Efficacy of cognitive pragmatic treatment on theory of mind functioning, quality of life and reduction of symptom severity in adults with schizophrenia

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ABSTRACT

Objective: Schizophrenia is a severely debilitating disorder characterized by heterogeneous psychopathology, it impacts an individual's subjective well-being, pragmatic communication skills, and cognitive functioning. The primary aim of this research was to evaluate the effectiveness of cognitive pragmatic treatment (CPT), an evidence-based group intervention program, on theory of mind (ToM) functioning, quality of life (QoL), and symptom severity of disorder in adults with schizophrenia.

Methods: One hundred individuals diagnosed with schizophrenia were chosen and randomly split into two groups, as control group (n=25) and experimental group (n=75). Experimental group received CPT for 3 months, while the control group got only routine psychiatric care. The individuals were assessed for symptom severity of the disorder, ToM functioning and QoL before and after the intervention. 3-months post-intervention, a follow-up evaluation was carried out. The data were analysed using both parametric as well as nonparametric statistics.

Results: The results of two-way Repeated Measure ANOVA found statistically significant differences between groups as well as tests (p<0.001) and between groups and their interaction with the tests (p<0.001). Experimental post-test as well as follow-up evaluation showed significant improvement in reducing the symptom severity of the disorder, improvement in ToM functioning and QoL compared to control group

Conclusion: The current study demonstrates that cognitive pragmatic treatment as evidence-based intervention can improve theory of mind functioning, as well as QoL of individuals with schizophrenia, by reducing the symptom severity.

Keywords: Schizophrenia, cognitive pragmatic treatment, theory of mind functioning, pragmatic communication, quality of life, positive and negative symptoms and general psychopathology

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INTRODUCTION:

Schizophrenia is a severe debilitating disorder which negatively impacts an individual's overall health, functioning, autonomy, subjective well-being, and life satisfaction. It disrupts brain function and interferes with thinking, language, memory and other cognitive processes. Individuals with this condition often present diverse patterns of positive and negative symptoms. The presence of positive symptoms indicates a dysfunction that is either excessive or abnormal (for example, hallucinations, delusions, and disorganized behaviour), whereas negative symptoms imply diminishment or absence of normal behaviours related to interest and motivation (for example, asociality, anhedonia, and avolition,) or expression of emotion (for example alogia and blunted affect). Negative symptoms which are the core symptom of schizophrenia are the primary cause of poor functional outcomes and long-term morbidity (Galderisi, 2018). Also, those with severe negative symptoms have the most severe impairments in theory of mind (ToM) functioning (Ozguven etal, 2010). Language deficits are linked to symptom severity of the disorder, particularly when it pertains to negative symptoms (de Boer et al., 2020). It was also found that quality of life (QoL) is affected by symptom severity such as anxiety, depression, and global function (Meher et al, 2022, Dong et al, 2019). A recent study found that negative symptoms lead to a greater burden of illness, which can be attributed to the lack of efficient and evidence-based treatment options (Correll et al., 2020). Negative symptoms must be evaluated and treated in order to reduce the burden they place on individuals with schizophrenia, caregivers, and healthcare systems. With respect to communication, one of the primary deficits in schizophrenia is pragmatic language impairment (Parola et al,2021). It is an impairment in complex use of language with respect to the context. Impaired pragmatic language comprehension and expression substantially impact socializing, lowering the QoL through social isolation. Communicative pragmatics is the study of how individuals utilize language and nonverbal cues like facial expressions and gestures to communicate meaningfully in certain social context (Levinson,1983). Schizophrenia is also associated with deficits in theory of mind (ToM) functioning. ToM is the skill to conceptualize and infer the motivations, emotions, and worldviews of other individuals (Achim et al, 2013), ToM skills are considered a prerequisite for developing social communication skills as it serves as one of the foundational elements for social interaction (Zhou et al., 2019., Ruhl, 2020). The poor functional outcome in individuals with schizophrenia is linked to impairments in ToM functioning (Ng et al.,2015). Deficits in ToM can be considered a plausible explanation for at least some of the social challenges of individuals with schizophrenia. As a result, ToM is a promising therapeutic target for enhancing their ability to function in everyday life. An integrated sequential rehabilitative approach, including ToM and pragmatics, can lead to greater benefits, with consequent effects on social well-being, employment, and QoL (Frank et al, 2018. Bambini et al., 2016). Schizophrenia impairs a person's capability to lead independent as well as productive lives by making daily tasks difficult and negatively influencing social, professional, and other relationships. This leads to a low QoL. Quality of life is described as "An individual's perception of the position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" by WHO. QoL evaluation is still not utilized frequently in clinical practice or in the development of health policy (Boyer et al., 2013). Individuals with schizophrenia are more immediately affected by their linguistic skills than by their general cognitive abilities in terms of their quality of life or ability to operate in everyday life (Agostoni et al., 2021; Bambini et al., 2022). According to prior research, QoL measurement has been useful in determining the functional impact of symptoms in schizophrenia (Tan et al, 2014) and is considered a valid and significant outcome criterion. And cognitive intervention can enhance QoL by reducing symptoms and improving cognitive and psychosocial functioning. (McGurk et al, 2007, Ojeda etal, 2012 and Karow et al.,2014). Earlier research on the efficacy of psychological therapies has mostly concentrated on psychotic symptoms and general psychopathology, ignoring well-being as a vital outcome factor. This study uses a group intervention program called cognitive pragmatic

treatment, that encompasses several facets of social communication skills to enhance communicative-pragmatic abilities and targeted cognitive functions. The program's novelty is the application of cognitive pragmatic theory (Bara, 2011), which focuses on human communication, cognitive and inferential processes, and states that a communication act can be expressed by words, gestures, body movements and facial emotions. In addition, the capacity to effectively match linguistic (verbal) utterances with extralinguistic and paralinguistic cues, is emphasized. Activities that increase inference and bridge gap between literal and intended meaning in day-to-day communication are focussed. Dedicated sessions target on various aspects of communication such as awareness, theory of mind, and executive functions.

