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Deficits of Chronic Schizophrenia in Relation to Long-Term Hospitalisation

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Eighty chronic schizophrenic and 16 manic-depressive psychotic patients conforming to Research Diagnostic Criteria were examined in terms of their mental state, cognitive functioning, current behaviour, and neurological status. They comprised out-patients, day-care patients, and long-stay in-patients belonging to two mental hospitals with different social conditions. Assessed deficits were not significantly related to record variables such as age, duration of illness, duration of hospitalisation, or treatment received. Analysis of the different groups of patients reveals that long-term hospital care has had little effect on the deficits of chronic schizophrenia, and suggests that these are integral features of the disease process.

The hypothesis that the deficits of chronic schizophrenia are due to the disease process, and are not attributable to external factors such as hospital care (Johnstone *et al*, 1981) provokes a renaissance of interest in these deficits. This hypothesis tends to complicate the hitherto inviolate (and ingenious) concept of institutionalisation. Further studies are warranted to renounce or renovate that concept, and to understand the respective contributions of biological process, hospital care, and treatment received to the development of the "defect state" in patients with chronic schizophrenia.

A review of the literature reveals a consonance of opinions regarding the existence and nature of deficits in chronic schizophrenia (Kraepelin, 1919; Wing & Brown, 1970; Bhaskaran et al, 1972; Crow, 1980; Owens & Johnstone, 1980; Johnstone *et al*, 1981; Andraesen, 1982; Maser & Keith, 1983; Weinberger *et al*, 1983; Taylor & Abrams, 1984), but evidence concerning their causes has been accumulated under different headings, such as a social hypothesis (Wing & Brown, 1961), a disease process hypothesis (Johnstone *et al*, 1981), and an alternative hypothesis (Marsden, 1976).

The present investigators have attempted to study the deficits of chronic schizophrenia, in the light of these mutually contradictory hypotheses, and to consider whether they are in fact integral features of the schizophrenic process or consequences of long-term hospital care, by comparing:

1. The deficits of long-stay-in-patients with chronic schizophrenia and with manic-depressive psychosis in the same hospital.
2. The deficits of long-stay chronic schizophrenic patients in two mental hospitals with different social structures and staff patterns.
3. The deficits of long-stay patients, day-care patients and outpatients with chronic schizophrenia.

Method

This study was conducted at two mental hospitals in south India. The one at Bangalore is the clinical psychiatric wing of the National Institute of Mental Health and Neuro Sciences (NIMHANS). This is a service, teaching, and research hospital, where as well as psychiatrists, clinical psychologists, psychiatric social workers, and psychiatric nurses are trained. The other mental hospital (MH) is a non-teaching, non-academic, service-oriented institution. The two hospitals differ markedly in their social conditions, staffing patterns and administrative policies. They score respectively 61 points and 7 points on Barton's proposed scale for rating psychiatric hospitals (Barton, 1965).

Sample

The sample consisted of 96 male and female patients, between the ages of 20 and 55 years, conforming to Research Diagnostic Criteria (Spitzer *et al*, 1978) for schizophrenia and manic-depressive psychosis. Specific exclusion criteria were epilepsy, organic mental disorders, alcohol dependence, drug dependence, mental retardation, major systemic debilitating physical illness like tuberculosis, diabetes and malignancy, and leucotomy and other neurosurgical procedures. It was subdivided into four groups of 20 chronic schizophrenic patients and one group of 16 patients with manic-depressive psychosis (affective illness). The first three groups were from NIMHANS and the latter two were from MH. "Long-Stay", in the present study, meant continuous hospitalisation for more than two years.

