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The International Pilot Study of Schizophrenia: five-year follow-up findings[1]

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SYNOPSIS A five-year follow-up of the patients initially included in the International Pilot Study of Schizophrenia was conducted in eight of the nine centres. Adequate information was obtained for 807 patients, representing 76% of the initial cohort. Clinical and social outcomes were significantly better for patients in Agra and Ibadan than for those in the centres in developed countries. In Cali, only social outcome was significantly better.

INTRODUCTION

The International Pilot Study of Schizophrenia (IPSS) is a transcultural psychiatric investigation of 1202 patients in nine countries – Colombia, Czechoslovakia, Denmark, India, Nigeria, China, Union of Soviet Socialist Republics, United Kingdom and the United States of America.

The IPSS sample was recruited from successive admissions or referrals to psychiatric facilities in the different centres and thus was not necessarily representative of the wider population of schizophrenic and other psychiatric patients in the community.

The first publication related to this study (WHO, 1973) presented a detailed account of the origins of the study as well as description of the place of the IPSS in the World Health Organization's long-term programme in epidemiological and social psychiatry. The results of a two-year follow-up of the original cohort of patients were published in a second volume (WHO, 1979). The initial phase of the study, which occupied the period between April 1968 and September 1969, demonstrated the feasibility of a large-scale international collaborative study, which required the field workers involved to apply standardized interviews in eight different languages. Despite this linguistic diversity, satisfactory inter-rater reliability was achieved for the schedules used. It was discovered that patients with characteristic patterns of signs and symptoms, closely corresponding to descriptions of schizophrenia in the most widely used textbooks, were found in each of the settings. In seven of the nine centres, the diagnostic term schizophrenia was applied by the research psychiatrists to a group of patients whose clinical characteristics were very similar across these centres. In the two remaining centres, Washington and Moscow, the psychiatrists included broader clinical groupings under the rubric of schizophrenia. This was confirmed by the use of a computer program, CATEGO (Wing *et al.* 1974), which functioned as a reference classification with which to compare the diagnostic practices in each of the centres. Agreement between the centres on a core group of patients diagnosed as schizophrenia was sufficient to justify comparison of the outcome of patients in the various centres.

A two-year follow-up study of the original cohort was successfully completed although the proportion of patients with complete assessments was rather low in some of the centres, notably London and Ibadan. In London there were difficulties due to insufficient staff, while in Ibadan problems arose in tracing rural patients. Of the 1202 patients given an initial examination, it was possible to obtain sufficient information about 77% to include them in the basic follow-

[1] This paper on the 5-year follow-up of patients included in the International Pilot Study of Schizophrenia of the WHO was prepared on behalf of the collaborating investigators (see Appendix).

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up analyses. In presenting the material, the Agra, Cali and Ibadan centres will be referred to as centres in developing countries because of the prevailing socio-economic conditions in India, Colombia and Nigeria. Taipei has not been included as a centre in a developing country because the characteristics of medical care facilities and the principal causes of death in the city resemble those of a centre in a developed country. Aarhus, London, Moscow, Washington and Prague are referred to as centres in developed countries.

Using this convention, the two-year follow-up data revealed that patients with an initial diagnosis of schizophrenia had a considerably better course and outcome in centres in developing countries than in centres in developed countries (WHO, 1979). This remained true whether clinical outcome, social outcome, or a combination of the two was considered. A strikingly good outcome characterized schizophrenic patients in Agra, where over 90% were followed-up, as well as in Ibadan, where the follow-up rate was 50%. The poorest outcome was evident in Aarhus, where a similar definition of schizophrenia was applied as in Agra and Ibadan. Hence neither the relative success of the follow-up, nor the diagnostic practices of the psychiatrists can account for the markedly better outcome for schizophrenia in the developing countries.

Another artefactual explanation for this finding cannot be excluded, namely that patients who chose to attend the sparse facilities in the centres in developing countries were selected, by themselves or relatives, on the basis of a good prognosis. The follow-up data, as yet unpublished, from the WHO Determinants of Outcome study (Sartorius *et al.* 1986) provide evidence against this possibility, since they relate to a strict epidemiological sample making a first contact with psychiatric facilities, yet still demonstrate a better outcome for schizophrenic patients in developing countries.