Early-life social and linguistic impairment are among the fundamental characteristics of the pathological processes that predispose to schizophrenia (Bambini et al, 2016), which highlights the significance of a prompt and long-term speech and language intervention, targeting cognition and social life. Systematic reviews carried out reveal the lack of research on speech and language treatment for schizophrenia and the need for research into therapeutic interventions to build a scientific evidence base for the improvement of the individual's overall QoL (Joyel et al., 2016, Mackay et al., 2018). CPT has been demonstrated to improve individual's communicative-pragmatic language skills, proving a beneficial treatment option for those living with schizophrenia (Bosco et al., 2016; Gabbatore et al., 2017).

The purpose of this research is to find out the effectiveness of cognitive pragmatic treatment in reducing schizophrenia symptom severity, improving theory of mind functioning (cognitive substrates) and quality of life.

MATERIALS AND METHODS:

Study Participants:

This research uses a pre-test and a post-test assessment and is a prospective but non randomised study. Saveetha medical college and Hospital institutional ethics committee (SMCH-IEC) approved the research (004/08/2021/IEC/SMCH) on August 6, 2021. Written & oral informed consent was obtained from all individual participants and their caretakers included in the study, which was available in both English and the local language (Tamil). Each participant's complete clinical profile was acquired using a proforma and confidentiality was maintained. The study was carried out between August and April, 2021-22 at Saveetha medical college and Hospital and tertiary care centre (Home for schizophrenia). The sample size was estimated assuming a 30% difference among the means, 25% as standard deviation, 90% power, and 5% significance level. Adding, 20% as a drop out the estimated sample size was 25 each for 4 groups. Total of 100 individuals who met the inclusion requirements were randomly assigned to each group (25 in control and 75 in experimental group, respectively). Male and female between the ages of 18 to 65 years diagnosed with schizophrenia (in prodromal/residual phase) according to DSM V criteria, exhibiting varying degrees of autonomy, and disease onset between 1 and 30 were included. They must be native speakers of any Indian language with minimum level of education (at least high school), exhibiting basic cognitive capacity, as determined by MMSE "Mini-Mental-State-Examination" (Folstein et al.,1975) cut-off count of >24/30. Individuals with alcohol or drug abuse, signs of organic brain damage or intellectual disability, and acute psychosis were excluded.

Methodology:

A baseline assessment (T0) of symptom severity, theory of mind functioning, and quality of life was carried out for the control and experimental groups one week prior to commencement of treatment program. Experimental group participants were randomly allotted to three groups (25 in each) for a 12-week CPT program. Each group received 24 CPT sessions over 3 months period. Each session lasted around one hour approximately with optional 5-minute break. And was organized in a realistic context to practice pragmatic communication skills that could be applied to real-life communication. Each

session consisted of comprehension and production activities targeting a specific communication modality. Participants were guided through the treatment program with self-monitoring and responses from the clinician and group members. The control group received standard psychiatric care but no form of speech-language and pragmatic communication interventions or any other rehabilitative activities focusing on communication. CPT framework was adapted from prior research (Gabbatore etal, 2015). Session activities were modified for Indian participants and more pragmatic competence and ToM tasks were included. An overview of CPT group therapy sessions is described in Table 1. Prior to commencing the CPT program, a pilot sample group of 10 participants completed few trial sessions over the course of one month, and it was found that they were successful in adapting to the activities and were able to transfer them to daily conversation. Post-test assessment (T1) was carried out 1 week after the completion of a treatment. A follow-up evaluation (T2) was performed after 3 months to see whether treatment had sustained its positive effects. To avoid habituation, the tasks were alternated during the pre, post-test and follow-up phases of the evaluation.

TABLE 1: Overview of CPT Group therapy session:		
Weeks	Sessions	Activities/Tasks
1	Introduction, Awareness	This session includes introducing members, discussing session frequency, and orienting.
2	Linguistic/verbal modality	Use of prerecorded scenes (Comprehension) and simulated activities (Expression)
3	Extralinguistic modality	Prerecorded scenes and real-time simulation, based on the nonverbal mode of expression, Facial expression recognition (Ekman, 1993).
4	Paralinguistic modality	Prerecorded scenes and role-playing. Voice inflection and identification of prosody tasks,
5	Social appropriateness skill	prerecorded scenes and simulated activities concentrated on social & communicative appropriateness in varied contexts
6	Conversational ability	Prerecorded scenes, and Role play simulation on conversational rules (turn-taking, topic maintenance, etc.)
7	Telephone conversation	Audio clips and real-time simulation on phone conversation rules (voice only, no paralinguistic and gesture indicators)
8	Executive functioning	Sub-goal tasks both independently and in teams (for ex: planning household chores, doing laundry, food preparation, Housekeeping, etc.)
9	Theory of mind	Prerecorded scenes as well as role-play with emphasis on the potential to build meta-representations of self and other's mental state.
10	Narrative ability	Picture description, storytelling, or describing a circumstance with the right amount of information

11	Overall communicative ability	Prerecorded scenes and role play emphasizing pragmatic efficacy across all communication competence modes.
12	Post-training awareness	Conclusions and feedback based on session comments of each week

Following the end of data collection, a demonstration on contextual as well as social communication was given to the control group and their caregivers.

Tools used:

ToM functioning was assessed using Sally and Ann task (Baron-Cohen et al.,1985). Participants were given two paper dolls, Sally and Ann, who were acting out a scenario involving false beliefs. On the basis of the character's knowledge and beliefs, participants were requested to accurately interpret the character's behaviour. In addition, Smarties Task (Perner etal,1989) which is based on the paradigm of unexpected material, was administered. Participants were shown a box of popular candy brand and asked what they predict. After the participant guesses "smarties," the evaluator reveals that the container contains pencils. The evaluator next closes the box and asks the participants what they predict that another person would think is inside. Participants pass the challenge when they properly respond "Smarties," demonstrating an awareness of other's beliefs.