Group I: Long-stay chronic schizophrenic patients at NIMHANS who had had at least two years of continuous

TABLE I
Recorded variables

Recorded variables	*Group I n = 20 Long-stay (NIMHANS)*		*Group II n = 20 Day care (NIMHANS)*		*Group III n = 20 O.P. (NIMHANS)*		*Group IV n = 20 Long-stay (MH)*		*Group V n = 16 Long-stay (MH) MDP*	
	Mean	*s.d.*	*Mean*	*s.d.*	*Mean*	*s.d.*	*Mean*	*s.d.*	*Mean*	*s.d.*
Age	42.35	9.3374	35.7	10.3877	40.15	7.8019	45.2	7.3097	39.81	9.435
Duration of illness (Yrs)	16.84	5.9490	12.279	6.5116	12.07	4.4428	20.075	7.0492	10.167	4.4197
Age of onset (Yrs)	25.15	7.8289	24.05	6.9792	28.15	4.4871	25.15	5.8604	29.25	8.5595
Total period of hospitalisation	13.9385	7.1999	2.913	2.4484	6.4183	0.3175	15.4665	7.5350	8.0043	4.3623
Total medication received (equivalent to chlorpromazine in Kgs.)	2.1315	1.9464	0.9515	0.4142	1.155	0.8306	1.275	0.2950	0.7612	0.6357
Medication during 1st 5 yrs (equivalent to chlorpromazine in Kgs.)	0.341	0.3399	0.2595	0.3448	0.358	0.4774	0.7269	0.3997	0.1519	0.0657
No. of ECTs	41.25	29.6157	31.6	20.0050	19.5	15.8592	70.05	45.8297	25.43	11.5121

TABLE II
The Nature of deficits

	I n = 20 Long-stay (NIMHANS)		*II n = 20 Day care (NIMHANS)*		*III n = 20 O.P. (NIMHANS)*		*IV n = 20 Long-stay (MH)*		*V n = 16 Long-stay (MH) MDP*	
	Mean	*s.d.*	*Mean*	*s.d.*	*Mean*	*s.d.*	*Mean*	*s.d.*	*Mean*	*s.d.*
Positive symptoms	1.35	1.8100	0.45	0.5104	2.9	2.2219	0.8	1.3992	0.5	1.4142
Negative symptoms	55	28.3344	45.95	22.2367	59.35	19.7822	57.1	21.0835	2.3125	8.9868
*Mental state deficits	56.25	29.0460	46.35	22.2551	65.6	14.0202	60.15	35.6034	2.625	10.2364
Cognitive functioning	16.25	7.2756	21.7	5.8499	19.8	6.6495	13.5	4.6282	24.5625	2.9204
Current behaviour	8.6	3.9789	5.9	2.8457	8.80	3.7500	9.80	4.0859	1.31	1.9906
**Total deficits	78.35	38.7628	60.55	29.3803	84.6	21.6585	82.75	27.0416	6.375	2.9411

*Total of positive and negative symptoms.
**Mental state deficits + Cognitive impairment + Current behaviour

TABLE III
Relationship between recorded variables and deficits in chronic schizophrenic patients

Recorded variables	*Positive symptoms*	*Negative symptoms*	*Mental state deficits*	*Cognitive functioning*	*Current behaviour*	*Total deficits*
Age	0.0300	0.1194	−0.2913	−0.0699	0.0699	0.1586
Duration of illness	−0.1293	0.0400	−0.2260	0.0400	−0.0997	0.0200
Age of onset	−0.0300	0.0360	−0.2821	0.0699	0.0400	−0.1974
Total medication	−0.0599	0.0003	−0.1781	0.0200	−0.1293	−0.1586
Medication during first 5 years	0.2070	−0.0300	0.0997	0.1684	−0.2355	−0.1293
ECT	0.1684	0.0599	0.0100	0.0400	−0.0699	0.2355
Duration of Hospitalisation	−0.4132	0.2415	0.1871	0.0281	0.2342	0.3215

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hospitalisation at the time of assessment and had never had long-stay or day care at any hospital other than NIMHANS.

Group II: Chronic schizophrenic patients living at home and receiving day care at NIMHANS, who had never had a long stay at any hospital during the entire course of their illness.

