Indian Journal of Clinical Psychiatry
An Official Journal of **Association of Clinical Psychiatry**
(Indian Psychiatric Society- Uttar Pradesh State Branch (IPS-UPSB))

RESEARCH ARTICLE
doi: 10.54169/ijocp.v4i01.124

Evaluation of Language Dysfunction among Untreated Patients with Psychosis Attending the Psychiatry Inpatient Services of a Tertiary Healthcare Centre from North India: A Cross-sectional Study

Aditi Jain*, Abbas Mehdi

Career Institute of Medical Sciences and Hospital, Lucknow, Uttar Pradesh, India.

ARTICLE INFO

Correspondence:
Aditi Jain
nishajainprays@gmail.com
Career Institute of Medical Sciences and Hospital, Lucknow, Uttar Pradesh, India.

Dates:
Received: 02-03-2024
Accepted: 06-04-2024
Published: 05-06-2024

Keywords:
Language, Schizophrenia, Psychosis, Clinical language disorder rating scale, North India.

How to Cite:
Jain A, Mehdi A. Evaluation of Language Dysfunction among Untreated Patients with Psychosis Attending the Psychiatry Inpatient Services of a Tertiary Healthcare Centre from North India: A Cross-sectional Study. Indian Journal of Clinical Psychiatry.2024;4(1):58-70.
doi: 10.54169/ijocp.v4i01.124

Abstract

Background: Psychosis, encompassing conditions such as schizophrenia and bipolar affective disorder with psychotic features, presents a perplexing landscape where language dysfunction emerges as a notable hallmark. Compared to classical psychotic symptoms (such as delusions and hallucinations), language disorganization can be directly observed, and it is not dependent upon subjective reports of abnormal experiences on part of the patient. Consequently, it has been regarded by researchers as a more objective and informative clinical marker of brain dysfunction in psychosis. There is a dearth of Indian studies in this domain and when compared to international studies, a strong need for revival of research has been felt.

Aim: To evaluate language dysfunction among first-admission untreated patients of psychosis using the clinical language disorder rating scale (CLANG).

Methodology: In this cross-sectional study, language dysfunction among 60 untreated psychotic patients who attended the psychiatry inpatient services of a tertiary care center from North India in the period from January 2022 to October 2023 were evaluated for the presence of language dysfunction using a valid tool called CLANG after taking approval from the Institutional Ethical Committee and with the informed consent of the patients and/or their caregivers. Data set for 60 patients regarding the sociodemographic-clinical profile and language dysfunction was obtained. The data was analyzed using descriptive and inferential statistics as appropriate.

Results: Diagnosis-wise, most of our patients belonged to schizophrenia (n = 26) (43.33%). Rest of them psychotic disorders like bipolar affective disorder with psychotic symptoms (15%) and schizoaffective disorder (11.67%) to name a few. The most commonly affected language domains in our patients were referential failures (65%), discourse failures (46.67%) and lack of semantic association (16.67%). Schizophrenics were differentiated from non-schizophrenic psychosis patients based on lack of semantic association (exclusively seen in schizophrenics). Referential failures and discourse failures were commonly noted in both schizophrenia and non-schizophrenic psychotic disorders. Poverty of speech was rather predominant in mood disorders with psychotic symptoms.

Conclusion: The findings of our study put emphasis on the fact that language dysfunction is a core component of the phenomenon of psychosis and perhaps revalidates the neural basis of psychosis. The domain 'lack of semantic association' was typically present in patients with a diagnosis of schizophrenia, while other language abnormalities like referential failures and abnormal prosody were generally present in patients of untreated psychosis.

Introduction

For the human species, language serves as the cornerstone of cognition, social interaction and identity. However, within the realm of psychosis, this fundamental aspect of human experience undergoes profound disruption. Psychosis, encompassing conditions such as schizophrenia and bipolar affective disorder with psychotic features, presents a perplexing landscape where language dysfunction emerges as a notable hallmark. Researchers have even proposed that schizophrenia is the price that "Homo sapiens" have to pay for language.[1]

The abnormal nature of verbal impairments in schizophrenia was studied for the first time by Woods *et al.* in 1938[2] and almost four decades later in 1979 by Nancy Andreasen who found out that several aspects of language were abnormal in patients with schizophrenia, viz. comprehension, attentional shifts in the sentences, pragmatics, semantic organization, referential failures, paucity of speech and fluency.[3,4]

LE DeLisi (2001) claimed that language impairment is one of the core phenomenological characteristics of patients with schizophrenia and proposed that there must be some deficits in the neural organization of language in schizophrenic patients.[5]

Compared to classical psychotic symptoms (such as delusions and hallucinations), language disorganization can be directly observed and it is not dependent upon the subjective report of abnormal experiences on part of the patient. Consequently, language disorganization has been regarded as a more objective and informative clinical marker of brain dysfunction in psychosis.[4,5]

Multiple international studies have examined speech samples of schizophrenia patients and reported anomalies at multiple levels of language processing i.e. lexical, syntactic, semantic and discourse levels.[6-11]

Need for the Study

There is a dearth of Indian studies in the domain of language dysfunction in psychosis as reported by Bhatia *et al.* in 2019.[12] Sultan *et al.* (2023) who did a review of Indian studies in the domain of language and schizophrenia, concluded that the number of studies done in India is very meagre and when compared to international studies, there is a strong need for revival of research in this area.[13]

Our motive, through the current study, is to illuminate the path toward a deeper understanding of this elusive aspect of language dysfunction in psychosis by exploring the multifaceted nature of language dysfunction among untreated psychotic patients.

