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Adjunctive Yoga training for persons with schizophrenia: who benefits?

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Abstract

Objective: The aim of this study was to identify factors associated with acceptability and efficacy of yoga training (YT) for improving cognitive dysfunction in individuals with schizophrenia (SZ).

Methods: We analysed data from two published clinical trials of YT for cognitive dysfunction among Indians with SZ: 1) a 21-day randomized controlled trial (RCT, N=286), 3 and 6 months follow-up; 2) a 21-day open trial (n=62). Multivariate analyses were conducted to examine the association of baseline characteristics (age, sex, socio-economic status, educational status, duration and severity of illness) with improvement in cognition (i.e., attention and face memory) following YT. Factors associated with acceptability were identified by comparing baseline demographic variables between screened and enrolled participants as well as completers versus non-completers.

Results: Enrolled participants were younger than screened persons who declined participation (t=2.952, p=0.003). No other characteristics were associated with study enrollment or completion. Regarding efficacy, schooling duration was nominally associated with greater and sustained cognitive improvement on a measure of facial memory. No other baseline characteristics were associated with efficacy of YT in the open trial, the RCT, or the combined samples (n=148).

Conclusions: YT is acceptable even among younger individuals with SZ. It also enhances specific cognitive functions, regardless of individual differences in selected psychosocial characteristics. Thus, yoga could be incorporated as adjunctive therapy for patients with SZ. Importantly, our results suggest cognitive dysfunction is remediable in persons with SZ across the age spectrum.

Keywords

Schizophrenia; Cognition; Yoga; Attention; Face Memory

Introduction

Schizophrenia (SZ) is a potentially disabling psychiatric illness presenting with a range of cognitive dysfunctions (i.e., attention, executive function, learning and memory) (Green, 1996, Elvevag and Goldberg, 2000, Green *et al.*, 2000, Gur *et al.*, 2001b, Bora and Pantelis, 2015). Cognitive impairment in SZ is associated with structural and functional brain abnormalities (Schobel *et al.*, 2009, Tan *et al.*, 2009, Gothe *et al.*, 2019) and profoundly affects long-term functional outcomes (i.e., response to rehabilitation, employability, daily functioning) (Green, 1996, Velligan *et al.*, 2000, Bhatia *et al.*, 2008, Bowie *et al.*, 2010).

The treatment for SZ is varied and provides incomplete benefits. Pharmacotherapy primarily targets positive symptoms in SZ but fails to improve all clinical features (Millan *et al.*, 2014, Remington *et al.*, 2016). Moreover, pharmacotherapy results in only modest benefits for core cognitive deficits in SZ (Thaker and Carpenter, 2001, Keefe *et al.*, 2006, Keefe *et al.*, 2007,

Hasan *et al.*, 2014, Tripathi *et al.*, 2018). In view of the limited benefits of pharmacotherapy, non-pharmacological cognitive enhancement techniques (CE) have been increasingly used to address cognitive dysfunction in SZ. Meta analytic evidence suggests moderate effects of CEs on cognitive performance (mean ES= 0.45, p=0.05, 95% CI: 0.30–0.59) (Hogarty *et al.*, 2004, McGurk *et al.*, 2005, Wykes and Huddy, 2009, Wykes *et al.*, 2011).

Yoga is an alternative cost-effective cognitive enhancement technique that can be learned easily and implemented for a prolonged period even after completion of supervised training (Deshpande *et al.* 2016). Yoga practice aims to improve physical and mental health, and it offers a lifestyle modification approach. It has beneficial effects on clinical symptom severity (i.e., psychotic symptoms, anxiety, stress) (Duraiswamy *et al.*, 2007, Behere *et al.*, 2011, Tsui, 2012), cognitive functions (Bhatia *et al.*, 2012, Bhatia *et al.*, 2017, Broderick and Vancampfort, 2017), and functional outcomes (Bhatia *et al.*, 2008, Tsui, 2012)(Aranya, 1983, Cramer *et al.*, 2013). Some investigators have also reported yoga improved negative symptoms and emotion recognition deficits in patients with SZ (Jayaram *et al.*, 2013).

