Original Article

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Relationship between Disability and Psychopathology Severity in Subjects having Acute Exacerbation of Schizophrenia on Treatment over three Month's Duration

Psychiatry/Mental Health Section

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ABSTRACT

Introduction: Schizophrenia is a disorder which has a chronic course frequently with subjects having significant disability. Understanding what the symptoms during initial period are, which predict level of disability in future would be useful.

Aim: To assess the change in disability and its correlation with psychopathology among patients with schizophrenia having acute exacerbation.

Materials and Methods: The study was conducted among 40 patients admitted in the hospital for acute exacerbation of schizophrenia. The subject was assessed with Positive and Negative Syndrome Scale (PANSS) for Schizophrenia (for symptom severity), Schedule for Assessment of Psychiatric Disability (SAPD) scale (for disability). Then at the end of three months after first assessment the PANSS, SAPD were re-administered. Paired t-tests for changes in severity of symptoms and Pearson's correlation of statistics were used to assess relation between symptom severity and disability.

Results: Forty patients were enrolled into the study, 3 did not complete the study. The PANSS positive subcategory score showed maximum change (mean=12.054, t=14.214, p<0.01). The SAPD change maximum was for behavioural functioning score (mean=7.783, t=12.337, p<0.01). Change in PANSS score correlation with endpoint SAPD showed total score, change in positive domain score, change in negative domain score had significant negative correlation to all disability domain scores.

Conclusion: Improvement in disability in subjects having schizophrenia appears to be significantly related to negative symptoms, excitement symptoms and disorganization symptoms.

Keywords: Negative symptoms, Positive symptoms, Social outcome

INTRODUCTION

Schizophrenia being a chronic mental illness has always been of significant research interest to look at various outcomes due to natural course or any interventions and among this one of the most important is social outcomes. In schizophrenia, the symptoms and the associated distress may fluctuate, and establishing symptoms at any point of time might therefore yield a less relevant picture than the more stable social situation. A review by Priebe S of various studies have shown that use of antipsychotics are effective in reducing productive symptoms and preventing relapses which would also result in reducing re-hospitalization rates. Yet, this effect was not necessarily linked with an improved social situation [1].

Patients' appraisal of their life is influenced by three major processes: a comparison with original expectations and aspirations; a comparison with the life situation and achievements of others; and an adaptation over time. The latter two may be particularly relevant for people with chronic schizophrenia, whose peer group is often people with similar impairments, and who may adapt to circumstances that they might have found unsatisfactory many years earlier [1].

Functioning of an individual on a daily basis is affected in various ways by the presence of negative symptoms. One of the most known aspects of this is the social amotivation. This is a classical deficit symptom in which the individual appears to have no interest to have interaction with others and tries to avoid social contact as much as possible. This may be related to anhedonia and also other forms of reduced levels of social reinforcement obtained from interactions [2].

Issac M et al., had reviewed studies on outcome in schizophrenia and had observed that studies from developing countries had shown better outcome in terms of functioning in social and occupational spheres of life [3]. They have observed that functional competence of individual is influenced more by social functioning than clinical status. Despite this the development of measures for the assessment of impaired social functioning has been far less in comparison to clinical rating. This is probably due to belief among most clinicians and researchers that symptomatology is closely related to social functioning and therefore not important to do standardised assessment of social adaptation [3].

This study was intended to further understanding of how if certain type of symptoms present during initial presentation would help us predict which subjects would probably develop more disability and then we would be able to probably better adjust the individual management for such subjects resulting in significant benefits for the individual and the society.

MATERIALS AND METHODS

The study was a prospective study which was conducted after getting approval of the hospital ethics committee. The study period was for six months from January of 2009 till June 2009. This study was based on subjects who had been part of a larger study done by the same authors which has been published earlier which looked at quality of life relationship to psychopathology severity [4]. The sample size was calculated with a power of 0.8 and confidence interval of 95% also limited by the time duration available for the study which was short.

The sample comprised 40 subjects who had satisfied the inclusion criteria: (a) patients aged 18 years and above; (b) fulfilling ICD-10 criteria for schizophrenia [5]; and (c) having an acute exacerbation defined as Clinical Global Impression Severity (CGI-S) scale score of

4 or more which necessitated admission in hospital. Subjects who refused to give written informed consent were excluded from the study [6]. The subjects were recruited from the patients admitted in Kasturba Medical College, Manipal, a tertiary hospital in south India under Department of Psychiatry. A convenience sampling method was used. The diagnosis was confirmed by consultant psychiatrists using ICD-10 Diagnostic Criteria for Research (ICD-10 DCR) [5].