Aim

To evaluate the language dysfunction among untreated patients of psychosis.

Objectives

- To examine the presence of disintegration of the components of language in untreated cases of psychosis using clinical language disorder rating scale (CLANG).[14]
- To see the correlation of sociodemographic and clinical parameters with CLANG domains among our patients of untreated psychosis.

Methodology

Setting

Inpatient services of the Department of Psychiatry at Career Institute of Medical Sciences and Hospital, Lucknow, which is a tertiary care centre.

Study Design

A cross-sectional study.

Approval of the Institutional Ethics Committee for our study was taken in the month of December 2021

The duration for recruitment of patients from inpatient services was from January 2022 to October 2023 (almost 22 months)

Protocol for Recruitment into Our Study

In the period from 1st January 2022 to 30th October 2023, there were a total of 303 admissions to the psychiatric ward under a broad diagnosis of psychosis including schizophrenia. Out of these 303, 88 patients were those patients who were drug naïve at the time of their admission, i.e., they had never ever received treatment before coming to us (untreated

psychosis). By purposive sampling, we chose 60 patients for our study (those patients were selected who had good findings after fulfilling the inclusion and exclusion criteria).

Sample Size

A total of 60 patients of psychosis.

Inclusion Criteria

- Males and females
- Age 18 to 60 years
- Psychosis diagnosed using ICD 10 criteria[15]
- Patients who had never received any psychiatric treatment prior to admission to our department.

Exclusion Criteria

- Subnormal intelligence
- Presence of comorbid substance use disorder
- Non psychotic mood disorder
- History of learning disabilities
- History of expressive speech disorder
- Hearing impairment
- Stress related speech disorder like emotional numbness in post traumatic stress disorder (PTSD)
- Presence of catatonic symptoms such as mutism and stupor
- Aphasia/dysphasia secondary to laryngeal or cerebral dysfunction
- Those who refused to be a part of our study (for any reason)

Description of CLANG in Brief[14]

It is a simple rating instrument which is based on modern psycholinguistic framework. This scale was validated in an extensive sample of 204 Hong Kong Chinese schizophrenic patients. It consists of 17 observer rated items anchored on a four-point severity scale, i.e., 0, 1, 2 and 3 (0 = Normal, 1 = Mild, no more than 10% of the time, 2 = Moderate, regular occurrence 10 to 50% of the time, 3 = Severe, pervasive, more than 50% of the time)

Rating is based on verbal output during a period of conversation with the patient (lasting at least 15 minutes). Factor analysis done by Chen *et al.* (1966) revealed three major domains of language disorder captured by the scale: the semantic level, the syntactic level and the production level. The internal consistency of the CLANG and the relative contribution of individual items as found out by applying Cronbach's alpha coefficient, proved that the internal reliability of the subscales is high (alpha coefficient for semantics subscale 0.76), for syntax subscale 0.80, and for production subscale 0.72. The intra-class correlation coefficient for the syntax subscale is 0.93, for the semantics subscale is 0.83 and for the production subscale is 0.88. Thus CLANG is a reliable, valid and informative instrument for the clinical assessment of language disorder in schizophrenia.[13]

Description of 17 Items of the CLANG Scale

Excess phonetic association

Abnormal association based on phonetic similarity (punning and clang associations).

Abnormal syntactic structure

Violations of ordinary rules of grammar leading to incomprehensible speech.

Excessive syntactic constraints

Excessive application of rigid grammatical structure to speech output, producing language that is "formal" and lack of flexibility of ordinary spoken language.

Lack of semantic association

Lack of normal semantic association between ideas expressed successively

Referential failures

Unclear links which leave excessive ambiguity as to which expressions refers back (or forth) to which items in preceding and subsequent speech.

Discourse failures (loss of schematic organization)

Lack of the normal organization in which speech units, (eg. One or two sentences or above) progresses from one context to the other in a gradual and prepared manner.

Excessive details

Details given grossly in excess of that required in the given context.

Lack of details

Details given (though judged to be probably appropriate in meaning) grossly inadequate to context.

Aprosodic speech

Flat monotonous speech without appropriate inflection and emotional quality.

Abnormal Prosody

Bizarre quality of voice, eg., high pitch , mechanical etc.

Pragmatic disorder

Speech content reflects defective knowledge of the world (judged to be independent of delusional ideas, i.e., of personal significance etc).

Dysfluency

Stuttering, false starts, hesitations.

Dysarthria

Articulation difficulties.

Poverty of speech

Reduced overall speech output.

Pressure of speech

Increased speech of word production as if a rapid internal production process paces speech.

Neologisms

Construction of idiosyncratic new words for personal use.

Paraphasic Error

Substitution of word by words with similar meaning (but inappropriate and less precise).

Ethical Considerations

- Before starting the study, approval for this study was obtained from the Institutional Ethics Committee in December 2021.
- Written informed consent was obtained from the patients and/or their relatives after asking them to go through the patient information sheet printed in the local language commonly used (Hindi) and a verbal explanation by the interviewer.
- The nature and purpose of the study was explained to them.
- Confidentiality of the information provided was maintained.
- No beneficial treatment was withheld and treatment was not altered in any way to facilitate intake into the study

How Data Collection was Done

Starting from January 2022, we aimed at enrolling patients fulfilling the inclusion and exclusion criteria for our study and his/her diagnosis based on ICD 10 was confirmed by consultant psychiatrist of the level of professor. Diagnosis of schizophrenia was not essential for inclusion into the study, rather expression of verbal or written speech were given more importance in our patients of untreated psychosis

Thus, out of 60 patients, we had 26 patients with diagnosis of schizophrenia rest of them were having diagnoses other than schizophrenia as mentioned vide infra in Table 1 of our observations.

