

## **Appendix-1**

### **Informed Consent form**

#### **Informed Consent form for patients**

**Title: Effect of add-on Yoga therapy for social cognition in schizophrenia**

#### **Information to participants:**

As you know, you have been diagnosed to be having schizophrenia. We invite you to take part in our study titled, “Effect of add-on yoga therapy for social cognition in schizophrenia”. Researchers have shown that there may be certain changes in the brain of patients with schizophrenia leading to deficits in social cognition. The social cognition deficits include inability to think what others may think about certain events; recognize their emotions, intentions etc. Yoga has been found to be useful in patients with schizophrenia. In this study we are examining the effect of yoga on certain brain functions that are important for social interactions in patients with schizophrenia.

The duration of the study is one month. If you consent, you will have an equal chance of being allotted to either the yoga or waitlist control group. If you are allotted to the yoga group, you will be required to attend the daily (except holidays) training sessions conducted at NIMHANS for one month. Waitlist control subjects will get yoga therapy at the end of the study. Yoga is not expected to have any serious adverse effect on your physical or mental health. All subjects will have to be available for the assessments and test procedures at the beginning of the study, at one month and few weekly assessments.

You will undergo some psychological tests and laboratory tests. Activation of certain specialized neurons in the brain (mirror neurons) will be studied by a procedure called functional Near Infra-Red Spectroscopy (fNIRS) in which wires will be placed on the head to record activation of specialized regions related to social cognition in the brain, while you watch an image and short video clips of hand grasping a tea cup and you too doing the same action (after or before the video clips) for few minutes. This may cause slight discomfort, but is safe and not known to cause any adverse effects. fNIRS is an imaging technique to assess the blood flow in the brain and does not involve any radiation or X-rays. The infra-red rays are present in natural sunlight and does not cause harm to you. Established procedures and previous investigations have not reported any short or long term adverse events with infra-red spectroscopy. You will have an opportunity to see these instruments and procedures before undergoing the procedures. In case, if you develop any discomfort during any of these procedures, you always have the freedom to inform us at the earliest. We will also examine your symptoms and social cognitive abilities by interviewing in detail. This will involve answering a few questions based on some simple stories (narrated with the help of pictures or videos).

We will keep the information that you provide us with utmost confidentiality. The data collected will be coded and will be kept in secure place not accessible

to anybody else other than the research team. None of the data will be shared with anybody else except the research team and for publication purpose. The results of these examinations may not be of any benefit to you, but may help advance our understanding of the nature of schizophrenia and potential benefits of yoga in schizophrenia. Taking part in this study does not involve any risks to your health. During the period of study, you will be advised to continue the treatment as per your treating doctor. Please be informed that you have every right to refuse to take part in this study at any point in time. Your refusal to take part in the study will not adversely affect your treatment in any way.

**Undertaking by the investigator:**

Your consent to participate in the above study is sought. You have the right to refuse consent or withdraw the same during any part of the study without giving any reason. In such an event, you will still receive best possible treatment, without any prejudice. I/We undertake to maintain complete confidentiality regarding the information obtained from the subject/patient during the course of the study. If you have any doubts about the study, please feel free to clarify the same. Even during the study, you are free to contact any of the investigators for clarification if you so desire. The list of investigators and their phone numbers are given below:

Investigators	Phone
Dr Ramajayam G	26995320
Dr NK Manjunath	22639983
Dr Shivarama Varambally	26995253

**Consent:**

I/We have been informed about the procedures of the study. The possible risks too have been explained to me/us as stated in the information. I/We have understood that I/We have the right to refuse my consent or withdraw it any time during the study without adversely affecting my treatment. I/We am/are aware that by subjecting to this investigation, I/We will have to give more time for assessments by the investigating team and that these assessments do not interfere with the benefits.

I, ....., the undersigned, give my consent for my relative to be contacted to be a participant of this study.

Signature of the first degree relative  
(Name and address)


Signature of the witness  
(Name and address)

Signature of the Doctor/investigator:

Date:

## Appendix-2

### Ethics committee Approval letters



**NATIONAL INSTITUTE OF MENTAL HEALTH AND NEURO SCIENCES**  
(INSTITUTE OF NATIONAL IMPORTANCE)  
P.B. NO. 2900, HOSUR ROAD, BENGALURU - 560 029 (INDIA)

**Dr. B.N. GANGADHAR,**  
*Professor of Psychiatry,*  
Dean-Behavioural Sciences & Member-Secretary  
NIMHANS ETHICS COMMITTEE

Off : 26995004/26564222  
Fax: 91-80- 26564830/26566811  
email: [bn@nimhans.ac.in](mailto:bn@nimhans.ac.in)  
[kalyanybg@yahoo.com](mailto:kalyanybg@yahoo.com)