Data was collected on the basis of assessment at admission, discharge from hospital and three months after first assessment. The diagnosis were ascertained by face to face clinical interview of the patients and their informants by the psychiatrists using the ICD-10 DCR criteria. All consenting adults who fulfilled the inclusion criteria were first administered the socio-demographic proforma by the investigator. The Mini International Neuropsychiatric Interview (MINI) which is a short structured interview was used to confirm the diagnosis and rule out other psychiatric disorders [6]. All the patients in the study received treatment as per individual consultant's decision which included pharmacological management with antipsychotics (first generation or second generation) and psychosocial management including psycho-education and family therapy. The severities of symptoms as assessed by clinician were rated at admission on CGI-S scale and improvement was rated on Clinical Global Impression- Improvement (CGI-I) scale at discharge and at end of 3 months [7]. The Positive And Negative Syndrome Scale (PANSS) and Schedule For Assessment for Psychiatric Disability (SAPD) scale were used for assessment at baseline and at end of 3 months [8,9]. All the instruments used were used obtained from the online sources of the same freely usable with purpose of doing research as a student.

In addition to the total PANSS score (sum of all 30 items, maximum score 7 per item), five sub-scales were calculated [10]. These sub-scales were:

(a) **Positive symptoms:** delusions, hallucinatory behaviour, grandiosity, suspiciousness (items 1, 3, 5 and 6 on the positive sub-scale); stereotyped thinking (item 7 on the negative subscale); somatic concern, unusual thought content, lack of judgement and insight (items 1, 9 and 12 on the general psychopathology sub-scale);

(b) **Negative symptoms:** blunted affect, emotional withdrawal, poor rapport, passive social withdrawal, lack of spontaneity (items 1, 2, 3, 4 and 6 on the negative sub-scale); motor retardation, active social avoidance (items 7 and 16 on the general psychopathology sub-scale);

(c) **Disorganized thoughts:** conceptual disorganization (item 2 on the positive sub-scale); difficulty in abstract thinking (item 5 on the negative subscale); mannerisms and posturing, disorientation, poor attention, disturbance of volition, preoccupation (items 5, 10, 11, 13 and 15 on the general psychopathology sub-scale);

(d) **Uncontrolled hostility/excitement:** excitement, hostility (items 4 and 7 of the positive sub-scale); uncooperativeness and poor impulse control (items 8 and 14 on the general psychopathology sub-scale);

(e) **Anxiety/depression:** anxiety, guilt feelings, tension, depression (items 2, 3, 4 and 6 on the general psychopathology sub-scale).

The SAPD was used to assess disability in social functioning. The instrument was developed from the Disability Assessment Schedule of the World Health Organization and was standardized for use in India [9]. Information given by both the patient and the key informant formed the basis for scoring on the instrument. They were asked to use the last one month functioning of the patient as reference period. The SAPD scored disability into three domains of functioning which are general activity, social role and occupational role.

Analysis of data was carried out using SPSS software package (version 10, SPSS Inc, Chicago, USA). Descriptive statistics were used. Parametric tests, the paired t-test, pearsons' correlation test were used to look for changes in severity of symptoms and disability. Co-relation of statistics was used to assess relations between symptom severity and disability.

RESULTS

Out of the 40 subjects who were included in the study only 37 completed the study and the other 3 were lost during follow up. To prevent skewing of data towards subjects who might have had better response to medications. As it was probable that subjects who dropped out early were the ones who might have not had much improvement. Therefore, for baseline their data was also used but to correlate, if change of symptoms had association with disability only subjects whose full data was available was used.

[Table/Fig-1] presents the socio-demographic distribution of the study population (n=40), the mean age of 34.27 (SD±9.72), males were the majority 23 (57.5%), most of the subjects were having a high school education 17 (42.5%), most of the subjects were single 21 (52.5%), 14(35%) of the subjects were homemakers, the family income per month showed that the most frequent range being 2000-5000 having 13(32.5%) of the subjects.

[Table/Fig-2] presents the illness variables and it showed that mean duration of illness was 7.92 years (SD±6.738), the number of subjects having known medical co-morbidity were 8 (20%) most of which were cardiovascular or endocrinal. There were 28 (70%) subjects who had other co-morbid psychiatric disorders along with diagnosis of schizophrenia mostly they had substance abuse disorders. The severity of illness as indicated by CGI-S showed that 18 (45%) subjects had severe illness, the CGI-I which indicated overall improvement of illness for the 37 subjects assessed at endpoint showed that 27 (67.5%) subjects had much improved from baseline.