The positive and negative syndrome scale for schizophrenia, PANSS (Kay et al., 1987) was used to evaluate psychopathology based on semi-structured clinical interviews. It is a standardised tool for classifying and quantifying symptoms. It is a 30-item scale that examines the correlation between different types of psychopathologies and how they relate to one another, as well as the presence or absence of positive and negative symptoms. It consists of three different subscales (positive, negative, and general), positive and negative measuring 7 items each with a score range of 7-49, and general sub scale measuring 16 items with score range of 16-112. A total measure of illness severity (Total PANSS, score range 30-210) was calculated from the sum of the three subscales. Psychiatrists administered the test.

Tamil Indian WHOQOL-Bref scale was used. It is a structured self-report interview consisting of 26 items evaluated on a five-point Likert scale, with 4 domains evaluating environment, psychological health, physical health, social relationships, along with two items indicating overall quality of life (WHOQOL Group, 1998). Due to the fact that items 3, 4, and 26 were stated negatively, they were reversed prior to analysis such that higher scores indicate a better quality of life. Administration scoring analysis and interpretation of the data was carried out as per WHOQOL-Bref guidelines. Every assessment protocol has been coded by someone other than the person who delivered it for reducing the possibility of bias in the results.

STATISTICAL ANALYSIS:

The data is presented as the mean $\pm$ SEM (standard error of the mean), and it was analysed utilising two-way Repeated Measure analysis of variance (RM ANOVA) for a single-factor repetition, followed by a Bonferroni 't' test for post hoc multiple comparisons. Factor A, was groups (between-group comparison – Control and Experimental). Factor B, was tests (within-group comparison, i.e., repetition factor – Pre-test, Post-test and Follow-up), and group X test interaction. It was decided that statistical significance was achieved at probability of equal to or less than 0.05. To do the statistical evaluation and graph plotting, SigmaPlot 14.5 (Systat Software Inc., San Jose, USA) was used.

RESULTS:

Theory of mind Functioning:

The mean and SEM of theory of mind functioning are given in Table 2.

Mrs. Anusuya Muthu[1], Dr. Shanthi Nambi[2], Dr. Raman Krishnan[3], Dr. Rajagopalan Vijayaraghavan[4]   886

S.No	Groups and comparisons	Tests	Theory of mind functioning
	Table 2: Comparison of control and experimental groups on theory of mind functioning by two-way RM ANOVA with Bonferroni 't' test."		
1	Control	Pre-test	0.9 ± 0.1
	Control	Post-test	0.9 ± 0.1
	Control	Follow-up	0.9 ± 0.1
	Experimental	Pre-test	1.0 ± 0.1
	Experimental	Post-test	4.0 ± 0.1
	Experimental	Follow-up	4.0 ± 0.1
2	Significance between Pre-tests (Control and Experimental)		$t = 0.838$ $P = 0.403$
	Significance between Post-tests (Control and Experimental)		$t = 14.890$ $P < 0.001$
	Significance between Follow-ups (Control and Experimental)		$t = 14.890$ $P < 0.001$
3	Significance within Control (Post-test and Pre-test)		$t = 5.941E\text{-}016$ $P = 1.0$
	Significance within Control (Follow-up and Pre-test)		$t = 0$ $P = 1.0$
	Significance within Control (Follow-up and Post-test)		$t = 5.941E\text{-}016$ $P = 1.0$
4	Significance within Experimental (Post-test and Pre-test)		$t = 26.940$ $P < 0.001$
	Significance within Experimental (Pre-test and Follow-up)		$t = 26.940$ $P < 0.001$
	Significance within Experimental (Follow-up and Post-test)		$t = 0$ $P = 1.0$
n – Control = 25; Experimental = 75			

The pre-test phase of the investigation showed no statistically significant difference between the control and experimental groups (P = 0.403), while post-test and follow-up phases revealed

significant differences (P<0.001 and P<0.001, respectively). Within test comparison of the control group showed no statistical significance between post-test and pre-test, follow up and pre-test, and post-test and follow up (P = 1.0. 1.0 and 1.0 respectively). Whereas, the experimental group showed statistical significance between pre-test and post-test, pre-test and follow up (P < 0.001, < 0.001 respectively) except follow up and post-test (P = 1.0). This demonstrates that the post-test performance of the experimental group improved.

Figure 1 shows the mean performance scores achieved for theory of mind functioning at T0 (pre-test), T1 (post-test), and T2 (follow-up) comparing the experimental and control groups. It was found to be statistically significant for groups (P<0.001), tests (P<0.001), interaction (P<0.001). Experimental group showed significance on both post-test and follow-up (P<0.001, 0.001, and 0.001 respectively).
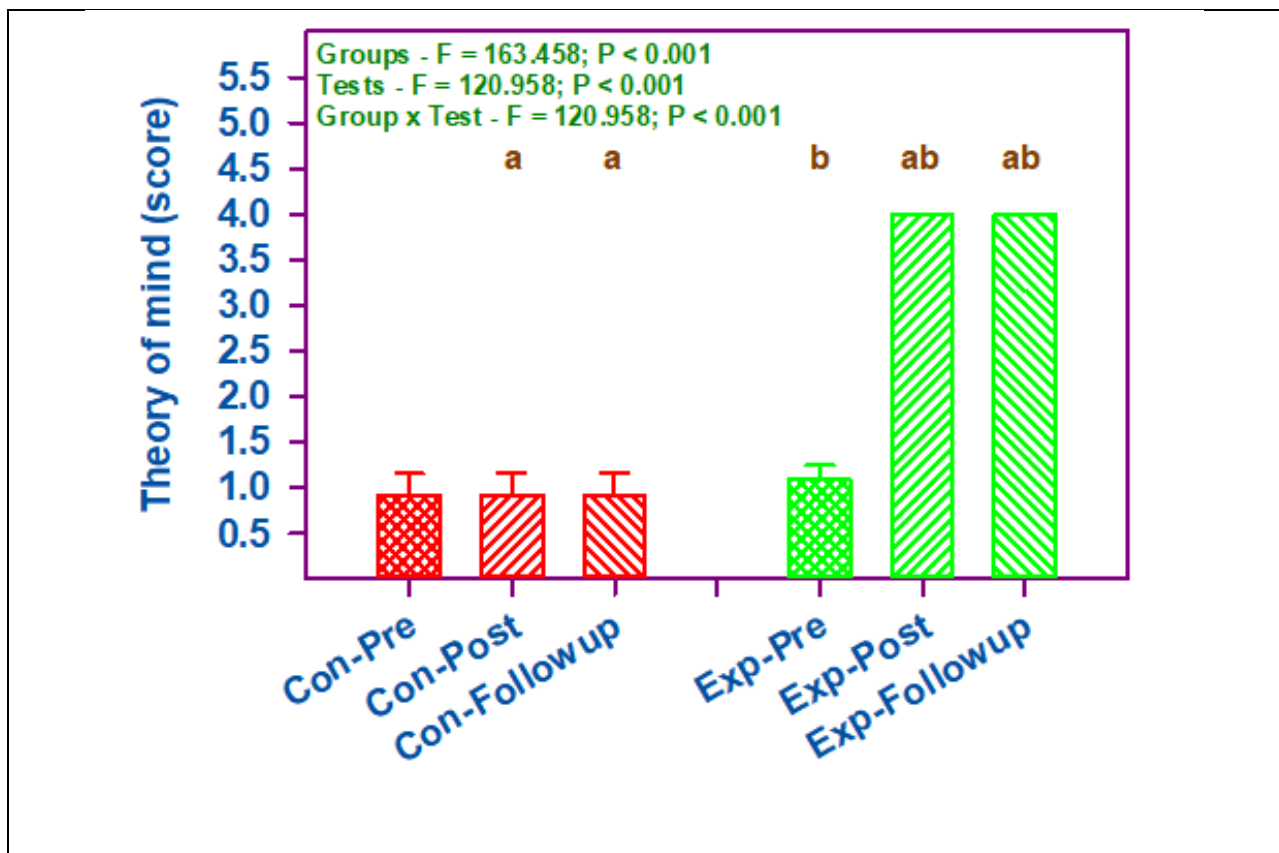
Figure 1: Comparison of control and experimental groups on theory of mind functioning