We present here the findings from the five-year follow-up of the IPSS, which not only confirm the two-year results, but amplify them, since a more complete follow-up was achieved in some of the centres. The centre in Taipei ceased participating in the IPSS before the five-year follow-up study was completed so that data from that centre are not included in this paper.

METHOD

Instruments

Four main types of schedule were used during the follow-up phase of the IPSS: the Present State Examination (PSE), the Follow-up Psychiatric History schedule (FUPH), the Follow-up Social Descriptions schedule (FUSD) and the Follow-up Diagnostic Assessment schedule (FUDA). The PSE was originally devised by Wing *et al.* (1974) and was translated from English into the seven other languages of the IPSS with the usual precautions (WHO, 1973). The development of the other three schedules is described in the second IPSS publication (WHO, 1979). The main purposes of the five-year FUPH were to collect information on the course of the patient's illness in the interval between initial examination and the five-year follow-up, and to provide an account of any socioeconomic changes affecting the patient during the same period. The FUDA schedule requires the psychiatrist assessing the patient at follow-up to state his diagnosis of the patient using follow-up information only, and to reformulate the diagnosis using all the information available. In addition to interviews with the patient, information was obtained from family members, health records and health professionals.

Reliability of instruments

This was established for the instruments used for initial assessment and for the follow-up schedules by interviews being regularly rated by a number of research workers, both within centres and between centres. Various measures of reliability of rating were presented for the two-year follow-up data (WHO, 1979). With respect to the PSE, the intracentre reliability was extremely high for all 129 units of analysis derived from the PSE items (intraclass correlation coefficient, agreement ratio 0·87). The intercentre reliability was about 5% lower than in the intracentre exercises, but still very satisfactory.

For the various measures of course and outcome, with the exception of social outcome, the inter-rater agreement ranged from 0·58 to 0·75. When social outcome was analysed as a trichotomous variable, low levels of reliability resulted. Therefore the categories were collapsed into 'severe impairment' and 'all other out-

Table 1. *Number of patients in each centre with a PSE at five-year follow-up*

	Aarhus	Agra	Cali	Ibadan	London	Moscow	Praque	Washington	All centres
	N (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)
followed up	8 (6)	37 (26)	10 (8)	59 (41)	45 (35)	20 (14)	17 (14)	62 (47)	258 (24)
owed up	4 (3)	6 (4)	10 (8)	2 (1)	1 (1)	0 (0)	3 (2)	0 (0)	26 (2)
t no PSE	113 (87)	88 (63)	102 (80)	53 (37)	55 (43)	48 (34)	98 (78)	67 (51)	624 (59)
within months of follow up	5 (4)	9 (6)	5 (4)	31 (21)	26 (20)	72 (51)	7 (6)	2 (2)	157 (15)
more than months after follow up									
Totals	130	140	127	145	127	140	125	131	1065

Table 2. *Distribution of all patients assessed at five-year follow-up by ICD diagnosis and centre*

ICD diagnosis	Aarhus	Agra	Cali	Ibadan	London	Moscow	Praque	Washington	All centres
22 = Puerperal psychosis	2	—	—	—	—	1	—	—	3
01 = Simple schizophrenia	6	2	1	1	2	—	5	3	20
02 = Hebephrenic schizophrenia	11	—	19	8	7	—	3	—	48
03 = Catatonic schizophrenia	2	15	12	6	3	—	—	—	38
04 = Paranoid schizophrenia	26	11	17	28	44	12	30	33	201
05 = Acute schizophrenia	—	8	27	4	—	11	4	6	60
06 = Latent schizophrenia	3	—	3	—	—	11	2	2	21
07 = Residual schizophrenia	—	—	—	—	1	—	2	—	3
08 = Schizo-affective	1	14	7	15	7	4	15	6	69
09 = Other schizophrenia	1	3	6	2	—	28	3	2	45
10 = Unspecified schizophrenia	—	20	—	5	—	—	1	—	26
31 = Agitated depression	1	3	1	—	—	—	—	—	5
32 = Manic-depressive depression	17	3	1	5	4	9	18	1	58
33 = Manic-depressive manic	19	16	3	2	3	1	7	1	52
34 = Other affective disorder	4	—	—	1	3	1	—	2	11
35 = Paranoid states	9	—	—	1	—	—	8	—	18
36 = Other psychoses	1	—	1	5	—	6	1	1	15
37 = Reactive depression	13	—	2	1	—	5	3	—	24
38 = Unspecified psychosis	2	—	—	—	—	—	—	—	2
39 = Depressive neurosis	2	6	5	2	8	8	6	8	45
30 = Other neurosis	2	2	12	—	—	23	—	4	43
personality disorders									
All	122	103	117	86	82	120	108	69	807
Percentage of Initial cohort	94	74	92	59	65	86	86	53	76

comes', which resulted in inter-rater agreement of 0·75.