For each patient, we took informed consent in the local language of the patient.

The sociodemographic profile sheet was filled up as per the information given by the patient as well as at least one reliable informant staying with the patient for most part of his/her life. The sociodemographic profile sheet covered parameters like name, age, sex, marital status, mother tongue, education, occupation, duration of untreated psychosis, diagnosis, age of onset and family history of psychiatric illness.

For the purpose of establishing psychiatric diagnoses, we used ICD 10.

All the 60 patients were then subjected to the administration of CLANG scale for the assessment of their language. For the purpose of eliciting a sufficient speech sample, we engaged the patient in conversation for at least 15 minutes under a standardized condition. The patient was asked to speak spontaneously for at least 3 to 5 minutes or write a paragraph on any of the following topics of their preference like my family, festivals of India, education system, status of India Pakistan relationship or any other topic of their choice. We kept in mind that we subjected the patients to open-ended questions rather than closed-ended ones which helped us

Table 1: The sociodemographic and clinical parameters among the patients in our study

Sociodemographic/clinical parameter		*No. of patients n (%)*
Age at time of first admission to hospital	21–30 years	44 (73.33%)
	31–40 years	13 (21.7%)
	41–50 years	3 (5%)
Mean age at time of first admission to hospital	25.4 years	
Gender	Male	38 (63.33%)
	Female	22 (36.67%)
Education	Secondary	41 (68.3%)
	Higher secondary	9 (15%)
	Graduate	10 (16.67%)
Occupation	Unemployed	22 (36.67%)
	Semiskilled laborer	22 (36.67%)
	Skilled laborer	8 (13.33%)
	Clerk/farmer/shopkeeper	2 (3.33%)
	Semi-professional	6 (10%)
Marital status	Single	17 (28.33%)
	Married	30 (50%)
	Separated	9 (15%)
	divorced	4 (6.67%)
Mother tongue	Hindi	60 (100%)
Age of onset of psychosis	21–30 years	41 (68.33%)
	31–40 years	19 (31.67%)
Mean age of onset of psychosis	23.9 years	
Family history	Present	6 (10%)
	Absent	54 (90%)
Diagnosis	Schizophrenia	26 (43.33%)
	Schizoaffective disorder	7 (11.67%)
	Persistent delusional disorder	3 (5%)
	Acute and transient psychotic disorders	7 (11.67%)
	Other nonorganic psychotic disorders	2 (3.33%)
	Severe depressive episode with psychotic symptoms	6 (10%)
	Bipolar affective disorder with psychotic symptoms	9 (15%)
Duration of untreated psychosis (in months)	<12	5 (8.33%)
	12–24	40 (66.67%)
	24–36	9 (15%)
	36–48	6 (10%)
Mean DUP in months	30 ± 0.86	

elicit a sufficient speech sample in order to be able to apply the scale efficiently for language assessment. In some cases, we even showed the patients pictures and asked them to speak on it. The speech samples of the patients were audiotaped as well as video recorded. Later on, they were meticulously scrutinized for the presence of language dysfunction as defined in the CLANG scale.

The results were noted down for all 60 patients.

Outcome Parameters

- The presence of disintegration of the components of language in diagnosed and untreated acute psychosis patients using CLANG.
- The presence of any correlation between sociodemographic and clinical parameters and CLANG domains.

Statistical Analysis

The data analysis was done using SPSS 20.0 version.

In descriptive statistics, we used simple measures like frequency and percentage for ordinal and nominal variables for the sociodemographic and clinical profiles of the patients.

For inferential statistics, we used Spearman's correlation coefficient test and one way Analysis of Variance (ANOVA).

The *p-value* of < 0.05 has been considered to be statistically significant and a $p < 0.005$ to be highly significant.

Results

Descriptive Statistics

Table 1 of our results shows the sociodemographic parameters like age, gender, occupation, education, marital status and mother tongue and clinical parameters like age of onset of psychosis, family history, diagnosis and duration of untreated psychosis among the patients in our study.

Most of our psychotic patients were 21 to 30 years of age (73.33%) and the mean age was 25.4 years The mean age of onset of psychosis in our patients was 23.9 years.

Diagnosis-wise, our sample consisted of a spectrum of psychotic disorders, as mentioned in Table 1 of our results. Most of our patients belonged to schizophrenia (n = 26) (43.33%). A total of seven of them had schizoaffective disorder (11.67%), 7 had acute and transient psychotic disorder (11.67%), 3 had persistent delusional disorder (5%), 2 had other nonorganic psychotic disorder (3.33%), 6 had severe depressive episodes with psychotic symptoms (10%) and 9 had bipolar affective disorder with psychotic symptoms (15%).

Table 2 shows the distribution of language dysfunction in our patients using CLANG Scale.

When mild, moderate and severe language disturbances in the patients were clubbed together, the most commonly affected language domains were referential failures (65%). The second most common language disturbance in our study was discourse failures (46.67%). We found out that lack of details (33.33%), poverty of speech (33.33%), were rather common in patients of mood disorders with psychotic symptoms.

As regards prosody related language disturbances, abnormal prosody (28.33%) and aprosodic speech (21.67%) were seen in our patients. None of the patients of mood disorder with psychosis had abnormal prosody. Abnormal syntax was seen in 16.67% of our patients.None of our patients had dysarthria or paraphasic error. Lack of semantic association was seen in 18.34% of our patients.