A growing body of research supports the cognitive benefits of yoga in patients with SZ. During an RCT in India, compared with usual care, the yoga training (YT) group showed significant (10%) improvement in mean facial emotion recognition deficits and symptoms, with improvements sustained for four months (Behere *et al.*, 2011). Another study showed six sessions of YT are sufficient to observe improvements in working memory in those with SZ (Brunner *et al.*, 2017). Others have shown yoga-related improvements in executive control (Subramaniam and Bhatt, 2017) and processing speed (Verma and Wollina, 2008, Purohit and Pradhan, 2017). A meta-analysis to study effects of YT on cognition in SZ reported both short-(after 21 days yoga) and long-term(two months after YT) benefits of yoga practice on attention, processing speed, and executive functioning (Cramer *et al.*, 2013). Our prior yoga studies have evidenced substantial improvement in cognitive functioning across several domains among outpatients with SZ, following manualized 21-day YT (Bhatia *et al.*, 2012, Bhatia *et al.*, 2014, Bhatia *et al.*, 2017). In an open trial of YT in SZ, using a computerised cognitive battery, our group demonstrated small to medium effect-size improvements in several cognitive domains (attention, spatial memory, face memory, working memory) (Bhatia *et al.*, 2012). Our group also conducted a single-blind RCT (n=286) to study the cognitive benefits of three weeks of YT relative to light-intensity physical exercise in adults with SZ. We found YT-related improvements in attention, spatial memory, face memory, particularly with regard to speed parameters (i.e., reaction time for tasks across multiple cognitive domains) (Bhatia *et al.*, 2014, Bhatia *et al.*, 2017). In a Cochrane review, Broderick *et al.* reported evidence in favor of yoga over standard care in improving cognition among patients with SZ; however, they noted significant heterogeneity among the three studies that were analyzed (Broderick and Vancampfort, 2017). A review of brain studies suggested that yoga can reduce age-related and neurodegenerative declines (Gothe *et al.*, 2019).

Individual variation in factors like symptom severity could affect response to yoga; it could also reflect individual differences in acceptability of and benefit from yoga interventions among patients with SZ. To adapt YT for clinical and community settings, it is critical to identify demographic and clinical characteristics linked with YT acceptability and efficacy.

To this end, we examined the extent to which demographic (age, gender, education, occupation of head of the household) and clinical characteristics (symptom severity, duration of illness) were linked to the acceptability and efficacy of YT in individuals with SZ using data from our published trials: 1) an RCT (N=104) of YT versus light-intensity aerobic exercise (Bhatia *et al.*, 2017) and 2) an open-trial (n= 62) of adjunctive YT versus treatment as usual (n=62) (Bhatia *et al.*, 2012). We predicted that acceptance of YT would be higher among older persons, and its efficacy would be inversely related to severity of cognitive dysfunction.

Methods

Site

The RCT study was conducted between 2010 to 2015 in the Department of Psychiatry, Post Graduate Institute of Medical Education and Research, Dr. Ram Manohar Lohia Hospital (RMLH), Delhi, India (now the Atal Bihari Vajpayee Institute of Medical Sciences - ABVIMS). All clinicians in the Department of Psychiatry at the Atal Bihari Vajpayee Institute of Medical Sciences, Dr. Ram Manohar Lohia Hospital (ABVIMS-Dr. RML Hospital) were requested to refer patients to participate in our Yoga RCT after oral informed consent (Bhatia *et al.*, 2014, Bhatia *et al.*, 2017). Written informed consent was taken after screening and consent. RCT was single blind, block randomized intervention study. The comparator was physical exercise and treatment as usual. The assessment was carried out at baseline, after 21 days intervention, 3 months after intervention/no intervention It was registered at ClinicalTrials.gov and the number is NCT01879709. The detailed methods (Bhatia *et al.*, 2014) and results of the RCT have been published (Bhatia *et al.*, 2014, Bhatia *et al.*, 2017).

The open trial was also conducted at the same site between 2006 and 2009 (Bhatia *et al.*, 2012). The two trials used similar inclusion and exclusion criteria for SZ participants. It was a nonblind trial. The comparator was the schizophrenia sample who did not agree to yoga but assessed after one month of baseline. The participants were outpatients, older than 18 years and residents of Delhi. Persons with alcohol/illicit substance dependence or those with neurological disorders were excluded from each of the two trials.