The checks on inter-rater reliability of the schedules continued between the two-year and five-year follow-ups, but analyses of the data are not available. While it is possible that rater drift occurred over the long follow-up period of this study, there is no reason why this should have produced a systematic bias affecting the assessment of outcome in one centre differently from the others.

Completeness of follow-up

The absence of the Taipei centre from the five-year follow-up removed 137 patients from the initial cohort of 1202, leaving 1065 to be followed-up in the remaining eight centres.

From Table 1 it can be seen that 59% of patients were examined with the PSE within six months either side of the five-year follow-up point. No patient was seen earlier than the limit, but 15% were interviewed more than five and a

Table 3(*a*). *Distribution of Centre diagnoses in original cohort and five-year follow-up sample*

	Original cohort		Follow-up sample	
	N	%	*N*	%
Schizophrenia	727	68·3	531	65·8
Mania	64	6·0	52	6·4
Other	274	25·7	224	27·8

Table 3(*b*). *Distribution of CATEGO classes in patients given diagnosis of schizophrenia*

	Original cohort		Follow-up sample	
CATEGO class	*N*	%	*N*	%
S+	443	60·9	323	60·8
S. P. O	581	79·9	421	79·3
Other	146	20·1	110	20·7

Table 3(*c*). *Sex distribution of original cohort and five-year follow-up sample*

	Original cohort		Follow-up sample	
	N	%	*N*	%
Centre schizophrenia				
Female	357	49·1	261	49·1
Male	370	50·9	270	50·9
All diagnoses				
Female	582	54·6	443	54·9
Male	483	45·4	364	45·1

Table 3(*d*). *Age distribution of original cohort and five-year follow-up sample*

	Original cohort		Follow-up sample	
	N	%	*N*	%
Centre schizophrenia				
Age < 30	430	59·2	312	58·8
Age > 30	296	40·8	219	41·2
All diagnoses				
Age < 30	573	53·9	425	52·7
Age > 30	491	46·1	382	47·3

half years after the initial examination. The longest duration of follow-up, recorded for a single patient, was seven years and three months. In all, 74% of the original cohort were given a PSE at the five-year folow-up, a creditable success rate and very similar to the 76% reinterviewed at the two-year follow-up.

Table 3(*e*). *Marital status of original cohort and five-year follow-up sample*

	Original cohort		Follow-up sample	
	N	%	*N*	%
Centre schizophrenia				
Married or cohabiting	298	41·1	210	39·6
Single/widowed/ divorced	427	58·9	320	60·4
All diagnoses				
Married or cohabiting	508	47·8	383	47·5
Single/widowed/ divorced	555	52·2	423	52·5

Table 3(*f*). *Type of onset of original cohort and five-year follow-up sample*

	Original cohort		Follow-up sample	
	N	%	*N*	%
Centre schizophrenia				
Sudden	99	13·6	72	13·6
Slow/insidious	623	85·7	457	86·1
All diagnoses				
Sudden	158	14·8	119	14·8
Slow/insidious	897	84·2	683	84·6

In addition to the patients assessed with all the instruments including the PSE, for another 26 individuals information was obtained by using only the FUPH and FUSD schedules. Thus, sufficient information to characterize outcome over five years was obtained for a total of 807 patients, representing 76% of the initial cohort.

A frequent reason for not tracing or not assessing patients at the five-year folow-up was death. A total of 52 patients, or 4·9% of the original cohort, died during the follow-up period. There may have been additional deaths among patients who were not traced. Suicide (ascertained and suspected) was the commonest cause of death among the study patients, accounting for 38% of all known deaths. It is well-established that the suicide risk in schizophrenia is as high as in affective illnesses (e.g. Tsuang *et al.* 1979) and this is borne out in the IPSS. In two of the centres (Ibadan and Agra) the percentage of patients who died was 9·0 and 7·1 respectively. The centre with the lowest

percentage of deaths (0·8) was surprisingly not in a developed country but in Cali.