---

No. NIMH/DO/ETHICS SUB-COMMITTEE 24<sup>TH</sup> MEETING/2015 Date: 6.11.2015

**‘THROUGH HOD AND GUIDE’**

- Name of the investigator:** Dr. G. Ramajayam, Ph.D Scholar, S-VYASA University, Bengaluru, under the joint guidance of Dr. Shivarama Varambally, Dept. of Psychiatry, NIMHANS
- Reference number of the investigator:** Letter dated 05/08/15
- Title of the proposal submitted for ethical clearance:** **Title of the Ph.D Thesis Protocol:**  
“Effect of add-on Yoga therapy on social cognition in schizophrenia”
- Nature of the proposal submitted for ethical clearance:** Ph.D Thesis Protocol
- Date of Ethics Committee meeting held:** 11<sup>th</sup> August, 2015
- NIMHANS IEC No. of the proposal:** Item.No.I., Sl.No.1.02, Behavioural Sciences  
(Please quote this number in all the future correspondence related to this study)
- Members of the Ethics Sub-Committee who reviewed the proposal:** Dr. B.N. Gangadhar, Dean (Behavioural Sciences) and Chairman, Ethics Sub-Committee (Behavioural Sciences), Dr. V. Ravi, Dean (Basic Sciences) and Member, Ethics Sub-Committee (Behavioural Sciences) and Dr. Satish Chandra Girimaji, Professor of Child and Adolescent Psychiatry and Member, Ethics Sub-Committee (Behavioural Sciences)
- Clear statement of the decision reached:**  
**Comments:**  
At the Ethics Sub-Committee (Behavioural Sciences) Meeting held on 11<sup>th</sup> August, 2015 Committee reviewed the Thesis/Dissertation Protocol, study related documents from the ethical aspects. After consideration, Committee decided to approve the thesis/dissertation protocol in-principle.  
  
A letter to this effect was sent to you seeking certain clarifications/documents vide letter dated 14.9.2015. In response to this, you have submitted required clarifications/documents vide letter dated  
Contd...

29<sup>th</sup> September, 2015. Hence, the Thesis/Dissertation Protocol and study related documents are approved with respect to ethical aspects.

*Decision: The Ph.D Thesis Protocol and study related documents are approved with respect to ethical aspects.*



DR. B.N. GANGADHAR,  
DEAN(BEHAVIOURAL SCIENCES) AND  
MEMBER – SECRETARY NIMHANS ETHICS COMMITTEE



स्वामी विवेकानन्द योग-अनुसन्धान-संस्थानम्  
**Swami Vivekananda Yoga Anusandhāna Samsthānam**

(Declared as Deemed-to-be University under Section 3 of the UGC Act, 1956)

Eknath Bhavan, # 19, Gavipuram Circle, Kempegowda Nagar, Bangalore - 560 019

Ph: 080 - 2661 2669, Telefax: 080 - 2660 8645

E-mail: svyasa@svyasa.edu.in Website: www.svyasa.edu.in

RES/IEC-SVYASA/53/2015

June 05, 2015

To,  
Dr. Manjunath N K,  
Joint Director, R & D  
S-VYASA University,  
Bangalore.

**Reference:**

"Effect of add-on yoga therapy on social cognition in schizophrenia". -  
Committee Approval of the above mentioned study.

Dear **Dr. Manjunath N K,**

We have received from you the following study related documents vide  
your letter dated March 18, 2015

1	Project Proposal
2	Informed consent form

Ethics committee meeting was held on April 25, 2015 at 1:00 PM to 6:00  
PM at Eknath Bhavan, Bangalore. Above documents were examined and  
discussed in the meeting. After due consideration, the committee has  
decided to approve conducting the aforementioned study.





स्वामी विवेकानन्द योग-अनुसन्धान-संस्थानम्  
**Swami Vivekananda Yoga Anusandhāna Samsthānam**

(Declared as Deemed-to-be University under Section 3 of the UGC Act, 1956)

Ekmath Bhavan, # 19, Gavipuram Circle, Kompegowda Nagar, Bangalore - 560 019

Ph: 080 - 2661 2669, Telefax: 080 - 2660 8645

E-mail: [svyasa@svyasa.edu.in](mailto:svyasa@svyasa.edu.in) Website: [www.svyasa.edu.in](http://www.svyasa.edu.in)

This is to confirm that neither Dr. Manjunath N K, nor any staff participating in this study were involved in the voting procedures and decision making.

The Institutional Review Board / Independent Ethics Committee (IEC) are expected to be informed about the progress of the study / any changes in the protocol and patient information / informed consent. The investigators are also expected to submit a copy of the final report to IEC for records.

This approval is valid up to the completion of the study at the site.

Please submit to the IEC, the status report of the study as per the SOPs.

The IEC is organized & operates according to the requirements of ICH-GCP, Indian Council of Medical Research Guidelines & Schedule Y.

Best Wishes,

*Subramanya p.*

Dr. Subramanya p,  
Member Secretary,  
Institutional Ethics Committee,  
S-VYASA, Bangalore.

## Appendix-3 Scales

### The Groningen Social Disabilities Schedule-II SCORING SHEET

**General Rating Scale:**

- 0= No disability
- 1= Some disability
- 2= Moderate disability
- 3= Severe disability
- 8= Insufficient information
- 9= Not applicable

Subject's Name:

P. No:

Informant: Name:

Date:

Relationship:

ROLE	DIMENSION	DIMENSIONAL RATING	OVERALL ROLE RATING
<b>I. SELF CARE</b>	A. Personal Care		
	B. Self Presentation		
<b>II. FAMILY</b>	A. Atmosphere / Preservation		
	B. Economic independence		
	C. One person household		
<b>III. KINSHIP</b>	A. Affective relationship (with parents)		
	B. Actual contacts (with parents)		
	C. A & B with siblings		
<b>IV. PARTNER</b>	A. Affective relationship		
	B. Sexual relationship		
	C. Active interests (single)		
<b>V. PARENTAL</b>	A. Affective relationship		
	B. Active involvement		