[Table/Fig-3] presents the results of paired t tests done for the various symptoms domains assessed by PANSS (higher scores indicate increased severity of illness) at baseline and at endpoint for

Age		34.27 (SD±9.73) years
Sex	Male	23 (57.5%)
	Female	17 (42.5%)
Education	Primary	04 (10.0%)
	Secondary	07 (17.5%)
	Higher	17 (42.5%)
	Intermediate	05 (12.5%)
	Diploma	03 (07.5%)
	Graduate	04 (10.0%)
Marital status	Single	21 (52.5%)
	Married	13 (32.5%)
	Separated	03 (07.5%)
	Widow	03 (07.5%)
Occupation	Student	03 (07.5%)
	Labourer	11 (27.5%)
	Homemaker	14 (35.0%)
	Farmer	06 (15.0%)
	Non-professional	06 (15.0%)
Family income per month	<1000 Rs	01 (02.5%)
	1000-2000 Rs	07 (17.5%)
	2000-5000 Rs	13 (32.5%)
	5000-10000 Rs	10 (25.0%)
	>10000 Rs	09 (22.5%)

[Table/Fig-1]: Socio-demographic distribution of the study population.

Years of illness (n=40)		7.92 (SD±6.73)
Medical co-morbidity (N=40)	Present Absent	08 (20.0%) 32 (80.0%)
Other co-morbid psychiatric disorders (N=40)	Present Absent	28 (70.0%) 12 (30.0%)
CGI-S at baseline (N=40)	Moderately ill Markedly ill Severely ill Extremely ill	05 (12.5%) 16 (40.0%) 18 (45.0%) 01 (02.5%)
CGI-I at end point (n=37)	Very much improved Much improved Minimally improved	03 (07.5%) 27 (67.5%) 07 (17.5%)

[Table/Fig-2]: Clinical variables of the sample population.

	Baseline mean score	Endpoint mean score	Mean change	Standard deviation	Standard error of mean	
Change in PANSS score	99.891	71.054	28.837	14.838	2.439	t=11.821, p<0.01**
Change in PANSS positive domain score	31.324	19.270	12.054	5.158	0.848	t=14.214, p<0.01**
Change in PANSS negative domain score	22.891	18.351	4.540	4.711	0.774	t=5.862, p<0.01**
Change in PANSS disorganization domain score	23.297	16.621	6.675	4.534	0.745	t=8.956, p<0.01**
Change in PANSS excitement domain score	12.891	7.810	5.081	3.506	0.576	t=8.813, p<0.01**
Change in PANSS anxiety/ depression domain score	9.486	9.000	0.486	3.158	0.519	t=0.937, p=0.35

[Table/Fig-3]: Change in PANSS scores from baseline to endpoint (n=37).
*p<0.05, ** p<0.01, (paired t test) PANSS-Positive and Negative Symptom Scale

	Baseline mean score	Endpoint mean score	Mean change	Standard deviation	Standard error of mean	
Change in overall disability score	03.567	01.837	1.729	0.870	0.143	t=12.083, p<.01**
Change in behavioural functioning score	07.621	15.405	7.783	3.837	0.630	t=12.337, p<.01**
Change in social functioning score	09.918	04.189	5.729	2.445	0.402	t=14.252, p<.01**
Change in occupational functioning score	11.351	05.675	5.675	3.197	0.525	t=10.796, p<.01**

[Table/Fig-4]: Change in SAPD scores from baseline to endpoint (n=37).
*p<0.05, **p<0.01, (paired t test), PANSS-Positive and Negative Symptom Scale

the 37 subjects who completed the study. It showed that except for the affective (anxiety/depression) domain (mean=0.486, t=0.937, p=0.35), the other domains of PANSS showed significant change maximum was for positive domain (mean=12.054, t=14.214, p<0.01).

[Table/Fig-4] presents the results of paired t-tests done for the disability domains as assessed by SAPD (higher scores indicate increased disability) at baseline and at endpoint for the 37 subjects who completed the study. It showed that all of them were showing significant change maximum was for behavioural functioning score (mean=7.783, t=12.337, p<0.01).

[Table/Fig-5] presents the correlation of baseline PANSS total scores and domain scores to the various baseline disability domains. It showed total scores, negative domain score and disorganization had significant positive correlation of total scores to behavioural functioning and occupational functioning of the disability domains baseline PANSS excitement domain score showed significant positive correlation to the social functioning (r=0.417, p=0.007) among the disability domain scores. No change in significant values even if the 3 subjects lost to follow-up was removed from the data.