Measures

Diagnosis: We administered the Hindi version of the Diagnostic Interview for Genetic Studies (DIGS) in both the trials (Nurnberger *et al.*, 1994, Deshpande *et al.*, 1998). DIGS and medical record information was integrated and discussed with board-certified psychiatrists and psychologists to establish consensus diagnoses. Data regarding demographic variables (gender, age, socioeconomic status (in terms of occupation of head of the household and school years) were collected as part of the DIGS in both the RCT and the open study (Bhatia *et al.*, 2012, Bhatia *et al.*, 2014).

Cognitive Function—Cognitive function was assessed using the University of Pennsylvania Computerized Neurocognitive Battery (Penn CNB) (Gur *et al.*, 2001a, Gur *et al.*, 2001c), a validated assessment tool that quantitatively estimates accuracy and speed of

performance in cognitive domains known to be impaired in schizophrenia. The Penn CNB incorporates computer-based assessment to enhance reliability of measurement and minimize observer bias. All cognitive evaluations were repeated at 21 days (end of training), and at 3- and 6-months post-training.

Intervention

The manualized group yoga training intervention was provided by a qualified instructor to the YT group in one-hour sessions every day for twenty-one consecutive days, with the exception of Sundays and public holidays, as previously detailed (Bhatia et al., 2014). The YT constitute amalgamation of ‘asanas’ (postures) and ‘pranayam’ (breathing exercises). Each session started with ‘Om’ chanting (prayer with deep breathing), then warm-up exercises and breathing exercises were commenced. The pranayama was performed to regulate movements and synchronise exercise with breathing. The asanas composed of different poses, including standing (Tadasan,Kati chakrasan, Trikonasan); supine lying postures (Savasana, Naukasan, Uttanpadasan, Pawanmuktasan – poorna and ardha); prone position postures (Bhujangasan,,Makarasan,,Dhanurasan Shalabhasan); sitting postures (Pashimottanasan, Vajrasana,Ushtrasan, Ardha Matsyendrasan, Gomukhasan). Patients exercised a light practice known as Kriya or Jalneti (a sanitizing practice of the sinus passages with warm salty water, which is considered to provide physical and psychological gains) on Saturdays. Clinical treatment (i.e., pharmacotherapy)—especially the type of antipsychotic medication--generally remained unchanged for all study participants for the duration of the intervention and follow-up periods, though medication doses were only occasionally changed for a few (Bhatia *et al.*, 2017).

Data Analysis

Chi-square and independent samples t-tests were used to test for group differences in sociodemographic factors between those individuals who enrolled in the RCT and those who were screened but did not enrol in the study. Multivariate analysis of covariance (MANCOVA) was used to examine associations of baseline sociodemographic (i.e., age, sex, marital status, occupation, head of household occupation) and clinical factors (i.e., global assessment of functioning, age at onset) with change in cognitive performance on tests (Cohen’s d). The cognitive domains selected were those in which the YT group in the RCT showed improvement over the course of the 21-day intervention, 3-month, and 6-month follow-up period i.e. attention and face memory (Bhatia *et al.*, 2017). We next conducted MANCOVA analyses to assess predictors of cognitive improvement in the above-mentioned tasks within our earlier open-trial (N=62) and further, using a combined sample of individuals with SZ from both trials (N=148). We focused our data analyses on the attention and face memory tests for the following reasons: 1) The YT group showed improvement in performance for face memory from baseline to post-intervention (β=1.90, p=0.016) and this improvement was sustained at the 3-month (β=1.97, p=0.006) and 6-month (β=1.58, p=0.008) follow-up visits in our published RCT (Bhatia *et al.*, 2017) and 2) The YT group showed significant improvement in attention from baseline to post-intervention in our open-trial (Cohen’s D=0.0892, p=0.0201), after two months (Cohen’s D=0.619, p= 0.0116) (Bhatia *et al.*, 2012) and 3) they showed *greater* improvement in attention relative to the PE control group in our RCT (β=0.51, p=0.036) (Bhatia *et al.*, 2017).

SPSS version 21 was used for analysis (IBM Corp, Released 2012.). Figure 1 illustrates the design of the old and present studies.