Figure 1 of our results shows the factors that were rated 'severe' in our study. They included referential failures (6.67%), lack of details (5%), discourse failure (3.33%), pressure of speech (1.67%) and lack of semantic association (1.67%).

Table 3 depicts the distribution of language disturbances in our study (diagnosis-wise) using

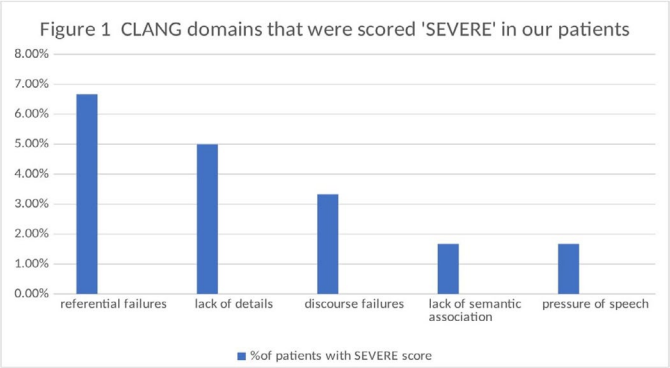

Figure 1: Factors that were rated 'severe' in our study

Table 2: Distribution of language dysfunction in our patients using CLANG scale

CLANG domain	*Score as per CLANG*	*No. of patients n (%)*
Excess phonetic association	Normal	52 (86.67%)
	Mild	4 (6.67%)
	Moderate	4 (6.67%)
	severe	0
Abnormal syntax	Normal	50 (83.33%)
	Mild	5 (8.33%)
	Moderate	5 (8.33%)
	Severe	0
Excess syntactic constraints	Normal	57 (95%)
	Mild	2 (3.33%)
	Moderate	1 (1.67%)
	Severe	0
Lack of semantic association	Normal	49 (81.67%)
	Mild	3 (5%)
	Moderate	7 (11.67%)
	Severe	1 (1.67%)
Referential failures	Normal	21 (35%)
	Mild	12 (20%)
	Moderate	23 (38.33%)
	Severe	4 (6.67%)
Discourse failure	Normal	32 (53.33%)
	Mild	11 (18.33%)
	Moderate	15 (25%)
	Severe	2 (3.33%)
Excess details	Normal	47 (78.33%)
	Mild	5 (8.33%)
	Moderate	8 (13.33%)
	Severe	0
Lack of details	Normal	40 (66.67%)
	Mild	10 (16.67%)
	Moderate	7 (11.67%)
	Severe	3 (5%)
Aprosodic speech	Normal	47 (78.33%)
	Mild	8 (13.33%)
	Moderate	5 (8.33%)
	Severe	0
Abnormal prosody	Normal	43 (71.67%)
	Mild	12 (20%)
	Moderate	5 (8.33%)
	Severe	0
Pragmatics disorder	Normal	58 (96.67%)
	Mild	1 (1.67%)
	Moderate	1 (1.67%)
	Severe	0
Dysfluency	Normal	52 (86.67%)
	Mild	5 (8.33%)
	Moderate	3 (5%)
	Severe	0
Dysarthria	Normal	60 (100%)
	Mild	0
	Moderate	0
	Severe	0
Poverty of speech	Normal	37 (61.67%)
	Mild	12 (20%)
	Moderate	11 (18.33%)
	Severe	0
Pressure of speech	Normal	54 (90%)
	Mild	3 (5%)
	Moderate	2 (3.33%)
	Severe	1 (1.67%)
Neologisms	Normal	56 (93.33%)
	Mild	2 (3.33%)
	Moderate	2 (3.33%)
	Severe	0
Paraphasic error	Normal	60 (100%)
	Mild	0
	Moderate	0
	Severe	0

0 = Normal, 1 = Mild, no more than 10% of the time,
2 = Moderate, regular occurrence 10 to 50% of the time,
3 = Severe, pervasive, more than 50% of the time

CLANG scale. It was evident that most of the patients with a diagnosis of schizophrenia were differentiated from non-schizophrenic psychoses patients based on lack of semantic association (exclusively seen in schizophrenics)

Table 3: Distribution of language disturbances in our study (diagnosis-wise) CLANG scale

CLANG domain	Severity as per CLANG scale	Diagnosis		
		Schizophrenia N (out of 26)	Psychotic disorders other than schizophrenia N (out of 19)	Mood disorder with psychosis N (out of 15)
Excess phonetic association	Normal	24	16	13
	Mild	0	2	0
	Moderate	2	1	2
	Severe	0	0	0
Abnormal syntax	Normal	19	12	15
	Mild	2	5	0
	Moderate	5	2	0
	Severe	0	0	0
Excess syntactic constraints	Normal	26	17	15
	Mild	0	2	0
	Moderate	0	0	0
	Severe	0	0	0
Lack of semantic association	Normal	15	19	15
	Mild	3	0	0
	Moderate	7	0	0
	Severe	1	0	0
Referential failures	Normal	6	6	15
	Mild	3	2	0
	Moderate	14	11	0
	Severe	3	0	0
Discourse failure	Normal	13	6	15
	Mild	3	4	0
	Moderate	9	9	0
	Severe	1	0	0
Excess details	Normal	23	10	14
	Mild	1	0	0
	Moderate	2	9	1
	Severe	0	0	0
Lack of details	Normal	16	18	6
	Mild	8	1	0
	Moderate	0	0	7
	Severe	0	0	2
Aprosodic speech	Normal	20	19	15
	Mild	1	0	0
	Moderate	5	0	0
	Severe	0	0	0
Abnormal prosody	Normal	19	9	15
	Mild	3	8	0
	Moderate	4	2	0
	Severe	0	0	0
Pragmatics disorder	Normal	24	19	14
	Mild	1	0	0
	Moderate	1	0	1
	Severe	0	0	0
Dysfluency	Normal	21	15	15
	Mild	3	2	0
	Moderate	2	2	0
	Severe	0	0	0
Dysarthria	Normal	26	19	15
	Mild	0	0	0
	Moderate	0	0	0
	Severe	0	0	0
Poverty of speech	Normal	19	19	7
	Mild	7	0	0
	Moderate	0	0	8
	Severe	0	0	0
Pressure of speech	Normal	26	14	14
	Mild	0	0	0
	Moderate	0	3	1
	Severe	0	2	0
Neologisms	Normal	23	6	14
	Mild	2	6	0
	Moderate	1	3	1
	Severe	0	0	0
Paraphasic error	Normal	26	19	15
	Mild	0	0	0
	Moderate	0	0	0
	Severe	0	0	0