Values are mean ± SE (n – Control = 25; Experimental = 75).

Two-way RM ANOVA with Bonferroni's t-test for post hoc comparisons of means was used to determine 'F' and 'P' values across groups (experimental and control) and tests (pre-, post-, as well as follow-up).

[a] statistically different from their corresponding pre-test (within group).

[b] significant differences from each control group (between group).

Results from the post-test phase for the experimental group are shown to have improved

ToM functioning and been sustained over the follow-up phase (see Table 2 and Figure 1).

Quality of life

The mean and SEM of QoL domains: environment, social relationships psychological, and physical health, are given in Table 3.

S.No	Groups as well as thier comparisons	Tests	Physical Health	Psychological	Social Relationships	Environment
Table 3: Comparison of control and experimental groups on quality-of-life domains by two-way RM ANOVA with Bonferroni 't' test.						
1	Control	Pre-test	40.5 ± 4.6	28.8 ± 3.4	23.2 ±3.9	27.5 ± 3.9
	Control	Post-test	40.5 ± 4.6	28.8 ± 3.4	23.2 ± 3.9	27.5 ± 3.9
	Control	Follow-up	40.5 ± 4.6	28.8 ± 3.4	23.2 ± 3.9	27.5± 3.9
	Experimental	Pre-test	44.1 ± 2.6	39.6 ± 1.9	24.9 ± 2.2	41.1 ± 2.3
	Experimental	Post-test	55.6 ± 2.6	54.6 ± 1.9	54.2 ± 2.2	51.6 ± 2.3
	Experimental	Follow-up	61.2 ± 2.6	60.8 ± 1.9	56.6 ± 2.2	59.2 ± 2.3
2	Significance between Pre-tests (Control and Experimental)		t=0.677 P= 0.500	t=2.739 P=0.007	t=0.380 P=0.704	t = 2.952 P=0.004
	Significance between Post-tests (Control and Experimental)		t = 2.818 P = 0.006	t = 6.538 P < 0.001	t = 6.819 P < 0.001	t = 5.241 P< 0.001
	Significance between Follow-ups (Control and Experimental)		t=3.885 P<0.001	t=8.125 P<0.001	t=7.346 P<0.001	t=6.893 P<0.001
3	Significance within Control (Post-test and Pre-test)		t = 0 P = 1.0	t = 0 P = 1.0	t = 0 P = 1.0	t = 0 P = 1.0
	Significance within Control (Pre-test and Follow-up)		t = 0 P = 1.0	t = 0 P = 1.0	t = 0 P = 1.0	t = 0 P = 1.0
	Significance within Control (Follow-up and Post-test)		t = 0 P = 1.0	t = 0 P = 1.0	t = 0 P = 1.0	t = 0 P = 1.0
4	Significance within Experimental (Pre-test and Post-test)		t = 7.577 P < 0.001	t =14.537 P < 0.001	t =15.398 P < 0.001	t =15.233 P<0.001
	Significance within Experimental (Pre-test and Follow-up)		t=11.353 P<0.001	t=20.606 P<0.001	t=16.657 P<0.001	t = 26.224 P <0.001
	Significance within Experimental (Follow-up and Post-test)		t=3.775 P<0.001	t=6.069 P<0.001	t = 1.260 P = 0.628	t = 10.991 P<0.001
n – Control = 25; Experimental = 75.						

The between test comparison of pre-test of control and experimental groups of physical health and social relationship domains showed no significance, whereas results were significant for psychological and environment domain. In the follow-up and post-test phases, statistical significance was observed for all domains (P < 0.001 and =0.006, respectively). No statistically significant differences were seen in control group between the pre- and post-tests, or pre- and post-tests and follow-up assessments (P = 1.0, 1.0, and 1.0, respectively). Whereas, the experimental group showed statistical significance between post-test and pre-test, follow-up and pre-test, and follow-up and post-test except for social relationship domain. This showed treatment's beneficial effect was observed in the post-test as well as in follow-up phase in experimental group.

Figure 2 compares pre, post-test and follow up mean performance scores for experimental group with control group on the QoL physical health and psychological domains. Groups (P=0.011), tests (P <0.001), and the interaction (P <0.001) all showed statistical significance.