Results:

Participants

For the RCT, a total of 957 patients were referred by clinicians and screened; out of these 339 individuals fulfilled inclusion criteria and were invited to participate in the study. Of these, 53 individuals did not sign informed consent and were therefore excluded from study. The remaining 286 patients completed all baseline assessments and constituted our Intent to Treat (ITT) sample including Yoga Training (YT): N= 104, Physical Exercise (PE): N=90, and Treatment as Usual (TAU): N=92.

In the open trial, a total of 694 participants were referred; this included schizophrenia, bipolar disorder, major depressive disorder and cardiac disorder. Out of these, 375 were excluded as they did not meet inclusion criteria or did not consent. The 319 participants included SZ (n=90), bipolar disorder (n=75), major depressive disorder (n=78) and cardiac disorder (n=76). There were 90 participants with schizophrenia enrolled in YT but 28 dropped out and 62 completed the yoga intervention. The flowchart is illustrating the sample flow of both the studies (Figure 2). The reasons for dropout was economic difficulty in commuting, non-availability of relatives to accompany the patients, staying far away, aggravation of symptoms among others. Some patients who were working could not get time off from their office.

Demographic characteristics of those who enrolled vs. those who did not enrol in the RCT

To study acceptability of YT, we compared the demographic characteristics of patients who consented to participate in our RCT (N=286) with those who were referred and screened but declined to be enrolled in the RCT (N=53). There were no significant differences between the two groups on gender and education, but those who enrolled in the study were significantly younger than others (t=−2.952, p=0.003) (See Table 1).

Baseline characteristics of YT completers and non-completers in RCT

Among those randomized to the YT group (N=104), 86 participants completed the intervention. Of the18 participants who did not complete the intervention, 12 dropped out after baseline assessment and randomization; the remaining 6 patients participated in yoga training for 2–14 days before dropping out of the trial. To study acceptability of YT further, we compared participants who completed the entire YT program and those who dropped out. Demographic, clinical, and cognitive characteristics did not differ between those who completed the 21-day yoga intervention (N=86) and those who failed to complete the intervention and post-intervention assessment (N=18).

Clinical and demographic predictors of change in cognitive performance in YT group in RCT

To study factors related to efficacy of YT, sociodemographic variables (age, gender, education, occupation of head of the household) and clinical factors (i.e., status as reflected

on the Global Assessment of Functioning (GAF) scale and age at onset) that were associated with cognition were selected. Education and occupation of head of household were considered indices of socioeconomic status, which was not specifically measured in these studies. Severity of illness (here measured by the GAF) and duration of illness (age at onset) were chosen because these have been shown to be associated with cognition in other studies of schizophrenia (Immonen et al., 2017, Harvey and Bowie, 2020). We tested these potential sociodemographic and clinical predictors of yoga-related cognitive improvement from 1) baseline to post-intervention (i.e., 21-days) 2) baseline to 3-month follow-up, and 3) baseline to 6-month follow-up using MANCOVA models (See Table 2 and Supplementary Table 1). Global assessment of functioning (GAF) at baseline was positively associated with an increase in speed of response for the Penn CNB face memory task from baseline to post-intervention (MANCOVA F *(1,45)* = 6.728, *p=0.01*). Education (number of years of schooling) was positively associated with improvement in face memory accuracy from pre- to post-intervention (MANCOVA *F (1,45)*=7.68*, p=0.008*) (Table 2) and from baseline to the 6-month follow-up (MANCOVA F *(1,41)*=5.54, *p*=0.02) (Supplementary Table 1). Education was also associated with improvement in speed on the face memory domain from baseline to 3-month follow-up (MANCOVA *F (1,41)* = 9.32, p=0.004). No other clinical or demographic factors tested were significantly associated with YT-related change in cognition. We also used Pearson correlations to examine the association between baseline sociodemographic and clinical features and the effect size of change (i.e., Cohen's d) for cognitive domains in which yoga-related improvement was observed. There was a small negative association between years of education and improvement in performance for face memory accuracy domains (r=−0.211, *p*=0.04) and no significant correlation with face memory speed.

None of the associations remained significant following corrections for multiple comparisons.