<b>VI. CITIZEN</b>	A. General interests		
	B. Participation in groups		
	C. Interests of fellow citizens		
<b>VII. SOCIAL</b>	A. Quality of contacts		
	B. Frequency / extent of contacts		
<b>VIII. OCCUPATIONAL</b>	A. Daily routine		
	B. Work performance		
	C. Contacts with others		
	D. Other daily activities		
<b>SUM SCORE</b>			

Name of Rater:

# SANS

0=None	1=Questionable	2=Mild	3=Moderate	4=Marked	5=Severe
--------	----------------	--------	------------	----------	----------

1-12 dupl

## 0. CARD NUMBER

[ \_ ] 13-14

## 1. AFFECTIVE FLATTENING OR BLUNTING

- |          |                                                                                                                                                                                               |       |    |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----|
| <b>1</b> | <b>Unchanged Facial Expression</b><br>The patient's face appears wooden —changes less than expected as emotional content of discourse changes.                                                | [ _ ] | 15 |
| <b>2</b> | <b>Decreased Spontaneous Movements</b><br>The patient shows few or no spontaneous movements, does not shift position, move extremities, etc.                                                  | [ _ ] | 16 |
| <b>3</b> | <b>Paucity of Expressive Gestures</b><br>The patient does not use hand gestures, body position, etc, as an aid in expressing his ideas.                                                       | [ _ ] | 17 |
| <b>4</b> | <b>Poor Eye Contact</b><br>The patient avoids eye contact or “stares through” interviewer even when speaking.                                                                                 | [ _ ] | 18 |
| <b>5</b> | <b>Affective Nonresponsiveness</b><br>The patient fails to laugh or smile when prompted.                                                                                                      | [ _ ] | 19 |
| <b>6</b> | <b>Inappropriate Affect</b><br>The patient's affect is inappropriate or incongruous, not simply flat or blunted.                                                                              | [ _ ] | 20 |
| <b>7</b> | <b>Lack of Vocal Inflections</b><br>The patient fails to show normal vocal emphasis patterns, is often monotonic.                                                                             | [ _ ] | 21 |
| <b>8</b> | <b>Global Rating of Affective Flattening</b><br>This rating should focus on overall severity of symptoms, especially unresponsiveness, eye contact, facial expression, and vocal inflections. | [ _ ] | 22 |

## 2. ALOGIA

- |           |                                                                                                                                                                              |       |    |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----|
| <b>9</b>  | <b>Poverty of Speech</b><br>The patient's replies to questions are restricted in amount, tend to be brief, concrete, unelaborated.                                           | [ _ ] | 23 |
| <b>10</b> | <b>Poverty of Content of Speech</b><br>The patient's replies are adequate in amount but tend to be vague, overconcrete or overgeneralized, and convey little in information. | [ _ ] | 24 |
| <b>11</b> | <b>Blocking</b><br>The patient indicated, either spontaneously or with prompting, that his train of thoughts was interrupted.                                                | [ _ ] | 25 |
| <b>12</b> | <b>Increased Latency of Response</b><br>The patient takes a long time to reply to questions; prompting indicates the patient is aware of the question.                       | [ _ ] | 26 |
| <b>13</b> | <b>Global Rating of Alogia</b><br>The core features of alogia are poverty of speech and poverty of content.                                                                  | [ _ ] | 27 |

0=None

1=Questionable

2=Mild

3=Moderate

4=Marked

5=Severe

### 3. AVOLITION – APATHY

- 14 **Grooming and Hygiene** [ \_ ] 28  
The patient's clothes may be sloppy or soiled, and he may have greasy hair, body odor, etc.
- 15 **Impersistence at Work or School** [ \_ ] 29  
The patient has difficulty seeking or maintaining employment, completing school work, keeping house, etc. If an inpatient, cannot persist at ward activities, such as OT, playing cards, etc.
- 16 **Physical Anergia** [ \_ ] 30  
The patient tends to be physically inert. He may sit for hours and not initiate spontaneous activity.
- 17 **Global Rating of Avolition – Apathy** [ \_ ] 31  
Strong weight may be given to one or prominent symptoms if particularly striking.

### 4. ANHEDONIA – ASOCIALITY

- 18 **Recreational Interests and Activities** [ \_ ] 32  
The patient may have few or no interests. Both the quality and the quantity of interests should be taken into account.
- 19 **Sexual Activity** [ \_ ] 33  
The patient may show decrease in sexual interest and activity, or enjoyment when active.
- 20 **Ability to Feel Intimacy and Closeness** [ \_ ] 34  
The patient may display an inability to form close or intimate relationships, especially with opposite sex and family.
- 21 **Relationships with Friends and Peers** [ \_ ] 35  
The patient may have few or no friends and may prefer to spend all his time isolated.
- 22 **Global Rating of Anhedonia – Asociality** [ \_ ] 36  
This rating should reflect overall severity, taking into account the patient's age, family status, etc.

### 5. ATTENTION

- 23 **Social Inattentiveness** [ \_ ] 37  
The patient appears uninvolved or unengaged. He may seem "spacey".
- 24 **Inattentiveness During Mental Status Testing** [ \_ ] 38  
Test of "serial 7s" (at least five subtractions) and spelling "world" backwards. Score 2 = 1 error, score 3 = 2 errors, score 4 = 3 errors.
- 25 **Global Rating of Attention** [ \_ ] 39  
This rating should assess the patient's overall concentration, clinically and on tests.

