

## Add-on Yoga Therapy for Social Cognition in Schizophrenia: A Pilot Study

### Abstract

**Background:** Yoga as a mind–body therapy is useful in lifestyle-related disorders including neuropsychiatric disorders. In schizophrenia patients, yoga has been shown to significantly improve negative symptoms, functioning, and plasma oxytocin level. **Aim:** The aim of the study was to study the effect of add-on yoga therapy on social cognition in schizophrenia patients. **Materials and Methods:** In a single pre-post, study design, 15 schizophrenia patients stabilized on antipsychotic medication for 6 weeks were assessed for social cognition (theory of mind, facial emotion recognition, and social perception [SP]) and clinical symptoms (negative and positive symptoms and social disability) before and after twenty sessions of add-on yoga therapy. **Results:** There was a significant improvement in the social cognition composite score after 20 sessions of yoga ( $t[13] = -5.37, P \leq 0.001$ ). Clinical symptoms also reduced significantly after twenty sessions of yoga. **Conclusion:** Results are promising to integrate yoga in clinical practice, if proven in well-controlled clinical trials.

**Keywords:** Schizophrenia, social cognition, yoga

### Introduction

Schizophrenia is a severe mental disorder affecting young adults with a lifetime prevalence of 1%. It is characterized by three important symptom clusters, namely, positive, negative, and cognitive symptoms. Except for the positive symptoms, there are no effective treatments available for the negative and cognitive symptoms.<sup>[1]</sup> In addition, the existing treatments are not free of side effects; some causing extrapyramidal side effects and others causing metabolic side effects.<sup>[2]</sup>

Unavailability of effective biological treatments for negative and cognitive symptoms adds to the already existing burden of socio-occupational dysfunction associated with these symptom clusters. Psychosocial interventions are available targeting a few or most of the domains of social cognition with or without neurocognition training. However, the majority of them (for example, cognitive enhancement therapy and social cognition interaction training) are highly resource intensive and their feasibility in developing countries are questionable though they might be effective. Moreover, they were developed keeping in mind the Western

patient population and their cultural validity in other cultures. Hence, there is a need to explore the role of other complementary therapies such as yoga for an integrated approach in treating patients with schizophrenia.

Yoga as a mind–body therapy is useful in lifestyle-related disorders including neuropsychiatric disorders.<sup>[3,4]</sup> In healthy adults and elderly, yoga is found to be efficacious in improving cognitive skills.<sup>[5]</sup> Yoga has been shown to significantly improve negative symptoms and functioning in schizophrenia patients.<sup>[6,7]</sup> In a recent study, along with improvements in functioning, yoga also increased oxytocin levels in patients with schizophrenia.<sup>[8]</sup>

In this study, we hypothesized that practice of yoga for 1 month would improve social cognition in patients with schizophrenia.

### Materials and Methods

#### Setting

The study was conducted in a tertiary care neuropsychiatry hospital in South India in collaboration with a Yoga University. The study was approved by the Ethics Committee of both the institutes.

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### Study design

The study design was a single group pre-post design.

### Sample

Patients with schizophrenia (outpatient  $n = 7$  and inpatient  $n = 8$ ) stabilized on antipsychotic medications for at least 6 weeks, and cooperative for yoga practices were recruited as a part of a larger randomized controlled trial after obtaining a written informed consent. Their diagnosis was made by their treating psychiatrists and confirmed with the Mini-International Neuro-psychiatric Interview.<sup>[9]</sup> They were of either gender, coming from the age group of 18–45 years with Clinical Global Impression-Severity<sup>[10]</sup> score of 3 or more. Patients with a history of risk of harm to self or others; who had received electroconvulsive therapy or yoga therapy in the last 6 months; patients with significant neurological disorder or head injury; and patients with substance abuse in the last 1 month or dependence in the last 6 months except nicotine were excluded from the study. Out of 15 patients recruited, one subject dropped out due to general medical illness (osteoarthritis).

### Intervention

A trained yoga instructor taught all the participants a validated yoga module for 1 month. Subjects attended twenty sessions of yoga over 6 weeks. Each session lasted for 1 h. The yoga module consisted of asana, pranayama, and AUM chanting. Details of the module can be found in an earlier publication.<sup>[11]</sup>

### Assessments

The following assessments were performed at baseline and after twenty sessions of yoga.