Clinical and demographic predictors of change in cognitive performance in YT group in Open Trial

We examined whether the same psychosocial variables analysed in the RCT were related to YT-related improvement from baseline to post-intervention in performance for attention and face memory in our open trial (N=62) (Bhatia *et al.*, 2012). Using MANCOVA, there was no significant association between any of the sociodemographic and clinical variables and improvement in performance for attention (Table 3). In a sensitivity analysis, we examined clinical and demographic of YT-related improvement from baseline to post-intervention in performance for attention and face memory using data from the combined sample (N=148) of individuals with SZ completing YT from our open trial (N=62) (Bhatia *et al.*, 2012) and our RCT (N=86). No significant association was found between any of the sociodemographic and clinical variables with improvement in cognitive performance.

Discussion

We examined whether demographic and clinical characteristics are associated with the *acceptability* and *efficacy* of YT for ameorilating cognitive dysfunction among individuals

with SZ, using data from two treatment trials of YT in SZ (Bhatia *et al.*, 2012, Bhatia *et al.*, 2017). We found that individuals who enrolled in our RCT study were younger, relative to those who were screened but did not consent to be enrolled in the study; this result contradicts our first hypothesis. Selected clinical and demographic characteristics were not associated with intervention attrition in our RCT. The results from our RCT, which were validated by results from our earlier open-trial, suggested that, contrary to our hypothesis, selected baseline clinical and demographic characteristics were not predictive of YT-related cognitive improvement (i.e., attention and facial memory). These results are in contrast to a systematic review where the authors concluded that yoga practitioners were more likely to be from a high socioeconomic background, middle aged, and white; however, the review encompassed predominantly studies in the USA and Europe, regardless of mental health status (Park *et al.,* 2015).

There are a plethora of mental health interventions available for persons with SZ, including lifestyle interventions (e.g. aerobic exercise, resistance training, YT) (Keller-Varady *et al.,* 2018, Maurus *et al.,* 2019), so it is important to understand for whom among those with SZ YT is most beneficial (Velten *et al.,* 2018). Ours is the first study to our knowledge that focused on identifying characteristics of individuals with SZ for whom yoga may be most acceptable and beneficial. A key benefit of this study was the ability to validate results from our RCT with data from our earlier open trial, and the ability to combine data from both trials to examine psychosocial predictors of YT-related cognitive improvement. Further, the availability of long-term follow-up data from 3- and 6-month follow-up visits from our RCT was a novel aspect of this study. Our results suggest that regardless of individual differences in clinical and demographic characteristics, yoga is an acceptable adjunctive clinical intervention among individuals with SZ. Further, our results suggest that persons with SZ are likely to be adherent to short-term YT interventions (i.e., 83% of participants completed 21-day intervention in RCT). Our findings further suggest that cognitive reserve (i.e., assessed by school years and functional status) may be nominally associated with cognitive benefit from YT, but these results need to be further validated. Still, it is notable that age *per se* was not associated with response to YT, suggesting that in persons with SZ, cognitive plasticity is retained even among older individuals.

Some limitations of our study should be noted. The study was restricted to Indians; thus, the results may not be generalizable to other ethnic groups. The analyses were retrospective in nature; thus, we are planning a prospective study. We utilized as outcome variables only those cognitive variables noted to improve with YT in prior studies; further, indices for community and social function were not analysed. Such studies are important as they address an important handicap for persons with SZ.

Conclusions

This study confirms the widespread acceptability of YT, even among younger Indian individuals with SZ. YT enhances specific cognitive functions, regardless of individual differences in selected demographic and clinical characteristics. Thus, yoga can serve as an adjunctive therapy for patients with schizophrenia in clinical practice. On a broader scale,

our results suggest cognitive dysfunction is remediable in persons with SZ across the age spectrum

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Significant Outcomes:

1. Yoga is acceptable to individuals with schizophrenia, even among younger individuals.
2. Yoga training is efficacious among individuals with schizophrenia.
3. Following corrections for multiple comparisons, individual differences in psychosocial characteristics, including age, gender, educational level and clinical severity are not associated with improvement cognitive functions.

Limitations:

1. The use of a short-term, intensive yoga intervention (21-days) does not enable generalization about longer term benefits.
2. Both trials were conducted in New Delhi, India, where yoga is a culturally acceptable practice. Clinical and demographic predictors of YT engagement and efficacy may differ in communities in which YT is less culturally normative.
3. Our ability to identify demographic and clinical predictors of YT engagement and efficacy was limited by the demographic and clinical data available from the trials on which this study was based.