Group III: Chronic schizophrenic patients living at home and attending the out-patient department at NIMHANS, who had never had a long stay or day care at any hospital.

Group IV: Long-stay chronic schizophrenic patients at MH, who had completed at least two years of continuous hospitalisation at the time of assessment and had never had a long stay, or day care, at any other hospital.

Group V: Long-stay in-patients with a diagnosis of manic depressive psychosis (MDP) at MH, who had completed at least two years of continuous hospitalisation at the time of assessment and had never had a long stay, or day care, at any other hospital.

Assessment

Historical data and details of past treatment (recorded variables), which included age, sex, duration of illness, age of onset, duration of hospital care and physical treatment received by the patient, were collected systematically with the aid of a proforma compiled for the purpose. Mental state was assessed using a scale for rating chronic pyschotic patients (Krawiecka *et al*, 1977) and the Scale For Assessment of Negative Symptoms (SANS—Andreasen, 1981). We used the former to rate positive symptoms only and the latter to rate negative symptoms. The Mini Mental State

TABLE IV
Correlation between deficits in chronic schizophrenic patients

Deficits	*Positive symptoms*	*Negative symptoms*	*Cognitive functioning*	*Current behaviour*
Positive symptoms	—	0.1534	−0.1031	0.2152
Negative symptoms	0.1534	—	−0.7126	0.8105
Cognitive functioning	−0.1031	−0.7126	—	−0.6255
Current behaviour	0.2152	0.8105	−0.6255	—

TABLE V
Comparison between long-stay schizophrenic and manic depressive psychotic patients at MH with regard to deficits

Deficits	*Group IV, n=20 Long-stay schizophrenic patients at MH*		*Group V, n=16 Long-stay MDP patients at MH*		*Comparison and significance*
	Mean	*s.d.*	*Mean*	*s.d.*	
Positive symptoms	0.80	1.3992	0.50	1.4142	t=0.6363 df=34 NS
Negative symptoms	57.10	21.0835	2.3125	8.9868	t=10.4911 df=34* P=<0.001
Mental state deficits	60.15	35.6034	2.625	10.2364	x^2=22.05 df=1 P=<0.001
Cognitive functioning	13.50	4.6282	24.5625	2.9204	t=22.8140 df=34 P=<0.001
Current behaviour	9.80	4.0859	1.31	1.9906	t=7.6026 df=34 P=<0.001
Total deficits	82.75	27.0416	6.375	2.9411	F=210.0647 df=1,33** P=<0.001

*Beheren's Fisher test.
**Age corrected analysis of covariance.

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(MMS—Folstein *et al*, 1975) and the Ward Behaviour Scale (WBS—Wing & Brown, 1961) were used to rate cognitive impairment and current behaviour respectively. A detailed neurological examination was carried out on each patient and neurological deficits were recorded.

Procedure

In this investigation, the entire in-patient population (405) and the day care population (168) at NIMHANS, the entire in-patient population at MH (572) and the 462 patients who attended the out-patient department of one of the six adult psychiatry units at NIMHANS over a period of two months were surveyed. Thirty-six in-patients, 84 day care patients and 64 out-patients at NIMHANS and 104 in-patients at MH satisfied the specific criteria laid down for chronic schizophrenia in the study. Random samples each of 20 patients who satisfied all the criteria from among in-patients and the day-care patients at NIMHANS were assessed (Group I and II). A random sample of 20 patients who satisfied the criteria for the out-patient sample and who also had a duration of illness more than five years were assessed (Group III). A random sample of 20 chronic schizophrenic patients from MH, (matched for sex with group I) who satisfied the criteria were selected and assessed (Group IV). The sampling was done in all these instances using the table of random numbers.

All the 16 long-stay patients with a definite diagnosis of manic-depressive psychosis at MH were assessed (Group V). They were regular patients, admitted through the magistrates, whose recorded variables were obtained from the case sheets.

