Organization ten-country study. *Psychol Med Monogr (Suppl)* 20
- Jong A de, Giel R, Slooff CJ, Wiersma D (1985) Social disability and outcome in schizophrenic patients. *Br J Psychiatry* 147:631-636
- Kavanagh S (1994) The costs of schizophrenia. *Ment Health Res Rev* 1:25-26
- Leon CA (1989) Clinical course and outcome of schizophrenia in Cali, Colombia. A 10-year follow-up study. *J Nerv Ment Dis* 177:593-606
- Marneros A, Deister A, Rohde A (1990) Psychopathological and social status of patients with affective, schizophrenic and schizo-affective disorders after long-term course. *Acta Psychiatr Scand* 82:352-358
- Melzer D, Hale AS, Malik SJ, Hogman GA, Wood S (1991) Community care for patients with schizophrenia one year after hospital discharge. *Br Med J* 303:1023-1026
- Menezes PR, Mann AH (1993) Characteristics of hospital treated schizophrenia in São Paulo, Brazil. *Soc Psychiatry Psychiatr Epidemiol* 28:267-274
- Menezes PR, Scazufca M (1993) Estudo de confiabilidade da versão em português da "Escala de Avaliação Psiquiátrica (WHO/DAS)". *Revista ABP-APAL* 15:65-67
- Osis MJ, Hardy E, Faundes A, Alves G (1993) Factors associated with prenatal care among low income women in the State of São Paulo, Brazil. *Rev Saude Publica* 27:49-53
- Rafty J (1992) Mental health services in transition: the United States and the United Kingdom. *Br J Psychiatry* 161:589-593
- Rössler W, Salize HJ (1994) Longitudinal statistics of mental health care in Germany. *Soc Psychiatry Psychiatr Epidemiol* 29:112-118
- Schubart C, Krumm B, Biehl H, Schwartz R (1986) Measurement of social disability in a schizophrenic patient group. *Soc Psychiatry* 21:1-9
- Schubart C, Krumm B, Biehl H, Maurer K, Jung E (1987) Factors influencing the course and outcome of symptomatology and social adjustment in first-onset schizophrenics. In: Hafner H, Gattaz WF, Janzarik W (eds) *Search for the causes of schizophrenia*. Springer, Berlin Heidelberg New York, pp 98-106
- SERC, Statistics and Epidemiology Research Corporation (1991) Epidemiological graphics, estimation, and testing package (EGRET), version 0.26.6. SERC, Seattle, Washington
- Strathdee G, Thornicroft G (1993) The principles of setting up mental health services in the community. In: Bhugra D, Leff J (eds) *Principles of social psychiatry*. Blackwell, Oxford, pp 473-489
- Tsuang MT, Fleming JA (1987) Long-term outcome of schizophrenia and other psychoses. In: Hafner H, Gattaz WF, Janzarik W (eds) *Search for the causes of schizophrenia*. Springer, Berlin Heidelberg New York, pp 88-97
- Westermeyer JF, Harrow M (1988) Course and outcome in schizophrenia. In: Tsuang MT, Simpson JC (eds) *Handbook of schizophrenia*, vol 3. Nosology, epidemiology and genetics. Elsevier, Amsterdam, pp 205-244
- Wing JK, Cooper JE, Sartorius N (1974) Measurement and classification of psychiatric symptoms: an instruction manual for the PSE and CATEGO Program. Cambridge University Press, London
- World Health Organization (1975) International classification of diseases, 9th edn. WHO, Geneva
- World Health Organization (1979) Schizophrenia: an international follow-up study. Wiley, New York
- World Health Organization (1988) Psychiatric Disability Assessment Schedule (WHO/DAS). WHO, Geneva