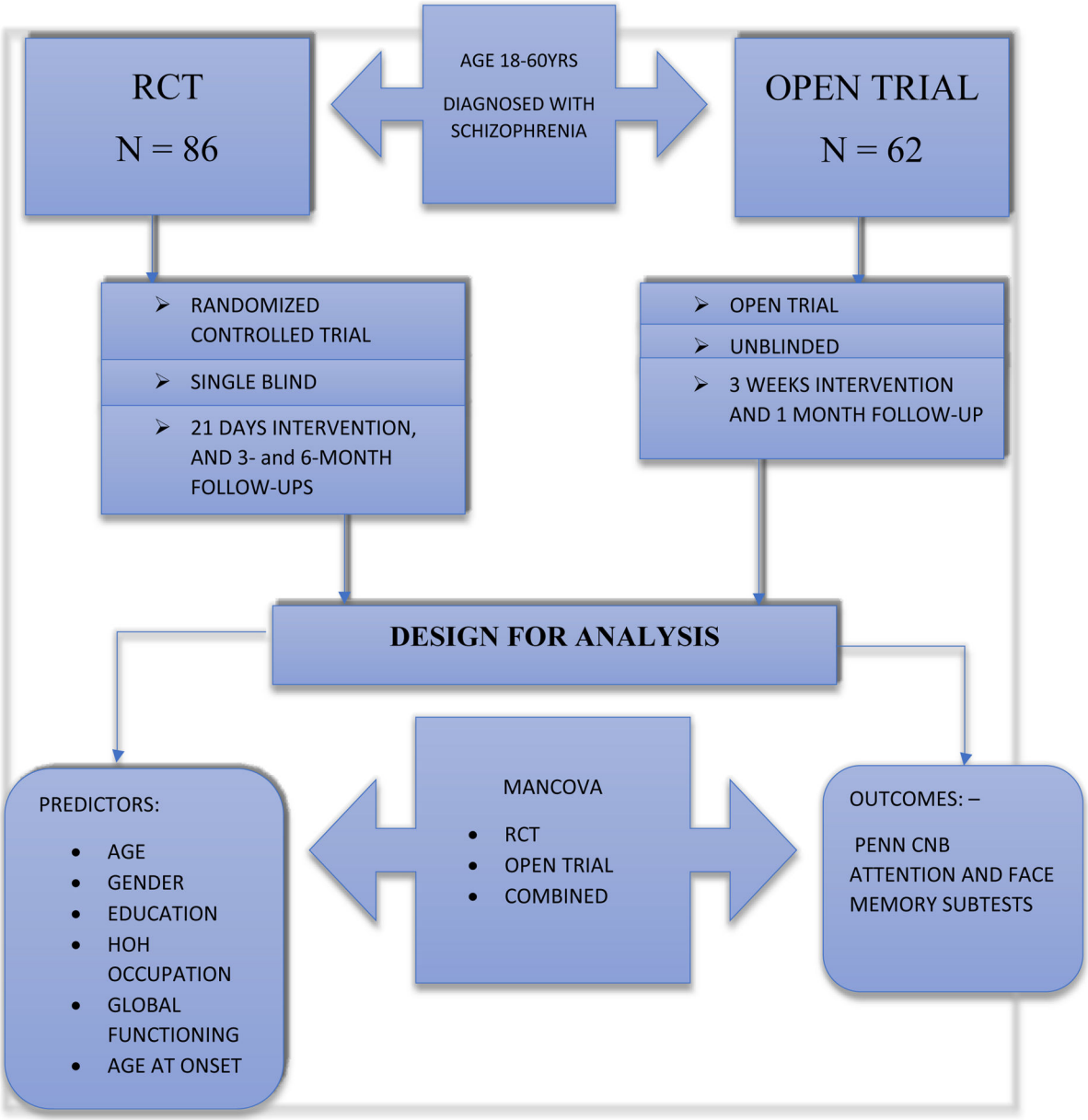

Figure 1:
Design of the study
Penn CNB= Penn Computerized Neurocognitive Battery; HOH= head of household; RCT=Randomized Controlled Trial; MANCOVA = Multivariate Analysis of Covariance