Of the 807 patients satisfactorily assessed at five-year follow-up 531 (65·8%) had an initial centre diagnosis of schizophrenia and 126 (15·6%) a diagnosis of an affective psychosis. Among the 1065 patients originally assessed, excluding the patients from the Taipei centre, a diagnosis of schizophrenia was given to 727 (68·3%) and of affective psychosis to 154 (14·5%). These figures suggest that successful follow-up is not influenced by initial diagnosis.

The initial diagnostic distribution of these 807 patients is shown for each centre in Table 2. The striking variation in distribution between centres is likely to be due to a combination of selection factors and, in the case of the subtypes of schizophrenia, differences in diagnostic practices. However, the high proportion of catatonic schizophrenia in Agra, Cali and Ibadan reflects a genuine difference in the prevalence of this subtype between developing and developed countries (Leff, 1988). It can be seen from Table 2 that sufficient outcome data were obtained from a low of 53% of the initial cohort in Washington to a high of 94% in Aarhus. It is reassuring that in one of the centres in a developing country, Cali, the success rate in obtaining follow-up data was over 90%.

Potential bias introduced by incomplete follow-up

Since patients lost to follow-up may bias the remainder of the sample either towards a better or a worse outcome, it is necessary to compare the patients successfully followed up with the original cohort. In particular such a comparison must include factors commonly associated with the prognosis of the major psychiatric illnesses. Age, sex and marital status are almost invariably identified as influencing the outcome of the whole range of psychiatric conditions, while type of onset is particularly important in schizophrenia. Tables 3(*a–f*) show the comparison of the five-year follow-up sample with members of the original cohort on all those variables, as well as on the distributions of Centre diagnoses (made by the research psychiatrists in each centre) and CATEGO diagnoses (made by the computer program). In each instance the value of the variable was that determined at initial interview.

In none of these comparisons did the sample followed-up differ significantly from the original cohort. In fact for most of the variables, the distributions are virtually identical. These results eliminate one interpretation of the findings.

RESULTS

Clinical course and outcome of patients with an initial diagnosis of schizophrenia

The IPSS was deliberately focused on schizophrenia, and we will present outcome data mainly for this group. However, comparisons will also be made with other diagnostic groups.

PSE at five-year follow-up

The PSE covers one month preceding the interview. When given at a follow-up of a cohort of schizophrenic patients, it will only record active symptoms over that period. Usually a high proportion of patients are in a quiescent phase. However, those with chronic symptoms and those who happen to be in an acute episode at the time will be identified by a PSE assessment. Some patients suffer from neurotic symptoms when not in a psychotic phase, and these have been included in Fig. 1. Patients have been divided into those who at five-year follow-up had at least one clearly psychotic or three possibly psychotic symptoms; those who were symptomatic but did not fulfil these criteria and those with no symptoms recorded by the PSE. Chi-square analysis indicates that the differences among the centres are statistically significant ($P < 0{\cdot}001$). The highest proportion of asymptomatic patients was found in both Agra and Ibadan, amounting to two-thirds of the sample seen at follow-up. The highest proportion of actively psychotic patients (nearly 60%) was shown by the samples from Aarhus and Moscow, which also had the lowest proportion of asymptomatic patients (under 5%).

Time spent in a psychotic episode

The cross-sectional data from the PSE at the five-year follow-up need to be supplemented by information of a more longitudinal nature. The follow-up psychiatric histories provide this type of data, and were used to estimate the percentage of the follow-up period that each patient spent in a psychotic episode. A psychotic episode was one which the psychiatrists completing the