Figure 3 shows pre, post-test and follow-up mean performance scores of experimental group with control group on QoL social relationships and environment domains respectively. Group differences (P= 0.011), test differences (P<0.001), interaction effects (P<0.001) were all statistically significant.
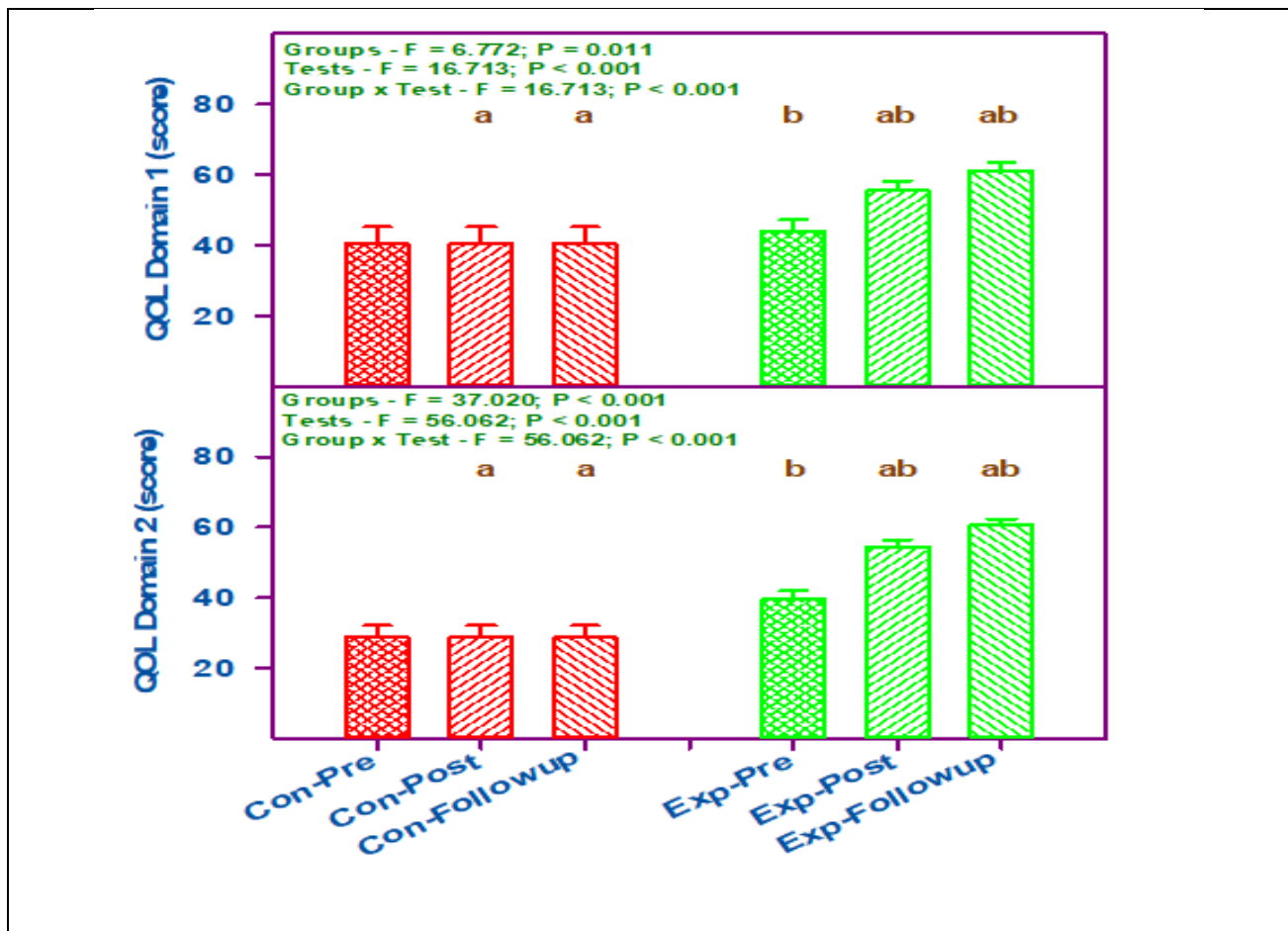

Figure 2: Comparison of control and experimental groups on quality of life- domain 1 (Physical health) and domain 2 (Psychological domain).

outcome values are mean ± SE (n – control = 25; experimental = 75).

Two-way RM ANOVA with Bonferroni's t test was utilized to calculate 'F' and 'P' values for experimental and control groups, pre-test, the post-test, the follow-up test, and the group X test interaction.

[a] Statistically different from their corresponding pre-test (within group).