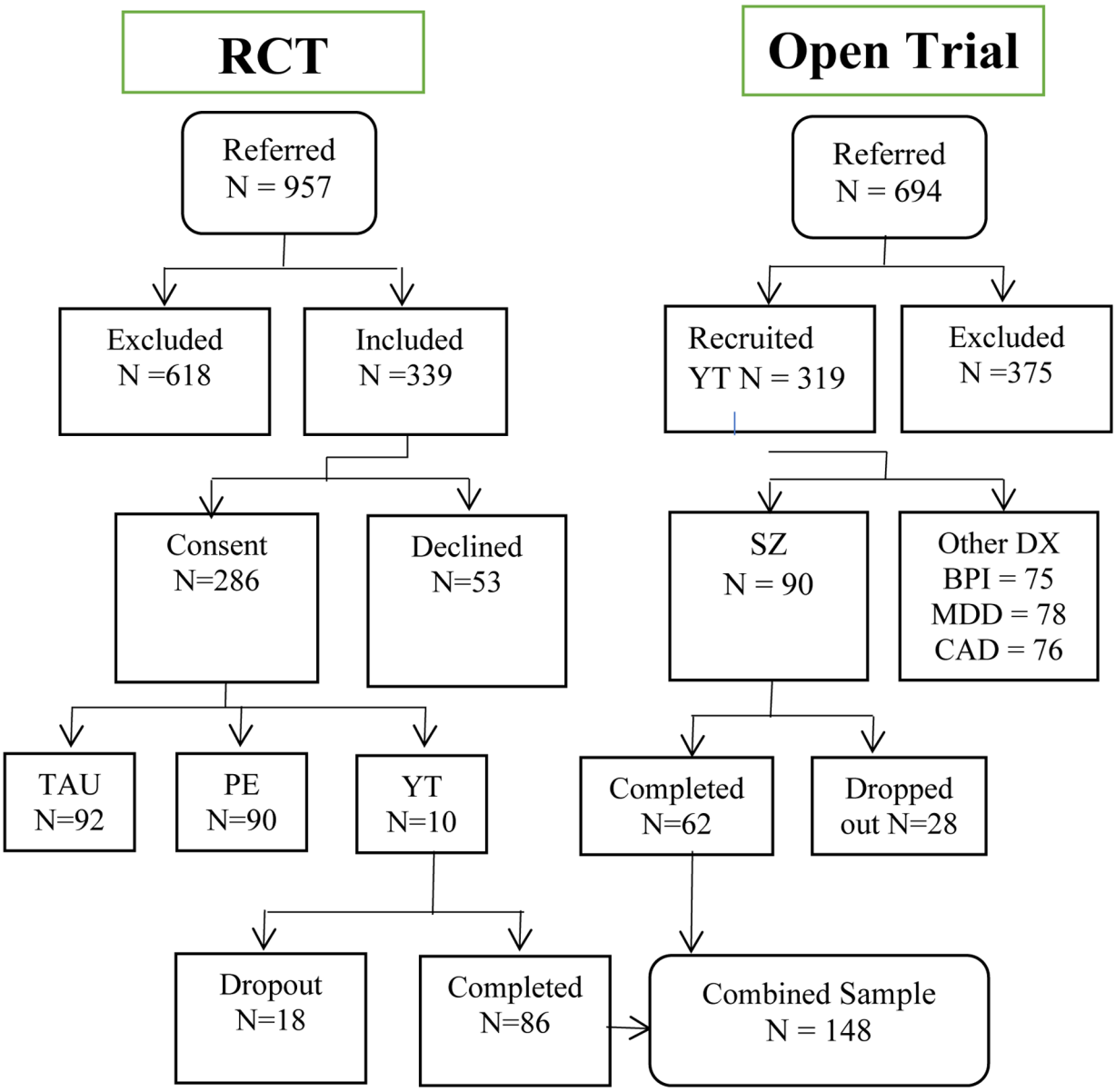

Figure 2:

Consort diagram showing enrolment of subjects, allocation to treatment and disposition status for two clinical trials (RCT and open trial of yoga)

RCT= Randomized control trial; YT= Yoga Training; PE=Physical Exercise; TAU=Treatment as usual;

SZ=Schizophrenia; DX=Diagnosis; BP1=Bipolar Disorder 1; MDD=Major Depressive Disorder; CAD=Cardiac Disorder