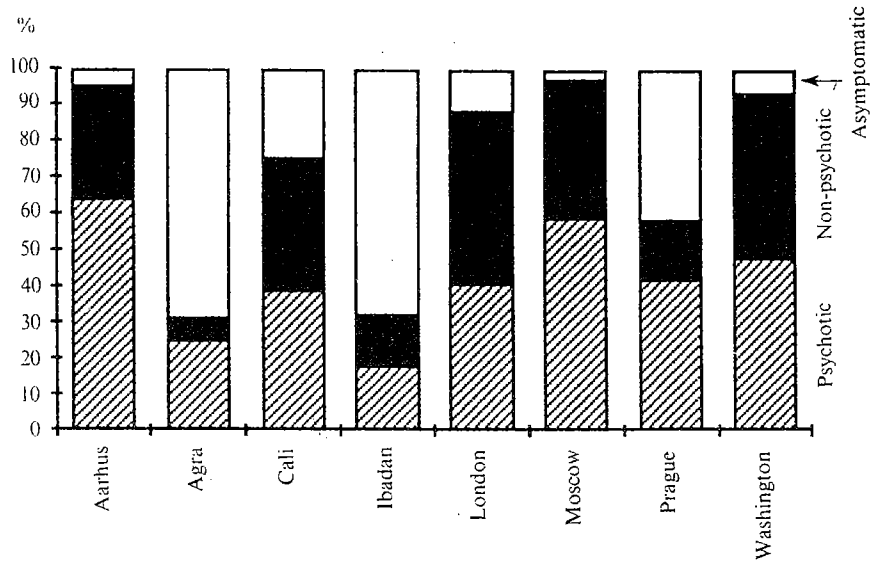

FIG. 1. Percentage of followed up initial evaluation schizophrenic patients, psychotic, non-psychotic and asymptomatic at five-year follow-up. ▨, Psychotic; ■, non-psychotic; □, asymptomatic. $\chi^2 = 168{\cdot}2$; df 14; $P < 0{\cdot}001$.

Table 4. *Distribution of schizophrenic patients assessed at five-year follow-up by percentage of time spent in a psychotic episode*

	Time psychotic (%)											
	0–5		6–15		16–45		46–75		76–100		Not Known	
	N	(%)	*N*	(%)	*N*	(%)	*N*	(%)	*N*	(%)	*N*	(%)
Aarhus	11	22	5	10	7	14	8	16	19	38	0	
Agra	30	41	18	25	9	12	4	5	11	15	1	1
Cali	38	41	20	22	8	9	5	5	19	21	2	2
Ibadan	36	52	16	23	4	6	3	4	9	13	1	1
London	16	25	13	20	16	25	4	6	14	22	1	2
Moscow	24	36	15	23	8	12	3	5	15	23	1	2
Prague	14	22	16	25	12	19	5	8	17	26	1	2
Washington	23	44	9	17	4	8	1	2	13	25	2	4
All centres	192	36	112	21	68	13	33	6	117	22	9	2

Kruskal–Wallis test (not known excluded); $\chi^2 = 31{\cdot}7$, df 7, $P < 0{\cdot}0001$.

follow-up schedules considered to be definitely schizophrenic, probably schizophrenic, an affective psychosis, or 'another psychosis'. Usually episodes classified as psychotic were characterized by hallucinations and/or delusions. The results are presented in Table 4, which shows that, for all centres together, over one third of patients initially diagnosed as having schizophrenia spent less than 5% of the five year follow-up period in a psychotic episode, while about a fifth were in a psychotic episode for more than 75% of the time.

A Kruskal-Wallis test indicates that the centres differ significantly with regard to the distribution of patients into the five groups ($P < 0{\cdot}0001$). Inspection of the Table reveals that the greatest variation occurs in the first and fifth columns. The centres with the highest proportion of patients spending 5% or less of time in a psychotic episode are Agra, Cali, Ibadan and Washington. Agra and Ibadan also have the smallest proportion of patients spending more than three-quarters of the period in a psychotic episode.

Table 5. *Distribution of schizophrenic patients assessed at five-year follow-up by pattern of course*

	Pattern of course													
	1		2		3		4		5		6		7	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Aarhus	3	6	9	18	0	—	0	—	1	2	17	34	20	40
Agra	31	42	3	4	2	3	0	—	19	26	11	15	7	10
Cali	10	11	16	17	1	1	1	1	11	12	33	36	19	21
Ibadan	23	33	5	7	0	—	2	3	22	32	9	13	7	10
London	3	5	8	13	0	—	4	6	9	14	31	48	9	14
Moscow	4	6	17	26	0	—	2	3	0	—	29	44	14	21
Prague	6	9	6	9	0	—	0	—	11	17	27	42	15	23
Washington	9	17	3	6	1	2	2	4	6	12	18	35	12	23
All centres	89	17	67	13	4	1	11	2	79	15	175	33	103	19

Pattern of course: 1, full remission of episode of inclusion, no further episodes; 2, partial remission, no further episodes; 3, at least one non-psychotic episode after episode of inclusion, full remission between all episodes; 4, at least one non-psychotic episode after episode of inclusion, incomplete remission between episodes; 5, at least one subsequent psychotic episode, full remission between episodes; 6, at least one subsequent psychotic episode, incomplete remission between episodes; 7, episode of inclusion continues throughout follow-up period without remission.