# SAPS

0=None 1=Questionable 2=Mild 3=Moderate 4=Marked 5=Severe

I-12 dupl

## 0. CARD NUMBER

[ \_ \_ ] 13-14

## 1. HALLUCINATIONS

- 1 Auditory Hallucinations** [ \_ ] 15  
The patient reports voices, noises, or other sounds that no one else hears.
- 2 Voices commenting** [ \_ ] 16  
The patient reports a voice which makes a running commentary on his behavior or thoughts.
- 3 Voices Conversing** [ \_ ] 17  
The patient reports hearing two or more voices conversing.
- 4 Somatic or Tactile Hallucinations** [ \_ ] 18  
The patient reports experiencing peculiar physical sensations in the body.
- 5 Olfactory Hallucinations** [ \_ ] 19  
The patient reports experiencing unusual smells which no one else notices.
- 6 Visual Hallucinations** [ \_ ] 20  
The patient sees shapes or people that are not actually present.
- 7 Global Rating of Hallucinations** [ \_ ] 21  
This rating should be based on the duration and severity of the hallucinations and their effects on the patient's life.

## 2. DELUSIONS

- 8 Persecutory Delusions** [ \_ ] 22  
The patient believes he is being conspired against or persecuted in some way.
- 9 Delusions of Jealousy** [ \_ ] 23  
The patient believes his spouse is having an affair with someone.
- 10 Delusions of Guilt or Sin** [ \_ ] 24  
The patient believes that he has committed some terrible sin or done something unforgivable.
- 11 Grandiose Delusions** [ \_ ] 25  
The patient believes he has special powers or abilities.

0=None 1=Questionable 2=Mild 3=Moderate 4=Marked 5=Severe

- |                                                                                                                      |       |    |
|----------------------------------------------------------------------------------------------------------------------|-------|----|
| <b>12 Religious Delusions</b>                                                                                        | [ _ ] | 26 |
| The patient is preoccupied with false beliefs of a religious nature.                                                 |       |    |
| <b>13 Somatic Delusions</b>                                                                                          | [ _ ] | 27 |
| The patient believes that somehow his body is diseased, abnormal, or changed.                                        |       |    |
| <b>14 Delusions of Reference</b>                                                                                     | [ _ ] | 28 |
| The patient believes that insignificant remarks or events refer to him or have special meaning.                      |       |    |
| <b>15 Delusions of Being Controlled</b>                                                                              | [ _ ] | 29 |
| The patient feels that his feelings or actions are controlled by some outside force.                                 |       |    |
| <b>16 Delusions of Mind Reading</b>                                                                                  | [ _ ] | 30 |
| The patient feels that people can read his mind or know his thoughts.                                                |       |    |
| <b>17 Thought Broadcasting</b>                                                                                       | [ _ ] | 31 |
| The patient believes that his thoughts are broadcast so that he himself or others can hear them.                     |       |    |
| <b>18 Thought Insertion</b>                                                                                          | [ _ ] | 32 |
| The patient believes that thoughts that are not his own have been inserted into his mind.                            |       |    |
| <b>19 Thought Withdrawal</b>                                                                                         | [ _ ] | 33 |
| The patient believes that thoughts have been taken away from his mind.                                               |       |    |
| <b>20 Global Rating of Delusions</b>                                                                                 | [ _ ] | 34 |
| This rating should be based on the duration and persistence of the delusions and their effect on the patient's life. |       |    |

### 3. BIZARRE BEHAVIOR

- |                                                                                                                    |       |    |
|--------------------------------------------------------------------------------------------------------------------|-------|----|
| <b>21 Clothing and Appearance</b>                                                                                  | [ _ ] | 35 |
| The patient dresses in an unusual manner or does other strange things to alter his appearance.                     |       |    |
| <b>22 Social and Sexual Behavior</b>                                                                               | [ _ ] | 36 |
| The patient may do things considered inappropriate according to usual social norms (e.g., masturbating in public). |       |    |
| <b>23 Aggressive and Agitated Behavior</b>                                                                         | [ _ ] | 37 |
| The patient may behave in an aggressive, agitated manner, often unpredictably.                                     |       |    |

0=None 1=Questionable 2=Mild 3=Moderate 4=Marked 5=Severe

**24 Repetitive or Stereotyped Behavior** [ \_ ] 38  
 The patient develops a set of repetitive actions or rituals that he must perform over and over.

**25 Global Rating of Bizarre Behavior** [ \_ ] 39  
 This rating should reflect the type of behavior and the extent to which it deviates from social norms.

#### 4. POSITIVE FORMAL THOUGHT DISORDER

**26 Derailment** [ \_ ] 40  
 A pattern of speech in which ideas slip off track onto ideas obliquely related or unrelated.

**27 Tangentiality** [ \_ ] 41  
 The patient replies to a question in an oblique or irrelevant manner.

**28 Incoherence** [ \_ ] 42  
 A pattern of speech that is essentially incomprehensible at times.

**29 Illogicality** [ \_ ] 43  
 A pattern of speech in which conclusions are reached that do not follow logically.

**30 Circumstantiality** [ \_ ] 44  
 A pattern of speech that is very indirect and delayed in reaching its goal idea.

**31 Pressure of Speech** [ \_ ] 45  
 The patient's speech is rapid and difficult to interrupt; the amount of speech produced is greater than that considered normal.