0=Normal,

1= Mild, no more than 10% of the time,

2= Moderate, regular occurrence 10 to 50% of the time,

3= Severe, pervasive, more than 50% of the time

*Psychotic disorders other than schizophrenia include: Schizoaffective disorder acute and transient psychotic disorders, persistent delusional disorder had other nonorganic psychotic disorder

Mood disorder with psychosis* includes severe depressive episodes with psychotic symptoms and bipolar affective disorder with psychotic symptoms

Discussion

The current study is one of the very few studies from India in the domains of evaluation of language dysfunction in first admission patients of untreated psychosis. It is relevant as there is a dearth of Indian studies in this domain as reported by Bhatia *et al*.[12] and Sultan *et al*.[13]

The primary objective of our study was to do an in-depth evaluation of the disintegration of components of language in patients with untreated psychosis and the secondary objective was to correlate the sociodemographic and clinical variables with CLANG domains in the subjects.

We chose to take only inpatients into our study for the purpose of ease of detailed evaluation, which is most of the times not possible in an outpatient setting. Our study is in conformity with a number of other studies which have tried to study language dysfunction in psychotic inpatients; notable ones among them were by Nancy Andreasen and William Grove from USA (1986),[8] Morice and Ingram (1982),[16] Fraser *et al*. (1986)[17] and Anand *et al*. (1994).[18]

In our study, we included only those patients who had never received any treatment because of greater chances of getting undiluted and robust findings for the presence of any language dysfunction. Our evaluation is supported by most previously conducted most studies like by Nelli and Crow (2003)[11] and Anand *et al*. (1994)[18] who also included only first-admission acute psychotic patients.

The total sample of our study was 60 patients of untreated psychosis which was chosen by purposive sampling. There are studies with sample sizes as much as 204 by Chen *et al*.[14] and 194 by Andreasen and Grove *et al*.[8] to as less as 37 schizophrenia patients by Tavono *et al*.,[19] 22 by Chaika *et al*.[20], 20 by Rutter *et al*.[21] and one multilingual patient by Bhatia *et al*.[12] Thus, the sample size of 60 in our study seems to be quite modest and comparable to discuss our findings to a certain extent.

Comparison of Socio-demographic and Clinical Parameters Between Previous Studies and Our Study

As evident from Table 1 of our results, which shows the socio-demographic and clinical profiles of the patients, most of our psychotic patients were 21 to 30 years of age (73.33%) and the mean age was 25.4 years, which is otherwise also the usual age of presentation in psychotic patients.

On comparing the mean age with other comparable studies, we found that it was surprisingly scattered from as early as 23.9 years in the study by Anand *et al*.[18] to 52.10 years by Taylor and Reed *et al*.[22] We believe that our study is fresher and perhaps almost in tune with the natural course of the age of onset in psychosis.

As far as the distribution of gender is concerned, males were predominant (68.33%). Previous studies have shown the percentage of males to range from 42.3% by Tavano *et al*.[19] to 55% by Murphy *et al*.[23]

Regarding education, most of the patients in our study had studied up to secondary education (68.33%), while most of the studies conducted previously by Andreasen and Grove (1986)[8], Chen *et al*. (1966),[14] had their patients with clearly higher mean levels of education compared to our patients.

Occupation-wise, (68.33%) most of our patients were unemployed (36.67%) or semiskilled laborers (36.67%).

About 50% of our patients were married and all our patients were Hindi-speaking (100%). Most of the language literature is composed of studies on English-speaking people, as reported by Tavano *et al*. who did their study in Italian-speaking patients for the first time.[19]

As far as the clinical parameters are concerned, the age of onset of psychosis for most of the patients was found to be between 21 to 30 years (68.33%) and the mean age of onset was 23.9 years. Tavano *et al*. found the mean age of onset to be 27.40 years in their schizophrenic patients.[19]

Diagnosis-wise, our sample consisted of a spectrum of psychotic disorders, as mentioned in Table 1 of our results. Most of our patients belonged to schizophrenia (n = 26) (43.33%). A total of seven of them had schizoaffective disorder (11.67%), 7 had acute and transient psychotic disorder (11.67%), 3 had persistent delusional disorder (5%), 2 had other non-organic psychotic disorder (3.33%), 6 had severe depressive episodes with psychotic symptoms(10%) and 9 had bipolar affective disorder with psychotic symptoms (15%).