*Excluded as not meeting inclusion criteria

Table 1:

Comparison between persons who participated and those who did not participate in the RCT

Variables	Declined to participate (N-53)	Participated (N=286)	Chi-square/t-value	P-value
Gender(M/F)	29/24	181/105	1.37	0.152
Age (Mean±sd)	40.13±11.263	35.70±9.747	2.952	0.003
Education	9.04±4.866	9.49±4.251	−0.644	0.52
Demographic and clinical features of participants who completed and participants who did not complete the 21-day yoga training				
Demographic Variables	**Noncompleters (n=18)**	**Completers (n=86)**	**Chi-square/t-value**	**p-value**
Age, Mean(SD),y	32.11 (8.33)	35.34(9.76)	−1.33	0.20
Gender Male/Female	12/06	50/36	0.60	0.34
Education, Mean (SD), y	10.47 (3.24)	10.20(4.20)	0.23	0.80
Married/Not Married	8/10	43/43	0.79	0.43
Occupation *	0/0/2/16	2/3/7/74	0.93	0.75
HOH ** Occupation	2/7/3/5	4/16/17/47	0.15	0.10
Clinical Variables				
Total SAPS # score	13.28 (15.74)	12.26(10.49)	0.34	0.74
Total SANS ## score	29.89 (23.66)	22.25(16.55)	1.64	0.10
Age at onset, years	25.11(6.144)	24.84 (7.96)	0.14	0.89
Duration of illness, weeks	325.93 (280.37)	461.49(309.48)	1.01	0.12
GAF ### Score (Past month)	37.83 (16.53)	37.67(14.61)	0.04	0.97
MMMSE $ Score Mean (SD)	27.50 (4.26)	25.93(6.31)	−1.58	0.32

*Participant's occupation;

**Head of household occupation;

#Scale for the Assessment of Negative Symptoms;

##Scale for the Assessment of Positive Symptoms

###Global Assessment of functioning;

$Modified Mini-Mental Status Examination

Table 2:

Associations between baseline demographic and clinical factors and improvement in cognition after yoga in a Randomized Controlled Trial MANCOVA (N=86) (Baseline vs Post-Intervention)

Baseline Variables	Attention (Accuracy) F (p-value)	Face memory (Accuracy) F (p-value)	Attention (Speed) F (p-value)	Face memory (Speed) F (p-value)
Age	0.387(0.537)	1.375(0.247)	0.832(0.367)	0.161(0.690)
HOH Occu *	0.180(0.674)	1.383(0.246)	1.586(0.214)	0.483(0.491)
Weight	0.226(0.637)	0.084(0.773)	1.414(0.241)	0.413(0.524)
GAF **	1.785(0.188)	0.288(0.594)	0.088(0.769)	6.728(0.013)
Education	2.383(0.13)	7.676(0.008)	1.866(0.179)	2.021(0.162)
Age at onset	0.597(0.444)	0.948(0.335)	0.006(0.941)	0.251(0.619)
Gender	0.004(0.951)	0.217(0.643)	0.533(0.469)	0.346(0.559)

* Head of household occupation;

** Global Assessment of Functioning

Table 3.

Associations between baseline demographic and clinical factors and improvement in cognition after yoga in the Open Trial (Baseline vs 21 days yoga) (N=62)

Baseline Sociodemographic and clinical Variables	**Cognitive Measures (beta, p)**			
	Attention (Accuracy) F (p-value)	**Face memory (Accuracy) F (p-value)**	**Attention (Speed) F (p-value)**	**Face memory (Speed) F (p-value)**
Age	3.326(0.078)	0.048(0.827)	1.302(0.262)	1.137(0.295)
Gender	0.005(0.946)	1.263(0.27)	1.457(0.237)	1.077(0.307)
Education	0.017(0.897)	0.17(0.683)	0.206(0.653)	0.424(0.52)
HOH Occu *	0.001(0.98)	1.381(0.249)	0.216(0.645)	2.226(0.146)
GAF **	0.69(0.412)	0.945(0.338)	0.986(0.329)	0.762(0.389)
Age at onset	1.255(0.271)	0.267(0.609)	0.203(0.655)	0.739(0.397)

*Head of household occupation;

**Global Assessment of Functioning