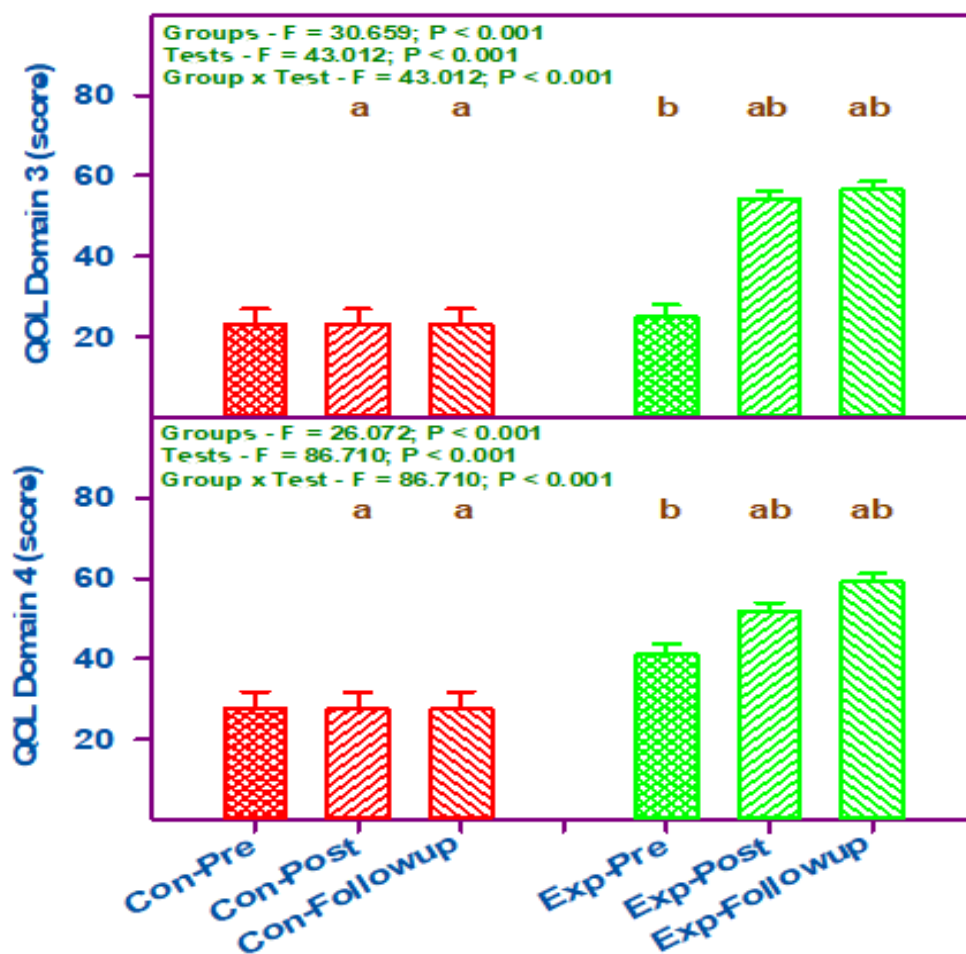[b] Significant differences from each control group (between group).

Figure 3: Comparison of control and experimental groups on QoL domain 3-Social relationships and domain 4-Environment.

Values are mean ± SE (n – Control = 25; Experimental = 75).

Two-way RM ANOVA with Bonferroni's t test was utilized to calculate 'F' and 'P' values for experimental and control groups, pre-test, the post-test, the follow-up test, and the group X test interaction.

[a] Statistically different from their corresponding pre-test (within group).

[b] Significant differences from each control group (between group).

Symptomatology of the disorder:

The mean and SEM of PANSS positive scores, negative scores, general scores and total scores outcome are given in Table 4

Table 4: Comparison of control and experimental groups on PANSS Positive, Negative, General and Total scores by two-way RM ANOVA with Bonferroni 't' test.						
S.No	Groups along with comparisons	Tests	PANS positive	PANS Negative	PANS general	TOTAL
1	Control	Pre-test	27.8 ± 1.5	20.5 ± 1.2	36.6 ± 2.0	84.1 ± 3.5
	Control	Post-test	27.8 ± 1.5	20.1 ± 1.2	36.6 ± 2.0	83.7 ± 3.5
	Control	Follow-up	27.8 ± 1.5	20.1 ± 1.2	36.6 ± 2.0	83.7 ± 3.5
	Experimental	Pre-test	$22.7 + 0.9$	19.1 ± 0.7	40.9 ± 1.2	82.4 ± 2.0
	Experimental	Post-test	21.5 ± 0.8	13.0 ± 0.7	32.0 ± 1.2	66.5 ± 2.0
	Experimental	Follow-up	21.0 ± 0.8	10.2 ± 0.7	27.7 ± 1.2	58.9 ± 2.0
2	Significance between Pre-tests (Control and Experimental)		t = 3.023 P=0.003	t=1.049 P=0.297	t=1.828 P=0.070	t=0.421 P=0.675
	Significance between Post-tests (Control and Experimental)		t = 3.722 P < 0.001	t = 5.147 P<0.001	t = 1.934 P=0.056	t = 4.239 P< 0.001
	Significance between Follow-ups (Control and Experimental)		t = 4.051 P<0.001	t=7.147 P<0.001	t=3.712 P<0.001	t=6.116 P<0.001
3	Significance within Control (Pre-test, Post-test)		t=0 P=1.0	t = 0.801 P = 1.0	t = 0 P = 1.0	t = 0.409 P = 1.0
	Significance within Control (Pre-test and Follow-up)		t = 0 P = 1.0	t = 0.801 P = 1.0	t = 0 P = 1.0	t = 0.409 P = 1.0
	Significance within Control (Follow-up and Post-test)		t=0 P = 1.0	t = 0 P = 1.0	t = 0 P = 1.0	t = 0 P =1.0
4	Significance within Experimental (Pre-test, Post-test)		t = 7.230 P<0.001	t =19.303 P<0.001	25.028 P < 0.001	25.635 <0.001
	Significance within Experimental (Pre-test and Follow-up)		t = 10.641 P<0.001	t = 28.050 P<0.001	36.851 P < 0.001	37.894 <0.001
	Significance within Experimental (Follow-up and Post-test)		t=3.412 P=0.002	t=8.747 P<0.001	11.824 P < 0.001	12.259 <0.001

n – Control = 25; Experimental = 75.

The between test comparison of pre-test of control and experimental groups showed no significance for PANSS negative, general scale and total scores, except for PANSS positive scale which showed significance. In post-test and follow-up phase, statistical significance was observed (P<0.001 and <0.001, respectively).   Control group showed no statistical significance between post-test and pre-test, follow-up and pre-test, and follow-up and post-test (P = 1.0. 1.0 and 1.0 respectively). Whereas, the experimental group showed statistical significance between post-test and pre-test, follow-up and pre-test, and post-test and follow-up (P<0.001, < 0.001 and < 0.001, respectively). This shows treatment's beneficial effect in the post-test as well as the follow-up phase in experimental group.

Figure 4 shows the mean performance scores achieved for PANSS positive and negative score at pre-test, post-test and follow-up phase comparing control with experimental groups. It was found to be statistically significant for groups (P<0.001), tests (P<0.001), interaction (P<0.001).