Pattern of course

The percentage of the follow-up period spent in a psychotic episode showed significant variation between centres. However, it does not distinguish between patients who experience one prolonged episode and those who suffer several short-lived episodes. This distinction can be made by treating the information from the follow-up psychiatric histories in a different way. Seven patterns of course (POC) were delineated as detailed in Table 5. In view of the small numbers in some cells the columns were combinaed as follows for analysis: 1+2+3, 4+5, 6+7. The distribution of patients according to the POCs differed significantly between centres ($\chi^2 = 83$, df 14, $P < 0{\cdot}0001$).

Very few patients from any centre show POC 3 and 4, indicating the rarity of non-psychotic episodes occurring in isolation from psychotic episodes. POC 1, representing the best outcome, shows the most striking variation between centres, with Agra and Ibadan standing out from the rest as having an exceptionally high percentage of patients in this category. Conversely, these two centres have strikingly low proportions of patients with POC 6 and 7, representing the worst outcomes. No other centre has less than one-third of its patients showing POC 6, but London has a surprisingly small proportion of patients who never recovered from the episode of inclusion, and resembles Agra and Ibadan in this respect. Although Cali has been grouped with the centres in developing countries, the pattern of course shown by its sample of schizophrenic patients closely resembles that of samples from centres in developed countries. Among the latter, Aarhus is conspicuous for a particularly poor outcome, nearly 40% of its patients being continuously psychotic for the whole 5-year follow-up.

These various approaches to categorizing the clinical outcome over 5 years of the schizophrenic patients in the IPSS consistently indicate that the patients from Agra and Ibadan fared best while those from Aarhus had the worst outcome.

Social outcome of patients with an initial diagnosis of schizophrenia

The data in the follow-up schedules were used to make a global assessment of the degree of social impairment suffered by each patient during the follow-up period. The assessment was based on the patients' occupational adjustment, relationship with friends, and degree of social interaction. Experience with analysis of the two-year follow-up data indicated that acceptable inter-rater reliability was achieved when patients were divided into two groups, those with severe social impairment and those without severe impairment. The five-year follow-up data analysed in this manner are displayed in Table 6. The differences between the Centres are highly significant ($P < 0{\cdot}001$).

The smallest proportions of patients with

Table 6. *Social impairment of schizophrenic patients assessed at five-year follow-up*

	Severe social impairment		Moderate, mild or no social impairment	
	N	%	*N*	%
Aarhus	25	50	25	50
Agra	9	13	62	87
Cali	15	17	73	83
Ibadan	13	19	55	81
London	17	27	47	73
Moscow	15	23	51	77
Prague	19	30	45	70
Washington	13	25	39	75
All centres	126	24	398	76

$\chi^2 = 28{\cdot}12$. df 7. $P < 0{\cdot}001$.

severe social impairment are found in the three centres in developing countries, Agra, Cali and Ibadan, while the largest proportion is shown by Aarhus. These findings closely parallel the clinical outcome data. Indeed Spearman's rank order correlation between severe social impairment and the worst clinical outcome (column 7, Table 5) is 0·76. However, it is worth noting that although Cali has twice the proportion of the worst clinical outcome patients as Agra and Ibadan, the percentage with severe social impairment is of the same order as in the other two developing centres. This same pattern characterized the Cali patients at the two-year follow-up.

In all centres the majority of patient with schizophrenia did not suffer severe impairment of their social functioning.

Types of subsequent episodes in patients with an initial diagnosis of schizophrenia

A long follow-up makes it possible to determine the consistency of the initial diagnosis over time. The key question is whether subsequent episodes of psychiatric illness conform to the episode of inclusion in terms of diagnosis. On the basis of the follow-up history data, episodes during the follow-up period were classified as definitely schizophrenic, probably schizophrenic, affective psychosis, other psychoses, and non-psychotic. These judgements were based on the WHO/ICD-8 glossary criteria. Table 7 shows the percentage distribution by clinical type of subsequent episodes of patients with an initial diagnosis of schizophrenia.