**32 Distractible Speech** [ \_ ] 46  
 The patient is distracted by nearby stimuli which interrupt his flow of speech.

**33 Changing** [ \_ ] 47  
 A pattern of speech in which sounds rather than meaningful relationships govern word choice.

**34 Global Rating of Positive Formal Thought Disorder** [ \_ ] 48  
 This rating should reflect the frequency of abnormality and the extent to which this affects the patient's ability to communicate.

Appendix-4 Raw Data

ID	Admn	Int	Age	Sex	Edu	Emp	ID	Marital	SES	DOI	DUP
1	1.00	2	20	1	14	2.00	1	1	2	2.00	0.80
2	2.00	1	29	1	12	1.00	2	1	1	13.00	1.00
3	1.00	2	26	1	9	1.00	3	1	1	7.00	0.10
4	2.00	1	35	1	17	1.00	4	2	2	14.00	3.00
5	1.00	1	38	0	12	2.00	5	2	2	1.00	1.00
6	1.00	1	30	0	15	2.00	6	2	2	5.00	2.50
7	2.00	1	24	1	16	1.00	7	1	2	2.00	1.00
8	2.00	2	35	1	5	2.00	8	2	1	15.00	1.00
9	2.00	1	43	1	15	1.00	9	1	2	23.00	7.00
10	2.00	2	33	1	12	2.00	10	2	1	9.00	0.50
11	1.00	2	33	1	18	1.00	11	1	2	3.00	3.00
12	2.00	2	25	0	15	1.00	12	1	1	5.00	1.00
13	2.00	2	38	1	18	1.00	13	1	2	16.00	5.00
14	2.00	1	28	0	10	1.00	14	1	2	15.00	4.50
15	1.00	1	22	1	16	2.00	15	1	2	1.00	0.50
16	1.00	1	34	0	16	1.00	16	2	2	12.00	1.00
17	1.00	2	33	0	8	2.00	17	2	2	0.50	0.40
18	2.00	1	26	1	15	1.00	18	1	3	1.00	1.00
19	1.00	1	46	0	10	2.00	19	2	2	12.00	9.40
20	1.00	2	30	1	6	1.00	20	1	1	7.00	3.00
21	1.00	1	30	1	14	1.00	21	1	2	14.00	3.00
22	1.00	2	29	1	16	1.00	22	1	2	8.00	1.00
23	1.00	2	31	0	9	2.00	23	2	1	11.00	1.00
24	1.00	2	35	0	10	2.00	24	2	1	8.00	4.00
25	1.00	2	34	0	10	2.00	25	2	2	12.00	0.20
26	1.00	2	27	1	17	1.00	26	1	2	8.00	0.50
27	1.00	1	41	1	10	2.00	27	1	2	15.00	2.00
28	1.00	1	31	1	12	2.00	28	1	2	6.00	6.00
29	1.00	1	30	1	11	1.00	29	1	2	6.00	0.50
30	1.00	1	35	1	7	1.00	30	2	2	13.00	1.00
31	1.00	1	25	0	15	1.00	31	1	3	7.00	4.00
32	2.00	1	27	0	14	1.00	32	1	2	10.00	1.00
33	1.00	2	39	0	12	2.00	33	2	2	4.00	1.00
34	1.00	2	26	1	12	1.00	34	1	1	3.00	0.50
35	1.00	2	43	1	15	2.00	35	1	2	1.00	0.16
36	1.00	2	41	1	15	2.00	36	2	2	13.00	1.50
37	1.00	1	45	1	15	2.00	37	1	2	5.00	0.50
38	1.00	2	26	1	12	1.00	38	1	2	5.00	0.08
39	1.00	1	35	1	10	1.00	39	1	2	10.00	*
40	1.00	2	25	1	12	1.00	40	1	1	5.00	2.50

ID	Drug_dose	CGI_S	CGI_I	CT_Pre	CT_Post	DSST_pre	DSST_post	VFT_pre	VFT_post
1	400	5	3	172	*	145	*	14	*
2	650	4	2	185	146	379	316	10	12
3	600	5	2	203	235	400	398	14	8
4	600	5	2	171	174	315	260	13	15
5	300	6	2	117	99	185	179	12	17
6	350	5	3	116	105	240	196	14	15
7	400	5	3	189	111	362	380	13	12
8	400	6	3	210	*	403	*	7	*
9	300	4	2	245	256	310	322	10	13
10	550	6	2	259	303	327	303	10	11
11	300	5	3	160	170	293	321	10	10
12	500	6	2	250	236	273	280	10	15
13	800	6	3	168	163	206	184	15	12
14	800	3	2	275	281	337	345	9	11
15	300	6	2	170	161	293	188	19	21
16	400	5	2	124	116	253	245	8	11
17	300	5	2	362	165	279	278	13	12
18	275	5	2	222	182	340	245	11	12
19	400	6	3	256	*	384	*	9	*
20	400	6	2	275	277	526	529	10	9
21	1200	6	2	290	100	263	285	15	12
22	400	4	3	175	210	285	300	12	13
23	400	6	3	360	366	702	710	6	5
24	500	5	2	180	190	296	300	9	10
25	200	5	2	109	172	338	253	11	14
26	400	5	3	358	405	277	594	5	6
27	1200	4	2	281	270	400	390	8	10
28	350	4	2	169	151	294	310	8	6
29	700	4	2	169	165	241	235	8	12
30	550	4	2	359	357	280	278	5	7
31	1500	4	2	140	136	215	210	12	16
32	550	6	2	143	139	210	206	11	14
33	800	5	2	228	*	221	*	9	*
34	400	4	2	380	383	533	580	8	10
35	400	6	3	230	226	446	449	6	7
36	600	4	5	310	313	327	313	7	9
37	400	4	2	247	240	234	228	11	14
38	800	4	3	203	210	243	240	9	11
39	500	4	2	180	176	360	353	7	11
40	400	4	3	250	181	218	238	10	13