Figure 5 demonstrates mean performance scores achieved for PANSS general score and PANSS total score at pre-test, post-test, along with follow-up comparing control as well as experimental groups. The results showed statistical significance for groups (P<0.001) but not for the PANSS general score (P=0.299), the tests (P<0.001), or interaction (P<0.001).
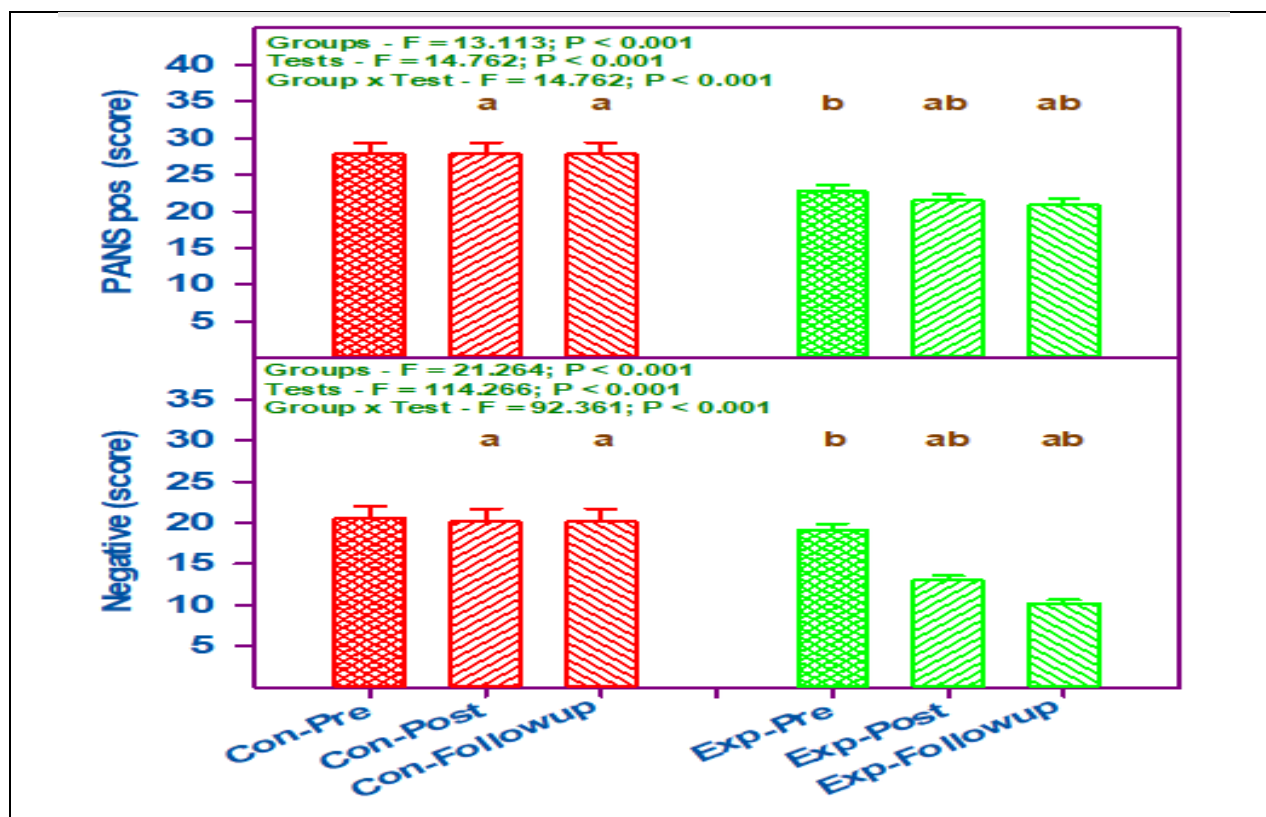

Figure 4: Comparison of control and experimental groups on PANSS positive and negative score outcome

Values are mean ± SE (n – Control = 25; Experimental = 75).

Two-way RM ANOVA with Bonferroni's t test was utilized to calculate 'F' and 'P' values for experimental and control groups, pre-test, the post-test, the follow-up test, and the group X test interaction.

[a] Statistically different from their corresponding pre-test (within group).

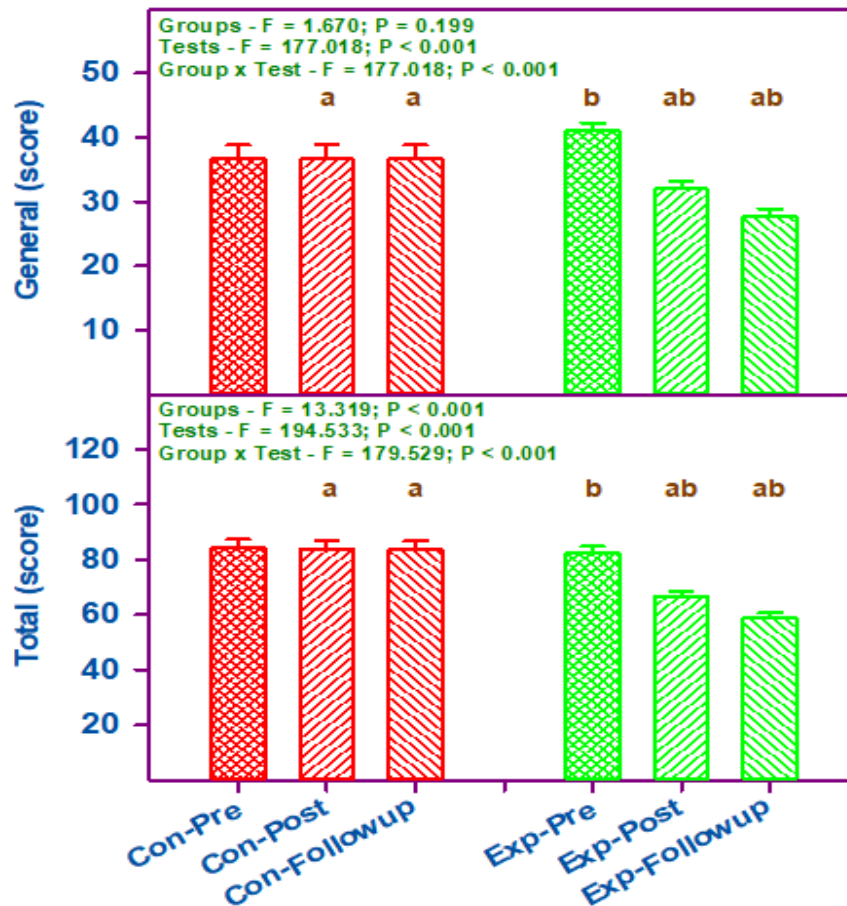[b] Significant differences from each control group (between group).