The pattern of distribution for developed and developing countries is very similar, although definite schizophrenic episodes preponderate in the former, and possible schizophrenic episodes in the latter. In the sample as a whole 59% of schizophrenic patients with subsequent episodes received definite and/or probable schizophrenic diagnoses for those episodes. The comparable figure for the two-year follow-up was 76% This difference is not due to an increase in the percentage of patients with only subsequent affective psychotic episodes in the longer follow-up, since the figures are 16% in the two-year follow-up and 15% in the five-year follow-up. Rather it is attributable to patients who suffered episodes of mixed schizophrenic and affective, and mixed schizophrenic and unknown diagnoses, who constituted 17% of the patients in Table 8. The category of unknown diagnosis does not appear in the two-year follow-up analysis, presumably reflecting the difficulty in obtaining clinical information in the longer follow-up.

The distribution for individual centres appears generally similar, except for Aarhus, which shows a strikingly high proportion of only definite schizophrenic episodes, and no patients with only subsequent affective psychotic episodes.

Comparison between findings at two-year and at five-year follow-up

It is instructive to compare the findings for outcome at the two-year and five-year follow-ups, to determine whether the pattern of course changed substantially over the additional three years. The results of this comparison for the seven patterns of clinical course are shown in Table 8.

There was an overall gain of 40 patients in the second follow-up. This introduces an ambiguity into the interpretation of any changes observed, since gains in any column may be due to an alteration in the pattern of course of patients seen at the two-year follow-up or to the acquisition of patients followed up for the first time at five years. Nevertheless, the differences in pattern between the two follow-ups are sufficiently uniform across centres to merit comment. Indeed, identical changes are apparent in the developing centres as in the developed centres, and in centres like Agra and Moscow,

Table 7. *Percentage distribution of schizophrenic patients by clinical type of subsequent episodes*

	No of patients	Only definite schizophrenic	Only possible schizophrenic	Definite and possible schizophrenic	Affective (definite and/or possible)	Schizophrenic and affective	Other episodes	Unknown and schizophrenic	Unknown mixed unknown and affective
Aarhus	18	61	17	11	0	6	6	0	0
Agra	32	22	34	6	22	12	0	3	0
Cali	48	21	21	8	10	8	2	17	12
Ibadan	34	26	32	9	12	3	6	3	9
London	44	36	16	5	20	16	0	5	2
Moscow	31	32	29	0	19	13	6	0	0
Washington	28	21	18	4	11	7	0	14	18
Prague	38	29	32	0	18	3	0	13	5
Total	273	29	25	5	15	9	2	8	7
Developed	159	34	23	3	16	9	2	7	6
Developing	114	23	28	8	14	8	3	9	8

Table 8. *A Comparison of patterns of course at two-year and five-year follow-up*

	F-U	Number of patients	Pattern of course* 1	2	3	4	5	6	7
Aarhus	2	48	3	11	0	0	2	8	24
	5	50	3	9	0	0	1	17	20
Agra	2	90	46	6	0	0	13	6	19
	5	73	31	3	2	0	19	11	7
Cali	2	77	15	12	0	0	10	20	20
	5	92	10	16	1	1	11	33	19
Ibadan	2	59	34	5	0	1	13	2	4
	5	69	23	5	0	2	22	9	7
London	2	57	13	4	0	2	7	14	17
	5	64	3	8	0	4	9	31	9
Moscow	2	69	5	21	0	2	7	22	12
	5	66	4	17	0	2	0	29	14
Prague	2	53	9	13	0	0	5	10	16
	5	65	6	6	0	0	11	27	15
Washington	2	38	8	6	0	0	0	6	18
	5	52	9	3	1	2	6	18	12
All centres†	2	491	133	78	0	5	57	88	130
	5	531	89	67	4	11	79	175	103
Overall changes		+40	−44	−11	+4	+6	+22	+87	−27

* For key see Table 5.
† $\chi^2 = 48{\cdot}8$, df 5, $P < 0{\cdot}0001$ (columns 3 and 4 combined).

which lost patients between the two follow-ups, as well as in all the other centres, which gained patients. In view of this uniformity, and in the interests of clarity, we will concentrate on the findings for all centres combined (bottom 3 rows of Table 8), which demonstrate a significant difference between the two follow-ups ($P < 0{\cdot}0001$).