ID	TOT_SAPS_1	TOT_SANS	TOT_GSDS	FOT_Pre	SOT_Pre	FPCI_Pre	FPCI_alt_Pre	ER_Pre
1	37	52	38	0.50	0.00	0.667	0.667	77.50
2	24	70	44	1.00	0.00	0.381	0.364	50.00
3	46	41	33	1.00	0.50	0.429	0.333	61.25
4	45	62	56	1.00	1.00	0.619	0.591	65.00
5	53	49	51	0.50	0.50	0.588	0.556	68.75
6	38	43	45	0.50	0.50	0.938	0.833	78.75
7	30	50	48	1.00	0.00	0.500	0.500	70.00
8	21	48	56	1.00	0.50	0.286	0.273	70.00
9	19	26	33	0.75	0.00	0.900	0.818	40.00
10	53	42	42	1.00	0.00	0.333	0.333	30.00
11	25	42	34	1.00	0.50	0.706	0.667	77.50
12	22	37	41	1.00	0.50	0.421	0.364	26.25
13	43	51	47	1.00	0.00	0.500	0.500	76.25
14	17	37	29	0.75	0.75	0.769	0.556	58.75
15	43	53	42	0.50	0.50	0.556	0.556	75.00
16	46	61	56	1.00	1.00	0.444	0.364	57.50
17	11	18	23	0.50	0.50	0.182	0.182	35.00
18	47	60	50	1.00	0.00	0.238	0.227	58.75
19	18	68	55	1.00	0.75	0.300	0.273	40.00
20	56	66	49	0.75	0.75	0.300	0.273	53.75
21	42	68	51	0.50	0.50	0.182	0.182	45.00
22	8	36	37	1.00	1.00	1.000	0.889	62.50
23	41	75	65	1.00	0.25	0.000	0.000	48.75
24	32	44	54	0.50	0.50	0.400	0.333	81.25
25	30	31	47	1.00	1.00	0.409	0.409	70.00
26	18	56	38	1.00	0.50	0.444	0.444	61.25
27	17	41	22	1.00	0.25	0.111	0.111	28.75
28	10	41	30	1.00	0.50	0.556	0.556	72.50
29	20	66	50	1.00	0.00	0.250	0.222	38.75
30	24	58	63	0.50	0.00	0.389	0.318	57.50
31	10	37	33	1.00	0.50	0.500	0.500	75.00
32	45	64	52	1.00	0.00	0.556	0.556	77.50
33	17	33	43	1.00	1.00	0.474	0.409	75.00
34	20	34	37	1.00	0.00	0.222	0.222	68.75
35	28	38	24	1.00	0.00	0.227	0.227	58.75
36	22	63	52	1.00	0.00	0.591	0.591	66.25
37	32	50	36	1.00	0.00	0.500	0.500	78.75
38	20	75	52	1.00	0.00	0.538	0.389	68.75
39	31	50	34	1.00	0.50	0.476	0.455	78.75
40	20	49	47	1.00	0.50	0.688	0.611	66.25