	Total PANSS score	Positive domain score	Negative domain score	Disorganization domain score	Excitement domain score	Anxiety/ depression domain score
	Pearson's correlation (significance)					
Baseline overall disability score	0.501 (<0.01)**	0.207 (0.200)	0.437 (<0.01)**	0.530 (<0.01)**	0.353 (0.025)*	-0.217 (0.179)
baseline behavioural functioning score	0.590 (<0.01)**	0.104 (0.523)	0.609 (<0.01)**	0.603 (<0.01)**	0.146 (0.369)	0.098 (0.547)
baseline social functioning score	0.301 (0.059)	0.281 (0.079)	0.156 (0.337)	0.267 (0.095)	0.417 (<0.01)**	-0.311 (0.051)
baseline occupational functioning score	0.568 (<0.01)**	0.217 (0.179)	0.511 (<0.01)**	0.543 (<0.01)**	0.256 (0.111)	-0.013 (0.938)

[Table/Fig-5]: Correlation of baseline total PANSS and subcategory scores to baseline disability scores (N=40).
*p<0.05, **p<0.01 (pearsons correlation test)

	Total PANSS score	Positive domain score	Negative domain score	Disorganization domain score	Excitement domain score	Anxiety/ depression domain score
	Pearson's correlation (significance)					
End point overall disability score	-0.534 (<0.01)**	-0.583 (<0.01)**	-0.453 (<0.01)**	-0.192 (0.255)	-0.244 (0.146)	-0.217 (0.179)
End point behavioural functioning score	-0.524 (<0.01)**	-0.469 (<0.01)**	-0.460 (<0.01)**	-0.230 (0.171)	-0.361 (0.028)*	0.098 (0.547)
End point social functioning score	-0.616 (<0.01)**	-0.580 (<0.01)**	-0.501 (<0.01)**	-0.323 (0.052)	-0.392 (0.016)*	-0311 (0.051)
End point occupational functioning score	-0.628 (<0.01)**	-0.605 (<0.01)**	-0.484 (<0.01)**	-0.349 (0.034)*	-0.390 (0.111)	-0.013 (0.938)

[Table/Fig-6]: Correlation of endpoint total PANSS and subcategory scores to endpoint disability scores (n=37).
*p<0.05, **p<0.01 (pearsons correlation test)

[Table/Fig-6] presents the correlation of change in total PANSS score and domain scores from baseline to the endpoint for the various endpoint disability domains. It showed total score, change in positive domain score, and change in negative domain score showed significant negative correlation to all disability domain scores. Change in disorganization domain score showed significant negative correlation to only occupational functioning domain score. Change in excitement domain score showed significant negative correlation to behavioural functioning score and social functioning of disability domain scores.

DISCUSSION

The present study made an attempt to determine whether change in severity of symptoms was having any relationship to the person's disability. As most of the subjects were single so many of the questions in part 3 of the SAPD was not applicable and as was done in studies using this scale earlier also while calculating scores for the whole sample they were left out for all of them [9].

Socio-Demographic Variables

The study centre caters to a predominantly rural/suburban catchment area. So a majority of subjects were from the rural/suburban area. Average age was around 34 years with males being slightly higher in number; this was similar to findings in other studies [11,12]. It has been considered that being married indicates good outcome and in Indian context most studies have found individuals are married. Most of the subjects were of low to middle socioeconomic status and were mostly labourers or homemakers as in other studies [13]. Most of them had a high school education or less as in other studies, but some studies had found that level of education was higher and it has been considered that higher level of education will positively affect later functioning [14,15].

Illness Variables

The analysis of the illness variables revealed that mean duration of illness was 7.92 years this is similar to other studies [14,15], but other studies have taken subjects with more than 10 years of illness [12,13]. Longer duration of illness at intake has been found to have a negative effect on overall symptoms at follow-up. A 20% of the subjects had a known medical co-morbidity, most common diagnosis were diabetes mellitus, dyslipidemia and hypertension. Possible cause for this may be that these patients are on psychiatric drugs already. Around 70% of the subjects had a co-morbid psychiatric diagnosis, this was in most cases substance abuse disorders predominantly tobacco, this was similar to other studies [13]. As this study had a requirement for acute exacerbation of schizophrenia needing hospitalization as an inclusion criteria, majority of the subjects who were enrolled in the study had a moderate to severe intensity of the illness as per the CGI-S scale which is similar to other studies [10]. At the end of study period of the 37 subjects who completed the study only 17.5% of them had shown minimal improvement while the rest had shown much or very much improvement in their clinical symptoms as per the CGI-I scale. It had been found in a meta-analysis of outcome that around 45% have good clinical outcome at 1 year [16]. As this study was of short duration of three months so outcome may be different from published findings.