Comparing with other relevant studies, we found that Chaika (1989) had 14 schizophrenics and eight manics in their study,[24] Andreasen *et al*. 1979 had 113 patients (32 manics, 36 depressives and 45 schizophrenic patients), 4 Chen *et al*. had 204 schizophrenic patients, 14 Nelli and Crow (2003) had 30 psychotic patients as cases and 15 major depressive disorder patients as controls.[11]

The duration of untreated psychosis was between 12 to 24 months for most of the patients (66.7%) and the mean DUP was 30 ± 0.86 months. In the study by Tavano *et al*., all the patients were on antipsychotic medications at the time of assessment, which they have mentioned as a limitation of their study as the role of medication, side effects and chronicity on language dimensions cannot completely be ruled out.[19]

Comparison of Language Dysfunction Between Previous Studies and Our Study

In our study, language dysfunction was the central focus in 60 patients of untreated psychosis.

Tables 2 and 3 of our results show the language dysfunction among our patients in detail. Most of the patients showed mild to moderate levels of language disturbances and as evident from Table 2. When mild, moderate and severe language disturbances in the patients were clubbed together, the most commonly affected language domains were referential failures (65%).

Diagnosis wise, this language abnormality was more frequently seen in schizophrenics (76.9%) than among psychotic disorders other than schizophrenia (68.4%).This finding is in keeping with a series of studies has shown that referential failures occur more frequently in the speech of schizophrenia patients than in the speech of non-schizophrenic individuals.[9,10,25]

The second most common language disturbance in our study was discourse failures (46.67%). Chaika (1974), who studied a single psychotic patient found that her deviant language coincided with her psychotic episodes and otherwise she spoke normally for weeks at a time. The abnormalities that Chaika observed were mainly discourse failure and syntactic constraints.[7] which have also been noted in our study. In another study, Chaika (1982) proposed that individuals with schizophrenia often commit errors in which they stray from 'normal path control' while speaking and claimed that the disordered discourse of schizophrenics often did not reach its end goal because of 'grammatical errors'.[24] These errors include neologisms which we have also noted in 20% of our patients.

Diagnosis-wise, none of our patients of mood disorder with psychosis exhibited discourse failures, which is in contrast to findings by Andreasen and Grove[8] and Solovay *et al*.[26] who claimed that other psychopathological groups often exhibit disordered discourse comparable to schizophrenics, particularly persons with symptoms of mania.

We found out that lack of details (33.33%), poverty of speech (33.33%), were rather common in patients of mood disorders with psychotic symptoms. This is in keeping with the findings of Andreasen *et al*., who also reported that speech disorder is certainly not confined to schizophrenia and many of the negative speech symptoms such as poverty of speech also occurred in depression.[8]

As regards prosody related language disturbances, abnormal prosody (28.33%) and aprosodic speech (21.67%) were seen in our patients. None of the patients of mood disorder with psychosis had abnormal prosody. This is partly in keeping and partly in contrast with the findings of Murphy and Cutting, who stated that that schizophrenics were significantly inferior to the normal group, but equivalent to manics and depressives on emotional prosody comprehension) while they were significantly inferior to all other groups on emotional prosody expression.[23]

Lack of semantic association was seen in 18.34% of our patients. As evident from Table 3 of our results, most of the patients with a diagnosis of schizophrenia were differentiated from non-schizophrenic psychoses patients based on lack of semantic association (exclusively seen in schizophrenics). As reported by various studies, abnormalities in semantic association are commonly proposed to be central to cognitive abnormalities in schizophrenia, with deficits reported on a wide variety of semantic processing tasks.[14,27]

Abnormal syntax was seen in 16.67% of our patients. This is in keeping with Tavano *et al*.[19] who showed that Italian patients with schizophrenia pre-

sented with a significant reduction in syntactic diversity indices with respect to healthy controls. This is in keeping with a number of other studies as well.[5,11,14]

None of our patients had dysarthria or paraphasic error.

Figure 1 of our results shows the factors that were rated 'severe' in our study. They included referential failures (6.67%), lack of details (5%), discourse failure (3.33%), pressure of speech (1.67%) and lack of semantic association (1.67%). Furthermore, our findings indicate that language deficits are present in schizophrenia independent of mother language, representing a core feature of this disease. Indeed so far, most of the literature included studies investigating language dimensions in English-speaking people with the exception of few like Tavano *et al.*[19] and Sumiyoshi *et al.*[28]

As evident from Table 4 of our results, when we saw the correlation of demographic and clinical factors with CLANG domains in our patients using Spearman's correlation, we found that lack of semantic association was positively and significantly correlated with the age of onset of untreated psychosis (0.50, p = 0.005,S). Referential failures were negatively and significantly correlated with level of education (-0.40, p = 0.02, S), whereas lack of details(0.52, p = 0.003, S) and abnormal prosody (0.42, p = 0.02, S) were positively and significantly correlated with level of education. Our findings of correlation is in conformity with the findings by Chen *et al.*, who also found a negative correlation of education with total CLANG factors. However, the authors specify that this negative correlation was confounded by illness duration and negative symptoms.[14]

As evident from Table 5 of our results, we saw the correlation of significant CLANG factors which could potentially distinguish the three diagnostic subgroups, i.e., schizophrenia, psychotic disorders other than schizophrenia and mood disorders from each other with certainty (p < 0.05) using one way

Table 4: The correlation of sociodemographic and clinical parameters with CLANG factors in all patients