ID	SPI_C_pre	SPI_C_low	SPI_C_high	SPI_A_pre	SPI_A_low	SPI_A_high	SPI_Pre	EB_Pre	PB_Pre
1	0.78	0.78	0.78	0.78	0.72	0.83	1.0000	0	0.00
2	0.64	0.67	0.61	0.53	0.56	0.50	0.8281	-3	0.00
3	0.69	0.56	0.83	0.56	0.39	0.72	0.8116	2	0.00
4	0.86	0.83	0.89	0.83	0.72	0.94	0.9651	0	0.71
5	0.89	0.83	0.94	0.83	0.83	0.83	0.9326	2	0.00
6	0.81	0.72	0.89	0.86	0.88	0.83	1.0617	0	0.60
7	0.89	0.89	0.89	0.75	0.72	0.78	0.8427	2	0.33
8	0.83	0.83	0.83	0.61	0.50	0.72	0.7345	4	0.80
9	0.92	0.94	0.89	0.67	0.61	0.72	0.7283	-5	0.00
10	0.28	0.06	0.50	0.39	0.22	0.56	1.3925	5	0.88
11	0.92	0.94	0.89	0.83	0.83	0.83	0.9022	-2	0.88
12	0.67	0.78	0.56	0.61	0.50	0.72	0.9104	4	0.06
13	0.53	0.39	0.67	0.56	0.39	0.72	1.0566	-3	0.00
14	0.72	0.72	0.72	0.61	0.61	0.61	0.8472	7	0.75
15	0.92	1.00	0.83	0.83	0.83	0.83	0.9022	3	0.14
16	0.78	0.83	0.72	0.67	0.56	0.78	0.8590	1	1.00
17	0.69	0.78	0.61	0.58	0.61	0.56	0.8406	0	0.40
18	0.53	0.50	0.56	0.42	0.33	0.50	0.7925	6	1.00
19	0.56	0.50	0.61	0.53	0.56	0.50	0.9464	1	0.30
20	0.50	0.50	0.50	0.47	0.50	0.44	0.9400	-2	0.00
21	0.86	0.89	0.83	0.67	0.61	0.72	0.7791	0	0.60
22	0.78	0.72	0.83	0.69	0.50	0.89	0.8846	2	0.75
23	0.81	0.83	0.78	0.61	0.61	0.61	0.7531	1	1.00
24	0.83	0.89	0.78	0.69	0.61	0.78	0.8313	1	0.57
25	0.42	0.39	0.44	0.47	0.56	0.39	1.1190	5	1.00
26	0.47	0.50	0.44	0.47	0.39	0.56	1.0000	4	1.00
27	0.42	0.39	0.44	0.28	0.28	0.28	0.6667	4	1.00
28	0.89	0.94	0.83	0.86	0.78	0.94	0.9663	1	0.40
29	0.75	0.78	0.72	0.56	0.50	0.61	0.7464	4	0.86
30	0.75	0.83	0.67	0.61	0.72	0.50	0.8133	1	0.90
31	0.92	0.89	0.94	0.53	0.44	0.61	0.5761	3	0.70
32	0.89	0.89	0.89	0.92	0.89	0.94	1.0337	0	1.00
33	0.64	0.61	0.67	0.72	0.72	0.72	1.1250	0	0.00
34	0.94	1.00	0.89	0.83	0.72	0.94	0.8830	8	0.25
35	0.47	0.56	0.39	0.42	0.50	0.33	0.8936	-3	0.50
36	0.47	0.44	0.50	0.47	0.50	0.44	1.0000	-3	0.50
37	0.47	0.44	0.50	0.50	0.50	0.50	1.0630	2	0.50
38	0.42	0.50	0.33	0.42	0.28	0.56	1.0000	-2	0.50
39	1.00	1.00	1.00	0.83	0.94	0.72	0.8300	8	0.40
40	0.83	0.89	0.78	0.78	0.72	0.83	0.9398	1	0.00

ID	SCCS_pre	TOT_SAPS	TOT_SANS	TOT_GSDS	FOT_Post	SOT_Post	FPCI_Post	FPCI_alt_p	ER_Post
1	58.84	39	52	41	*	*	*	*	*
2	54.18	10	33	26	1.00	1.00	1.125	1.000	86.25
3	67.06	46	41	26	0.50	1.00	0.429	0.409	81.25
4	84.68	9	8	14	0.50	0.50	1.059	1.000	88.75
5	64.16	8	14	15	1.00	1.00	0.909	0.909	73.75
6	75.74	2	16	9	1.00	0.50	0.955	0.955	87.50
7	60.85	5	21	13	1.00	0.50	1.000	1.000	72.50
8	64.41	*	*	*	*	*	*	*	*
9	55.57	3	6	5	1.00	1.00	0.944	0.944	83.75
10	60.51	21	36	39	0.75	0.00	0.100	0.091	71.25
11	77.66	14	45	36	1.00	0.50	1.000	0.955	78.75
12	61.88	10	24	29	1.00	0.50	0.667	0.667	75.00
13	66.38	36	47	39	0.50	0.50	0.400	0.364	81.25
14	74.07	11	26	24	0.75	0.00	0.857	0.818	68.75
15	64.16	14	21	22	1.00	1.00	1.000	1.000	85.00
16	77.56	13	30	25	1.00	1.00	1.000	1.000	87.50
17	47.45	2	35	19	0.50	0.25	0.615	0.444	61.25
18	52.36	11	24	24	1.00	1.00	0.941	0.889	88.75
19	67.93	*	*	*	*	*	*	*	*
20	65.55	34	57	40	1.00	0.25	0.429	0.333	47.50
21	48.22	18	31	18	1.00	0.50	1.000	1.000	55.00
22	90.19	9	38	33	1.00	1.00	0.364	0.364	56.25
23	49.81	35	78	65	1.00	0.00	0.000	0.000	48.75
24	60.88	20	41	47	1.00	0.50	0.273	0.273	71.23
25	84.56	6	22	30	1.00	0.00	0.235	0.222	63.75
26	71.13	24	44	39	0.75	0.25	0.190	0.182	62.50
27	46.30	17	18	8	1.00	1.00	0.955	0.955	87.50
28	74.95	8	20	27	1.00	1.00	1.048	1.000	91.25
29	47.68	10	49	40	1.00	0.50	0.750	0.682	87.50
30	45.55	13	28	37	1.00	0.50	0.471	0.444	92.50
31	66.52	2	12	15	1.00	1.00	1.000	1.000	85.00
32	67.29	6	35	23	0.50	1.00	1.000	1.000	78.75
33	86.98	*	*	*	*	*	*	*	71.25
34	55.85	20	32	37	1.00	0.50	0.318	0.318	72.50
35	54.16	20	35	24	0.50	0.75	0.222	0.222	57.50
36	65.07	22	62	51	0.50	0.00	0.667	0.667	70.00
37	67.01	5	18	19	1.00	0.50	0.955	0.955	82.50
38	64.51	15	75	45	0.25	0.50	0.100	0.091	70.00
39	71.87	5	20	28	1.00	0.50	0.944	0.944	85.00
40	75.81	20	48	27	1.00	1.00	0.429	0.409	66.25