TABLE VI

Comparison between long-stay schizophrenic patients at NIMHANS and at MH with regard to deficits

Deficits	*Group I, n = 20 Long-stay (NIMHANS)*		*Group IV, n = 20 Long-stay (MH)*		*Comparison*	
	Mean	*s.d.*	*Mean*	*s.d.*		
Positive symptoms	1.35	1.8100	0.8	1.3992	t = 1.0736 df = 38	NS
Negative symptoms	55	28.3344	57.1	21.0835	t = 0.2659 df = 38	NS
Mental state deficits	56.25	29.0460	60.15	35.6034	t = 0.0854 df = 38	NS
Cognitive functioning	16.25	7.2756	13.5	4.6282	t = 1.4263 df = 38	NS
Current behaviour deficits	8.6	3.9789	9.80	4.0859	t = 0.6273 df = 38	NS
Total deficits	78.35	38.7628	82.75	27.0416	t = 0.4163 df = 38	NS

TABLE VII

Comparison between long-stay, day-care and out-patients at NIMHANS with regard to deficits

Deficits	*Group I, n = 20 Long-stay (NIMHANS)*		*Group II, n = 20 Day-care (NIMHANS)*		*Group III, n = 20 Out-patients (NIMHANS)*		*Comparison and Significance*
	Mean	*s.d.*	*Mean*	*s.d.*	*Mean*	*s.d.*	
Positive symptoms	1.35	1.8100	0.45	0.5104	2.9	2.2219	$x^2 = 24.2583$ df = 2. $P = < 0.001$
Negative symptoms	55	28.3344	45.95	22.2367	59.35	19.7822	$x^2 = 2.54$ df = 2–NS
Mental state deficits	56.25	29.0460	46.35	22.2551	65.6	14.0202	$x^2 = 8.1424$ df = 2. $P = < 0.05$
Cognitive functioning	16.25	7.2756	21.7	5.8499	19.8	6.6495	$x^2 = 5.2$ df = 2.–NS
Current behaviour	8.6	3.9789	5.9	2.8457	8.8	3.75	$x^2 = 10.1786$ df = 2 $P = < 0.05$
Total deficits	78.35	38.7628	60.55	29.3803	84.6	21.6585	$x^2 = 2.8$ df = 2.–NS

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TABLE VIII
Comparison of study methods

Method	*Study by Wing & Brown (1970)*	*Study by Johnstone et al (1981)*	*The present study*
Diagnostic criteria	Clinical diagnosis	Feighner's criteria	Research diagnostic criteria
Sample	313 (120+120+73) Females only Age below 60 years Long-stay schizophrenic patients at three hospitals. Comparison was done between 20 patients each.	630 (510+120) Male and female Any age Long-stay and O.P. Schizophrenic patients	96 (20+20+20+20+16) Male and female 20–55 years Long-stay schizophrenic patients at NIMHANS and MH, OP and day-care patients. Long-stay MDP at MH
Exclusion criteria	NIL	NIL	Specific exclusion criteria
Design Scales for assessment	Retrospective and prospective Clinical rating scale (Wing) Ward Behaviour scale (Wing) Other details	Retrospective and prospective Krawiecka scale Withers & Hinton test for sensorium. Current Behaviour schedule Scheme for brief neurological assessment.	Retrospective and prospective Krawiecka scale SANS MMS WBS Neurological examination proforma (NIMHANS)
Assessment blind?	No	No	No

Results

The sample consisted of 35 males and 61 females. The mean age was 40.68 years (s.d. 9.3, range 26–55). Recorded variables were obtained and deficits assessed in all the patients.

The recorded variables which were used in the calculation of results are shown in Table I. Only one patient in group I and 13 patients in group IV had had insulin coma treatment. The mean number of insulin treatments received by the latter group was 101.1 (range 0-380). Number of insulin treatments poorly correlated with total deficits ($r = 0.2641$).