CLANG	*Age of onset*	*duration of untreated psychosis (DUP)*	*Education*
Abnormal syntax	0.15 (p = 0.42, NS)	-0.10 (p = 0.58) NS	-0.16 (p = 0.39, NS)
Lack of semantic association	0.50 (p = 0.005, S)	0.04 (p = 0.82, NS)	0.39 (p = 0.02, S)
Referential failures	-0.15 (p = 0.42, NS)	0.00 (p = 1.00, NS)	-0.40 (p = 0.02, S)
Discourse failure	0.09 (p = 0.61, NS)	-0.05 (p = 0.77, NS)	0.13 (p = 0.49, NS)
Excess details	0.09 (p = 0.61, NS)	-0.05 (p = 0.77, NS)	0.13 (p = 0.49, NS)
Lack of details	0.15 (p = 0.40, NS)	-0.19 (p = 0.29, NS)	0.52 (p = 0.003, S)
Abnormal prosody	0.03 (p = 0.86, NS)	-0.06 (p = 0.73, NS)	0.42 (p = 0.02, S)
Poverty of speech	0.05 (p = 0.77, NS)	-0.09 (p = 0.60, NS)	0.33 (p = 0.07, NS)

Table 5: The correlation of CLANG domains with various diagnostic subgroups in our patients

CLANG domain ↓	*Schizophrenia (n = 26)*	*Psychotic disorders other than schizophrenia* (n = 19)*	*Mood disorder with psychosis* (n = 15)*	*F-value*	*p-value*
Abnormal syntax	0.38 ± 0.50	0 ± 0	0 ± 0	3.43	0.047, S
Lack of semantic association	0.44 ± 0.51	0 ± 0	0 ± 0	4.32	0.024, S
Referential failures	0.83 ± 0.38	1 ± 0	0.50 ± 0.70	2.10	0.14, NS
Discourse failures	0.50 ± 0.51	0.70 ± 0.48	0 ± 0	1.77	0.18, NS
Excess details	0.16 ± 0.38	0.50 ± 0.52	0.50 ± 0.70	1.96	0.16, NS
Lack of details	0.27 ± 0.46	0.10 ± 0.31	0.50 ± 0.70	0.95	0.39, NS
Abnormal prosody	0.27 ± 0.46	0.50 ± 0.52	0 ± 0	1.22	0.30, NS
Poverty of speech	0.44 ± 0.51	0.20 ± 0.42	0.50 ± 0.70	0.87	0.43, NS

ANOVA. We found that only abnormal syntax and lack of semantic association have the potential to clearly distinguish the patients of schizophrenia from other psychotic disorders and mood disorders with psychosis. This further suggests that presence of other CLANG abnormalities like referential failures and abnormal prosody can even be present in other psychotic disorders other than schizophrenia and mood disorders with psychosis. However, abnormal syntax and lack of semantic association are clearly akin to schizophrenia and can be clinically used to distinguish when we have diagnostic confusion.

As reported by Sultan *et al.* in their review on studies on language and schizophrenia, there are inconsistencies found in and across the studies done in India that need to be addressed.[13] This makes our study all the more relevant in the sea of psychiatric research in the domain of language dysfunction in psychosis.

Strengths

- We took untreated psychotic patients so we could get robust and undiluted findings of language dysfunction.
- We did a very detailed evaluation of language dysfunction in our patients using a valid tool, i.e., CLANG.
- Our study has apparently identified which language abnormalities can objectively differentiate between the diagnostic subtypes of untreated psychosis, which is perhaps not mentioned in any study so far conducted in the field.
- Our study further substantiates the fact that language disintegration is an integral component of psychosis and hence revalidates the neural basis of psychosis.

Limitations

- Our study used only inpatients of untreated psychosis admitted in our tertiary care hospital between a period of January 2022 to October 2023 and therefore, we got a limited number of patients, i.e., 60 compared to the landmark studies like by Andreasen (194 subjects)[4] and by Chen *et al.* (204 subjects).[14]
- In our study, we did not do follow-up of our patients, whereas in some prominent studies like the one by Andreasen and Grove in 1986(8), they did follow of patients up to a period of six months.
- Unfortunately, due to technical and practical reasons, we could not combine our comprehensive neuropsychological assessment for language abnormalities with neuroimaging modalities which would have otherwise given regional activation for specific language dysfunction pathways.

Conclusion

As we come to the end of our results and discussion, we wonder how relevant this study is in the sea of psychiatric research. Our study puts emphasis on the fact that language dysfunction is a core component of the phenomenon of psychosis. Since this is the only Indian study (to the best of our knowledge) to have used the CLANG in patients of untreated psychosis, it is "eye catching" and unique in its own way. Our study highlights that lack of semantic association is typically present in patients with a diagnosis of schizophrenia, while other language abnormalities like referential failures and abnormal prosody can be generally present in patients of untreated psychosis.

Future implications

The critical findings of our study may raise the possibility that through the integration of functional neuro-imaging in untreated psychotic patients, it may be possible to study and decipher the related abnormal neural pathways in the future. For researchers, this study is expected to open up new research goals flown from each of our objectives, inspiring them to strive towards further validation of such studies in times to come.

References

1. Crow TJ. Schizophrenia as the price that Homo sapiens pays for language: a resolution of the central paradox in the origin of the species. Brain research reviews. 2000 Mar 1;31(2-3):118-29.
2. Woods WL. Language study in schizophrenia. The Journal of Nervous and Mental Disease. 1938 Mar 1;87(3):290-316.