ID	SPI_C_pos	SPI_C_low	SPI_C_hig	SPI_A_pos	SPI_A_low	SPI_A_hig	SPI_Pos	EB_Post	PB_Post	SCCS_Post
1	*	*	*	*	*	*	*	*	*	*
2	0.69	0.72	0.67	0.67	0.61	0.72	0.9710	-1	0.00	99.17
3	0.69	0.72	0.67	0.56	0.56	0.56	0.8116	5	0.00	71.06
4	0.83	0.89	0.78	0.83	0.83	0.83	1.0000	-5	1.00	78.93
5	0.92	0.94	0.89	0.92	0.94	0.89	1.0000	-1	0.00	92.93
6	0.97	1.00	0.94	0.86	0.89	0.83	0.8866	0	1.00	84.33
7	0.92	0.89	0.94	0.89	0.83	0.94	0.9674	3	0.40	83.85
8	*	*	*	*	*	*	*	*	*	*
9	0.83	0.83	0.83	0.78	0.89	0.67	0.9398	1	0.17	94.43
10	0.17	0.17	0.17	0.31	0.22	0.39	1.8235	1	1.00	67.72
11	0.92	0.89	0.94	0.69	0.61	0.78	0.7500	0	1.00	80.75
12	0.89	0.83	0.94	0.78	0.67	0.89	0.8764	1	0.71	75.87
13	0.58	0.61	0.56	0.72	0.72	0.72	1.2414	0	1.00	69.08
14	0.94	0.93	0.94	0.75	0.67	0.83	0.7975	3	0.40	61.84
15	0.92	0.94	0.89	0.78	0.83	0.72	0.8472	3	0.30	93.94
16	0.56	0.44	0.67	0.75	0.72	0.78	1.3393	4	0.67	104.29
17	0.28	0.22	0.33	0.42	0.39	0.44	1.5000	-5	0.00	69.55
18	0.92	0.89	0.94	0.86	0.83	0.89	0.9348	-1	0.20	95.27
19	*	*	*	*	*	*	*	*	*	*
20	0.25	0.22	0.28	0.44	0.50	0.39	1.7600	6	0.75	78.28
21	0.92	0.94	0.89	0.89	0.83	0.94	0.9674	-2	1.00	80.35
22	0.92	0.94	0.89	0.72	0.61	0.83	0.7826	1	1.00	74.18
23	0.64	0.67	0.61	0.47	0.67	0.28	0.7344	4	1.00	44.44
24	0.86	0.89	0.83	0.75	0.78	0.72	0.8721	6	0.90	67.15
25	0.67	0.56	0.78	0.67	0.67	0.67	1.0000	2	1.00	57.45
26	0.50	0.50	0.50	0.53	0.61	0.44	1.0600	6	0.90	57.50
27	0.97	0.94	1.00	0.86	0.83	0.89	0.8866	6	0.80	94.33
28	0.97	0.94	1.00	0.92	0.94	0.89	0.9485	-1	0.50	98.18
29	0.81	0.89	0.72	0.67	0.56	0.78	0.8272	4	0.70	79.04
30	0.97	0.94	1.00	0.92	0.89	0.94	0.9485	1	0.33	76.89
31	0.86	0.89	0.83	0.94	0.89	1.00	1.0930	1	0.50	98.86
32	0.86	0.83	0.89	0.83	0.78	0.89	0.9651	2	1.00	85.05
33	*	*	*	*	*	*	*	*	*	*
34	0.89	0.89	0.89	0.69	0.61	0.78	0.7753	1	0.00	66.37
35	0.75	0.89	0.61	0.83	0.83	0.83	1.1067	0	0.38	63.07
36	0.72	0.72	0.72	0.64	0.61	0.67	0.8890	0	0.00	55.12
37	0.92	0.89	0.94	0.81	0.67	0.94	0.8804	6	0.30	83.21
38	0.58	0.44	0.72	0.50	0.56	0.44	0.8621	1	0.50	48.24
39	0.81	0.78	0.83	0.86	0.89	0.83	1.0617	5	0.13	87.11
40	0.86	0.89	0.83	0.72	0.50	0.94	0.8372	2	0.00	78.57

## Appendix-5

### **Publications from this thesis**

**Govindaraj, R.,** Varambally, S., & Gangadhar, B. N. (2015). Yoga for schizophrenia: Patients' perspective. *International journal of yoga*, 8(2), 139.

**Govindaraj, R.,** Varambally, S., Sharma, M., & Gangadhar, B. N. (2016). Designing and validation of a yoga-based intervention for schizophrenia. *International Review of Psychiatry*, 28(3), 323-326.

**Govindaraj, R.,** Karmani, S., Varambally, S., & Gangadhar, B. N. (2016). Yoga and physical exercise—a review and comparison. *International Review of Psychiatry*, 28(3), 242-253.

**Govindaraj, R.,** Naik, Shalini., Manjunath, NK., Mehta, UM., Gangadhar, BN., Varambally, S. Add-on Yoga therapy for Social Cognition in Schizophrenia-a Pilot Study (In press)