1. Psychopathology was assessed using Scale for Assessment of Negative Symptoms (SANS)<sup>[12]</sup> and Scale for Assessment of Positive Symptoms (SAPS)<sup>[13]</sup>
2. Socio-occupational dysfunction was assessed by Groningen social disability scale (GSDS-II)<sup>[14]</sup>
3. Social Cognition was assessed using the social cognition rating tool for Indian setting,<sup>[15]</sup> a validated tool for assessing social cognition appropriate for Indian population that captures theory of mind and SP, and tool for recognition of emotions in neuropsychiatric disorders<sup>[16]</sup> that assesses facial emotion recognition. Each domain was scored as the proportion of correct responses on a scale of 0–100. The proportions of correct answers were converted into a global composite score by averaging the individual domain scores as done in earlier studies.<sup>[17]</sup>

A trained psychiatry resident performed the clinical assessments, and a trained research scholar performed the social cognition assessments. Neither of them was involved in training the subjects with yoga. The yoga instructor monitored yoga performances of all subjects.

### Statistical analysis

Data were tested for outliers and normality. Data were found to be normal, and there was no outlier. Paired  $t$ -test was applied to detect a difference in pre- and post-measures using Statistical Package for the Social Sciences version 24 (IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.).

### Results

The sociodemographic details of the subjects are shown in Table 1.

SANS, SAPS, and GSDS scores reduced significantly, and social cognition composite score (SCCS) improved significantly after 1 month of yoga practice [Table 2]. Effect size (Cohen’s  $d$ ) for SANS, SAPS, GSDS, and SCCS is 2.7, 1.5, 1.9, and 1.4, respectively.

### Discussion

At the end of 1-month add-on yoga therapy, scores on psychopathology and socio-occupational dysfunction rating scales reduced significantly and SCCS increased significantly. Previous studies have shown efficacy of yoga in reducing psychopathological symptoms, especially the negative symptoms. This is one of the first studies exploring the role of yoga in social cognition for patients with schizophrenia. Unlike previous studies,<sup>[8,16]</sup> which have primarily used tasks assessing only facial emotion recognition deficits (FERD), this study has included most of the domains of social cognition including FERD. A subgroup analysis of the social cognition subdomains

**Table 1: Sociodemographic details**

Variables	Mean (SD)
Age (years)	32.47 (6.9)
Sex ratio (male:female)*	9:6
Married: Single*	5:11
Years of education	13.4 (2.5)
Duration of illness (years)	9.33 (6.6)
CGI illness severity	4.8 (0.9)
Antipsychotic dosage (CPZ equivalent in mg)	548.33 (310.8)

\*Ratio. SD: Standard deviation, CPZ: Chlorpromazine, CGI: Clinical Global Impression

**Table 2: Pre-post measures**

Variables	Mean (SD)		$t$	df	$P$
	Baseline	1 month			
Total SANS	53.0 (13.3)	22.64 (11.0)	10.19	13	<0.001
Total SAPS	31.27 (14.1)	9.93 (4.6)	5.8	13	<0.001
GSDS	44.13 (10.7)	19.29 (9.3)	7.2	13	<0.001
SCCS	63.22 (12.3)	82.19 (11.1)	-5.37	13	<0.001

SANS: Scale for assessment of negative symptoms, SAPS: Scale for assessment of positive symptoms, GSDS: Groningen social disability scale, SCCS: Social cognition composite score, SD: Standard deviation

revealed significant changes in second-order theory of mind ( $t[13] = -2.45, P = 0.02$ ] and SP ( $t[13] = -2.35, P = 0.03$ ) but not in first-order theory of mind ( $t[13] = -1.61, P = 0.1$ ). The changes were significant in emotion recognition ( $t[13] = -5.05, P < 0.001$ ) and faux pas indices ( $t[13] = -8.0, P < 0.001$ ) (considered as higher-order theory of mind) as well. Whether the improvement in SCCS is due to improvement in all the individual domains or improvement in some other phenomena (like mirror neuron activity) which might be common to all the subdomains of social cognition, needs to be explored further. For example, a recent pilot study has shown improvement in mirror neuron activity with yoga intervention, measured by functional near infra-red spectroscopy.<sup>[18]</sup> The large effect size with yoga intervention is interesting, but it could also be due to the chance detection passing through the threshold of significance which is usually kept at 0.05 (type I error). Considering the small sample size, further studies with robust design are required for confirming the large effect size following yoga intervention. Yoga could possibly work by both bottom-up and top-down approaches-promoting relaxation through asana and pranayama and mindfulness through chanting and positive resolution, respectively. This dual effect of yoga might well fit in with the dual processing theory of Social Cognition,<sup>[19]</sup> with mindfulness (yoga mediated) promoting controlled (reflective) processing and relaxation modulating the reflexive (automatic) processing. Although the results are promising, they should be interpreted with caution as there is no control arm in this study and may need confirmation by well-controlled studies.

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### Conflicts of interest

There are no conflicts of interest.

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