3. Andreasen NC. Thought, language, and communication disorders: I. Clinical assessment, definition of terms, and evaluation of their reliability. Archives of general Psychiatry. 1979 Nov 1;36(12):1315-21.
4. Andreasen NC. Thought, language, and communication disorders: II. Diagnostic significance. Archives of general Psychiatry. 1979 Nov 1;36(12):1325-30.
5. DeLisi LE. Speech disorder in schizophrenia: review of the literature and exploration of its relation to the uniquely human capacity for language. Schizophrenia bulletin. 2001 Jan 1;27(3):481-96.
6. Marini A, Spoletini I, Rubino IA, Ciuffa M, Bria P, Martinotti G, Banfi G, Boccascino R, Strom P, Siracusano A, Caltagirone C. The language of schizophrenia: An analysis of micro and macrolinguistic abilities and their neuropsychological correlates. Schizophrenia research. 2008 Oct 1;105(1-3):144-55.
7. Chaika E. A linguist looks at "schizophrenic" language. Brain and language. 1974 Jul 1;1(3):257-76.
8. Andreasen NC, Grove WM. Thought, language, and communication in schizophrenia: diagnosis and prognosis. Schizophrenia bulletin. 1986 Jan 1;12(3):348-59.
9. Rochester S. Crazy talk: A study of the discourse of schizophrenic speakers. Springer Science & Business Media; 2013 Apr 17.
10. Docherty NM, Cohen AS, Nienow TM, Dinzeo TJ, Dangelmaier RE. Stability of formal thought disorder and referential communication disturbances in schizophrenia. Journal of Abnormal Psychology. 2003 Aug;112(3):469.
11. Ceccherini-Nelli A, Crow TJ. Disintegration of the components of language as the path to a revision of Bleuler's and Schneider's concepts of schizophrenia: Linguistic disturbances compared with first-rank symptoms in acute psychosis. The British Journal of Psychiatry. 2003 Mar;182(3):233-40.
12. Bhatia TK. Language and thought disorder in multilingual schizophrenia. World Englishes. 2019 Mar;38(1-2):18-29. available from: doi.org/10.1111/weng.12391.
13. Sultan A, Rizvi T. Language and Schizophrenia: A Review of Studies in India. International Journal of Indian Psychology. 2023;11(2).
14. Chen EY, Lam LC, Kan CS, Chan CK, Kwok CL, Nguyen DG, Chen RL. Language disorganisation in schizophrenia: validation and assessment with a new clinical rating instrument. East Asian Archives of Psychiatry. 1996 Sep 1;6(1):4.
15. World Health Organization. The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines. World Health Organization; 1992.
16. Morice RD, Ingram JC. Language analysis in schizophrenia: Diagnostic implications. Australian and New Zealand Journal of Psychiatry. 1982 Jan 1;16(2):11-21.
17. Fraser WI, King KM, Thomas P, Kendell RE. The diagnosis of schizophrenia by language analysis. The British Journal of Psychiatry. 1986 Mar;148(3):275-8.
18. Anand A, Wales RJ, Jackson HJ, Copolov DL. Linguistic impairment in early psychosis. The Journal of nervous and mental disease. 1994 Sep 1;182(9):488-93.
19. Tavano A, Sponda S, Fabbro F, Perlini C, Rambaldelli G, Ferro A, Cerruti S, Tansella M, Brambilla P. Specific linguistic and pragmatic deficits in Italian patients with schizophrenia. Schizophrenia Research. 2008 Jul 1;102(1-3):53-62. Available from: doi: 10.1016/j.schres.2008.02.008. Epub 2008 7th April.PMID: 18396387.
20. Chaika EO. Understanding Psychotic Speech: Beyond Freud and Chomsky. Charles C Thomas, Publisher; 1990.
21. Rutter DR. The reconstruction of schizophrenic speech. The British Journal of Psychiatry. 1979 Apr;134(4):356-9.
22. Taylor MA, Reed R, Berenbaum S. Patterns of speech disorders in schizophrenia and mania. The Journal of nervous and mental disease. 1994 Jun 1;182(6):319-26.
23. Murphy D, Cutting J. Prosodic comprehension and expression in schizophrenia. Journal of Neurology, Neurosurgery & Psychiatry. 1990 Sep 1;53(9):727-30. Available from :doi: 10.1136/jnnp.53.9.727.PMID: 2246653; PMCID: PMC1014247.
24. Chaika E. A unified explanation for the diverse structural deviations reported for adult schizophrenics with disrupted speech. Journal of Communication Disorders. 1982 Jun 1;15(3):167-89. [PubMed: 6124560]
25. Harvey PD. Speech competence in manic and schizophrenic psychoses: the association between clinically rated thought disorder and cohesion and reference performance. Journal of Abnormal Psychology. 1983 Aug;92(3):368.
26. Solovay MR, Shenton ME, Holzman PS. Comparative Studies of Disordered Discourses. Archives of General Psychiatry. 1987;44:13-20. [PubMed: 3800579]
27. Paulsen JS, Romero R, Chan A, Davis AV, Heaton RK, Jeste DV. Impairment of the semantic network in schizophrenia. Psychiatry research. 1996 Jul 31;63(2-3):109-21.
28. Sumiyoshi C, Sumiyoshi T, Nohara S, Yamashita I, Matsui M, Kurachi M, Niwa S. Disorganization of semantic memory underlies alogia in schizophrenia: an analysis of verbal fluency performance in Japanese subjects. Schizophrenia Research. 2005 Apr 1;74(1):91-100. ISSN09209964,https://doi.org/10.1016/j.schres.2004.05.011.(https://www.sciencedirect.com/science/article/pii/S0920996404001768)