Figure 5: Comparison of control and experimental groups on PANSS general score and total score outcome

Values are mean ± SE (n – Control = 25; Experimental = 75).

Two-way RM ANOVA with Bonferroni's t test was utilized to calculate 'F' and 'P' values for experimental and control groups, pre-test, the post-test, the follow-up test, and the group X test interaction.

[a] Statistically different from their corresponding pre-test (within group).

[b] Significant differences from each control group (between group).

DISCUSSION:

Cognitive pragmatic treatment has been proven to be effective in improving the communicative-pragmatic skills of individual with pragmatic language impairments such as schizophrenia, traumatic brain injury and autism spectrum disorder (Bosco et al. 2016, Bosco et al. 2018, Muthu et al, 2023, Bosco et al. 2018b, Parola et al. 2018, Gabbatore et al. 2022). The objective of the

Mrs. Anusuya Muthu[1], Dr. Shanthi Nambi[2], Dr. Raman Krishnan[3], Dr. Rajagopalan Vijayaraghavan[4]   894

present study was to examine the effectiveness of cognitive pragmatic treatment in improving ToM functioning, reduce symptom severity and enhance the QoL of individuals with schizophrenia.

CPT and ToM

Effective social interaction requires an understanding of other's emotions, intentions, and beliefs. The results of current research show improvement in ToM functioning following CPT and remained stable until the follow-up phase of the intervention in experimental group participants, whereas no difference could be noted in the ToM functioning of the control group; this positive outcome can be attributed to the structure and content of CPT, which focuses on the interpersonal component of ToM through pragmatic comprehension and production tasks involving role-play activities. Earlier research involving role-playing activities in communication skill training was proved to be efficient method to enable individuals with schizophrenia improve their conversational abilities (Padmavathi et al 2013). Also, socio-cognitive training has proven to enhance both cognitive and functional outcomes in individuals with schizophrenia (Bechi etal, 2020,). In schizophrenia, deficits in theory of mind (ToM) abilities mediates the connection between poor cognition and reduced functioning (Thibaudeau et al., 2017). Thus, the present study paves the way to understand the intricate and reciprocal interactions of cognitive ability, ToM, and pragmatic aspects of communication.

CPT and symptom severity

Another important result was the significant reduction of symptom severity of the disorder, with general psychopathology showing the greatest reduction followed by negative symptoms, and positive symptoms showing the least improvement. Training in social skills has been proven to significantly lower the negative symptoms of schizophrenia and improve social functioning, and is considered an affordable treatment option than individual therapy for negative and general symptoms (Aziz et al, 2017 and Turner et al, 2018). Comprehensive communication skill training has also been proven to be useful method for reducing depression symptoms, improving communication skills, and building a positive self-scheme in individuals with schizophrenia (Dogu, 2021). Similar to these training, CPT, which is based on cognitive pragmatic theory, focuses on all components that facilitate efficient social communication and has induced a reduction of symptom severity of the disorder. Although pharmaceutical medication is the preferred treatment for schizophrenia, it only partially alleviates negative symptoms (Kopelowicz, et al 2006). CPT in conjunction with pharmacological treatment will be effective in reducing the symptom severity and improving general functioning.

CPT and QoL

In experimental group, participants had a positive perception of CPT intervention and were able to adapt and follow the structure and content of CPT with relative ease, as evidenced by their consistent participation in treatment sessions, which may be attributed to CPT's interactive paradigm. In the literature, there is evidence that employing interactive paradigms enhances social skills in individuals with schizophrenia (Billeke et al, 2013).

Evidence from prior research shows that an individual's impression of treatment has significant impact on QoL and interventions (Beaudoin et al, 2022), QoL of individuals with schizophrenia attending CPT improved across all four domains examined, with social relationships showing the greatest improvement followed by psychological, physical health, and environment domains. This could be primarily a result of CPT group activities that emphasize on pragmatic communication and group interaction. Improvement in social skills of individuals with schizophrenia, enhances their quality of life, especially in social relationships. According to research, individuals with schizophrenia benefit from treatment that focuses on reducing negative symptoms, use of antipsychotic medications, and improving treatment adherence (He et al.,2022).

In the current study, participants presented a reduction in negative symptoms after CPT in experimental group, reflecting an improvement in QoL. Integrating evidence-based cognitive-communication interventions into standard psychiatric care can improve the longer-term prognosis and assist in preventing illness severity of individuals with schizophrenia.

CONCLUSION:

The goal of this study was to throw fresh light on the pragmatic language deficit in schizophrenia as a therapeutic intervention target and demonstrate that it could improve theory of mind functioning, quality of life, and symptom severity. Given the unmet demand for negative symptom treatment and the potential of CPT to reduce negative symptoms and improve QoL, the study has significant clinical implications. Overall finding of the study support the efficacy and stability of CPT and establishes the basis for integrating CPT with standard psychiatric treatment for individuals with schizophrenia in prodromal and residual phases. Also recommends that in schizophrenia rehabilitation, greater focus should be made on speech language pathologist and Psychologist to respond effectively to pragmatic language impairments and ToM functioning to enhance QoL and treatment efficacy. CPT should be recommended as a standard component of treatment for individuals with schizophrenia, as well as for other neuropsychiatric disorders like attention deficit hyperactivity disorder and pragmatic language impairments like autism spectrum disorder. Future research should be carried out to determine the effectiveness of CPT in treating neurogenic language disorders like aphasia and right hemisphere damage

Limitations: Despite its advantages, this study had a few limitations. This study was confined to a 3-month follow-up period following CPT completion. The efficiency of CPT should be evaluated over a longer period following the completion of the treatment course. Advanced ToM ability was not assessed, which would have allowed for a more comprehensive profile of the individual's mind-reading abilities.

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