Analysis of the differences between columns reveals the unsurprising fact that some patients who remain well for two years after an episode of schizophrenia, have subsequent attacks from which they make a good recovery. More noteworthy, it indicates the possibility of some clinical improvement over time in patients whose illness has pursued an unremitting course for two years. The overall loss of 27 patients from column 7 might be attributable to failure to follow them up, except that centres like London and Washington contacted more patients at five years than at two years but still showed a reduction in the number of patients with the worst outcome. In addition, a trend emerges that is important for epidemiological studies: as schizophrenic patients are followed up over longer periods of time, those who recover

completely tend to be lost to the study, while others with a relatively poor outcome are retained.

Predictors of outcome

It is evident from the foregoing analyses that both clinical and social outcome for this cohort of schizophrenic patients were better for the developing than the developed countries. Previous research has consistently identified other predictors of outcome, such as sex, marital status, pre-morbid personality and type of onset, as being important in schizophrenia. It is possible that differences between patients from developing and developed countries with respect to these factors could account for the superior outcome of the former.

To test these possibilities, a series of analyses were conducted where outcome variables were modelled to be dependent on the values of the developed/developing dichotomy as well as a number of other predictor variables. Log–linear models were used, where the logarithm of the odds of a particular outcome is expressed as a linear combination of the predictors. This model is sometimes referred to as the log–odds model or, especially where the predictors are continuous, the logistic regression model. Analyses were made using the procedure CATMOD from SAS version 5·18, which provides a generalization to handle more than two classes of outcome variables. Maximum likelihood estimation was used. The size of the log-likelihood statistic, $-2 \log L$, indicates the goodness-of-fit of the model. It is distributed as a χ^2 statistic with degrees of freedom dependent on the number of categories of the independent variables included. The contribution of each independent variable to the model may be represented by its corresponding contribution to the value of $-2 \log L$.

The outcome variables against which the models were tested were the time spent in psychotic episode (4 classes: < 5%; 5–14%; 15–94%; 95–100%). pattern of course (4 classes: 1; 2–5; 6; 7) and social impairment (3 classes: none; mild or moderate; severe). Results are summarized in Table 9.

The first factor to be entered into the model was whether a patient came from a centre in a developed or developing country. This is highly significant as a predictor of each of the outcome variables, the probability of better outcomes being significantly greater in developing countries. Other variables were also included in the model, one at a time, together with the first factor. None explains anywhere near the same variance as does the developed/developing dichotomy. There are significant associations however. Male patients are more likely than female patients to have a poor outcome on all three measures. Current age is not associated with outcome. Being married at initial examination means a higher probability of good social functioning, but is not associated with clinical outcome. Subjects who had sudden onset (overnight or a few hours) or those whose symptoms were comparatively recent were less likely to have poor outcomes. Having a symptom profile corresponding to CATEGO S+ was not associated with either social functioning or the length of time in psychotic episodes, but was associated with a significantly lower probability of a good pattern of course. Social isolation at initial examination was associated with poor social and clinical outcomes, while poor pre-morbid sexual adjustment affected social functioning only. A history of pre-morbid personality disorder was associated with poor outcomes on all three variables, unlike the experiences of negative life events prior to illness, which were associated with better clinical and social outcomes.

Thus, while clinical predictors affect clinical outcome and social predictors influence social outcome, there is also some cross-over; for example, a slow onset predicts social impairment at follow-up, and initial social isolation predicts a poor pattern of course.

In addition to the predictors listed in Table 9, the relationship between subgroups of schizophrenia, derived from the ICD categories, and outcome was examined. It was found that acute schizophrenia (295.4) and schizoaffective schizophrenia (295.7) were both associated with significantly better clinical and social outcomes than the other sub-groups. This is probably attributable to the influence of acuteness of onset and life events before onset on the outcome variables. (see Table 9).

Another predictor of outcome that was studied was first contact with psychiatric services. Many studies have shown that patients with schizophrenia making a first contact have a