Table II shows the nature of assessed deficits in each group. All the deficits, apart from positive symptoms, were least evident in patients with manic-depressive psychosis. Among schizophrenic patients, group II had the fewest deficits, group III had the most mental state and total deficits, group IV had the most cognitive and behavioural deficits. Neurological abnormality was observed in only five patients, all with chronic schizophrenia; two of these had tardive dyskinesia, three had Parkinsonian tremor. Neurological deficits were not considered further.

Tables III & IV show the relationships of recorded variables to deficits, and the correlation between the deficits. Recorded variables had poor correlations with deficits.

There was a significant difference in the incidence of negative deficits between groups IV and V (Table V). There was no significant difference between groups I and IV (Table VI). There were significant differences in positive symptoms, mental state deficits and current behaviour between groups I, II and III (Table VII), but the difference in total deficits was not statistically significant. Further analysis shows that the difference in mental state and current behaviour between groups I and III is not significant ($P = > 0.5$), whereas the difference in the incidence of positive symptoms remains significant between all three groups ($P = < 0.001$).

Discussion

In designing this study, the investigators have leaned on two comprehensive series of investigations, by Wing and colleagues and by Johnstone and colleagues, and its methodology in comparison with theirs is summarised in Table VIII. Our exclusion criteria are unique (compare Wing & Brown, 1970; Johnstone *et al*, 1981; Bhaskaran *et al*, 1972), enhancing the homogeneity of the sample and controlling for those physical variables which may contribute to the development of deficits. Our relatively narrow limits (RDC, age, and specific exclusion criteria) explain our comparatively small sample size.

The present study has a combined prospective and retrospective design. It has the inherent weakness of all retrospective studies with regard to recorded variables. Like any investigation dealing with social factors, it has also an inherent inability to control all the operative variables. However, it has taken care to control most variables relevant to its aims. The investigators were not blind to the diagnoses, or to the psychosocial environments of the patients, but this possible bias was not unique to the present study (Wing *et al*, 1970; Owens *et al*, 1980; Johnstone *et al*, 1981; Johnstone *et al*, 1985).

The results of the study (Table II) indicate that the deficits of chronic schizophrenia extend over a wide range, affecting mental state, cognitive abilities, and current behaviour. We found fewer neurological deficits than other investigators. Johnstone and colleagues reported that 66% of their patients had extrapyramidal symptoms and 9% had other neurological deficits, and that these were related to age and to neuroleptic medication (Owens *et al*, 1980; Johnstone *et al*, 1981). Our very low prevalence of neurological deficits may in part reflect the relatively narrow criteria used to select our patients, none of whom was older than 55 years. However, this aspect of the present study is also compromised by the fact that it did not undertake detailed assessment of 'soft' neurological signs.

Neither neuroleptic medication nor the number of ECTs received by the patient had any significant relationship to deficits (Table III). While a high degree of accuracy about the number of treatments actually received was possible in so far as ECT and insulin coma were concerned, the investigators were less certain about records of past neuroleptic medication. However, our finding that the total amount of medication was not significantly related to deficits does not support the 'alternative hypothesis' of Marsden (1976). Marsden, who challenged the 'disease process' and 'social' hypotheses, put up an alternative viewed from a neurological perspective. He maintained that deficits of schizophrenia such as cerebral atrophy and cognitive impairment were due to drug treatment rather than to incidental or causal pathology. The present study agrees with those of other investigators in suggesting that neuroleptic medication, as such, does not contribute to the development of deficits (Wing *et al*, 1970; Owens *et al*, 1980; Johnstone *et al*, 1981). Taking into consideration the concept of a rapid decline during the first five years and a subsequent plateau in schizophrenic deterioration (Lehman, 1980), the present study analysed the relationship between neuroleptic medication in the first five years and deficits. Our findings indicate that the amount of neuroleptic medication, initial or total, does not have any significant relationship to deficits in chronic schizophrenia. Comparison of deficits in patients treated with neuroleptic drugs and those who have never received them is a much better method than some of investigating the influence of medication.