Psychopathology Variables

Change in psychopathology from baseline to endpoint was examined and it was seen that there was a significant decrease in the total PANSS score. Also, looking at the various domains of the PANSS it was seen that except for the affective domain which did not show a significant change, the other four had shown a significant decrease with the maximum being seen in the positive domain and the least being in negative domain. Karow A et al., had found that there was a significant change in all domains and total PANSS score also [17]. This investigator's findings are similar to those by Ho BC et al., in their study [18]. Weiselgren IM et al., has suggested that symptoms in acute recent onset patients may have better predictive validity than those ascertained during an acute exacerbation in patients who have been ill longer [19]. The present study had a mixed population of first episode and chronic schizophrenics which may have affected findings.

Disability Variables

SAPD scale which was used to assess disability is a modification of the WHODAS II and has been found to be useful in assessing patients of schizophrenia from developing countries [9]. Other studies have used Global Assessment of Functioning (GAF) scale, Social and Occupational Functioning Assessment Scale (SOFAS), Social Functioning Scale (SFS) [20]. The SAPD gives higher score when disability increases. Change from baseline to endpoint was assessed and it was found that significant reduction in all the domains of the disability as well as overall disability were found, this was similar to other studies [13]. The SAPD gives higher score when disability increases. Change from baseline to endpoint was assessed and it was found that significant reduction in all the domains of the disability as well as overall disability were found, this was similar to other studies. On the other hand, the presence of a good support system of family members might be a possible explanation for the significant reduction in disability seen here and as reported in the previous Indian studies.

Correlations between baseline PANSS Domain Scores with Baseline Disability Domains

When looking at the scores at baseline when the subject is in acute exacerbation it was seen that total PANSS score had a significant positive correlation to the behavioural and occupational functioning. This result is in the expected direction. In the present study the analysis of the disability domains showed that PANSS positive and affective domains had no significant correlation. Possible explanation for this is that the patients are hospitalized during this period and as florid psychotic symptoms are expected in them thus they are less disruptive to the person's ability to meet their needs. While the PANSS negative and disorganization domains had significant positive correlation to the behavioural, occupational and overall disability, the excitement domain was having significant correlation to only the social functioning score. Thirtahalli J et al., had found that severity of symptoms was correlated to increase in disability and the present study reflects a somewhat similar finding [13].

Correlation of Change in PANSS Domains from Baseline to Endpoint with the Endpoint Disability Domains

The analysis showed that change in total PANSS score had significant negative correlation to all the disability domains. On analysing the relationship of change in PANSS domain scores to the disability domains, it showed that change in PANSS positive, negative domain had negative correlation to all the disability domains. The change in PANSS disorganization domain had negative correlation to only the occupational functioning, the change in PANSS excitement domain had negative correlation to the behavioural and social functioning domains and finally the change in PANSS affective domain had no significant correlation to any of the domains. Thirtahalli J et al., had found that change in PANSS negative domain had the strongest correlation to disability [13]. Saraswat N et al., had found that the positive and negative domains are significantly correlated to disability [20]. Seigel SJ et al., had found that both change in PANSS positive and negative domain had strong correlation to disability also they felt it is the type of symptom patient has than the intensity of the symptoms which determine the later functioning [15]. Akinsulore A et al.,

had found that positive, negative and affective domains have significant correlation to the disability domains, they felt it was due to poor social skills, lack of motivation and self stigma [21]. The better functioning due to fall of PANSS negative score is possibly due to the fact that some of the initial score was possibly due to secondary negative symptoms which resolved on treatment. Ritsner M et al., has also explained that the improvement in social relations is related to negative symptoms and social support as good family support helps improve the social relations and hence may effect disability [22].

LIMITATION

Limitations of this study were several. The sample size was small so the strength of correlation seen here cannot be generalized. There was no comparison group to look at whether the treatment was the cause for change. The duration of follow-up was short so they may not be able to detect substantial changes. The sample was not homogenous, it included both first episode and chronic patients which could have made interpretation of findings difficult. The effect of type of treatment given was not taken into consideration as this may also possibly affect the endpoint variables.

CONCLUSION

This study adds to the evidence which is increasingly showing that we need to look at schizophrenia as not purely as a psychotic disorder but rather a multifaceted one which requires interventions which would benefit in improving the persons social functioning ability also.

This study found that disability had a positive correlation to the negative, excitement and disorganization domains of PANSS. Correlation of change in PANSS domains from baseline to endpoint with change in disability had a negative correlation except for the affective domain.

Further research with larger samples and more homogenous population is needed to identify the strength of the associations of the domains of schizophrenia with domains of disability.

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