Our finding that the number of ECTs received by patients does not bear a significant relationship to deficits, and in particular not to cognitive impairment, indicates the transitory nature of the disputed ill-effects of this mode of treatment. Again, comparison of deficits in patients who have received ECT and those who have not is the best way of studying the problem.

Though it has become outmoded, insulin coma treatment has been used in certain of our hospitals. The present study reveals that insulin coma as such is not significantly related to the deficits of chronic schizophrenia, and it has been observed that only prolonged or profound coma has deleterious effects on schizophrenic patients (Kalinowsky *et al*, 1952). Prolonged coma can, of course, be prevented by adequate medical care.

The significant difference in deficits, except with regard to positive symptoms (Table V), between long-stay schizophrenic and long-stay manic-depressive psychotic patients indicates that these deficits, other than positive symptoms, are specific to schizophrenic illness. It also suggests that hospital care as such does not have a significant bearing on the deficits, otherwise the patients with MDP would have developed as many as did schizophrenics.

One must consider the possibility that hospital care is detrimental only to schizophrenic patients, who are specially vulnerable to developing deficits. It is unlikely that care differently given because of specific illness behaviour is responsible. Johnstone and colleagues found that in-patients with affective illness resembled schizophrenic in-patients with regard to cognitive deficits, but differed from them in terms of positive and negative features, and also in most of the behavioural items assessed (Johnstone *et al*, 1985).

The absence of significant differences in deficits between the long-stay schizophrenic patients at NIMHANS and at MH (Table VI) indicates that long-term hospital care and social environment do not have a significant influence on the deficits of chronic schizophrenia. This finding does not agree with that of Wing and colleagues, who found that deficits were significantly different in the schizophrenic patients from three different mental hospitals and were positively related to the degree of social poverty (Wing & Brown, 1970).

Comparison of the three groups of chronic schizophrenic patients at NIMHANS reveals that significant difference between deficits is limited to positive symptoms and to current behaviour (Table VII). Positive symptoms are significantly greater in out-patients, when compared with both long-stay and day-care patients. Similar observations have been made by other authors (Brown *et al*, 1966; Wing, 1978; Johnstone *et al*, 1981; Leff, 1982). Deficits in current behaviour are significantly less in day-care patients, but not significantly different between in-patients and out-patients. The fact that

there are significantly fewer deficits, in terms of positive symptoms and current behaviour, in day-care patients may be due either to psychosocial intervention or to other factors, such as the selection criteria for day care.

The conspicuous absence of significant differences in the deficits of chronic schizophrenic patients between the two hospitals, and between the three groups at NIMHANS, might be interpreted as support for a notion that psychosocial methods of treatment have little effect on these deficits. The investigators do not make such a claim on the basis of the present study, which has not attempted to deal with this aspect. To investigate it one would have to manipulate the environment by introducing various forms of psychosocial treatment and subsequently to study the influence of such changes on deficits, in a prospective design. Wing & Brown, who did this, could find definite improvement in only 21% of their patients (Wing *et al*, 1970). Further investigations are needed to find out whether deficits produced by the disease process can be helped by psychosocial modes of treatment.

Granting our methodological difficulties and deficiencies, the results we obtained are evidence to support the following hypotheses: (1) The disease process is responsible for the deficits in chronic schizophrenia. (2) Long-stay hospital care, as such, does not produce these deficits. (3) Physical methods of treatment do not a have significant bearing on them.

The present study is compromised by the following features: the rating was not blind, it was not entirely prospective in design, and all possible operative variables were not controlled. Future research in this area with modified methodology is indicated, although the replication of our findings by studies in which the rating is blind, if theoretically possible, would be impracticable.

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