



EFFICACY OF YOGASANA AS AN ADD ON INTERVENTION IN NEGATIVE SYMPTOMS AND CARE GIVEN BURDEN IN SCHIZOPHRENIA

Jassar A. J

Department Of Psychiatry, Government Mental Health Centre, Trivandrum

Sivasubramony. K*

Department Of Psychiatry, Government Medical College, Trivandrum *Corresponding Author

ABSTRACT Schizophrenia is a disorder characterized by disorder in thought, perception, cognition and mood. Patients with Schizophrenia experience a wide range of symptoms. Neuroleptics reduce the positive symptoms and disorganization but are not very effective in negative symptoms and cognitive symptoms. The present study is an effort to assess the efficacy of yoga on negative symptoms and its secondary effects on caregiver burden.

A randomized controlled trial was done at a tertiary care centre with consenting patients randomized into yoga group and waitlist group. Patients in yoga group were trained in yoga for a period of 3 months. Patients and caregivers were assessed using PANSS and Burden Assessment Schedule (BAS) respectively before and after the intervention.

Statistically significant differences were noted in yoga group in total PANSS Scores, Negative Symptom Scores, general psychopathology scores and BAS Scores. Yoga therapy can be considered as a complementary therapy in patients with prominent negative symptoms and can also promise secondary benefits in caregivers.

KEYWORDS :

INTRODUCTION

Schizophrenia, a chronic disorder is characterized by a disorder in thought, perception, cognition and mood. It is among the 20 leading causes of disability world- wide^[1]. The heterogeneous nature of symptoms makes it a difficult disorder to treat. The median lifetime prevalence is estimated to be 4.0 per 1000^[2]. It is thus a disorder which requires vast financial and health care resources.

Pharmacotherapy is the main modality of treatment in schizophrenia. Neuroleptic medications or antipsychotics have the capacity to decrease two categories of symptoms characteristics of schizophrenia, namely positive symptoms (delusions and hallucinations) and disorganization (inappropriate affect, incoherence and loose associations). But even with best modality of pharmacotherapy available, the effect on other symptom domain like negative symptoms and cognitive symptoms is negligible and sometimes deteriorating^[3,4].

Negative symptoms are indeed related to poorer functioning, unemployment, greater severity and less positive symptoms and it is also related to higher levels of objective and subjective burden compared to positive symptoms^[5]. Non pharmacological interventions like yoga are being researched in this context.

Apart from that, caregivers of schizophrenia have reported higher subjective and objective burden compared to caregivers of other chronic mental or physical illness^[6].

Family members experience burden on financial and emotional level and the extent of burden is linked to the amount of symptomatic behavior of patient^[7].

Yoga is a well known technique which is claimed to have physiological and physical benefits in various disorders. Yoga has been studied in schizophrenia inpatients and outpatients showing subjective and objective benefits. Various randomized controlled trials on stabilized patients demonstrated comparing yoga and exercise showed improvement in patients performing yoga in various domains like PANSS scores, sub-scores, socio-occupational functioning and physical and psychological health^[8,9,10].

Another study examined effects of yoga on facial emotional recognition deficit and found encouraging results^[11]. Even a study on effects of yoga in patients with acute functional psychosis concluded a reduction in total PANSS scores, general psychopathology scores, CGI scores and HDRS scores^[12]. Studies on effect of yoga when administered to caregivers of schizophrenia inpatients demonstrated no significant effects^[13] whereas a randomized controlled pilot study on caregivers of out-patients demonstrated significant effects^[14]. But it is not clear whether administering yoga in patients have any demonstrable effect on care giver burden. No studies have been

conducted investigating this.

So this study attempts to demonstrate the effects of yoga in outpatients as well as care givers.

METHODOLOGY

The aim was to study the efficacy of yoga postures (Yoga Asanas) on negative symptoms in individuals with Schizophrenia and care giver burden. The hypothesis of the study was that yoga as an add-on treatment helps in improving negative symptoms and care giver burden.

The study was a randomized controlled trial conducted in Mental Health Centre at Oolanpara in the district of Thiruvananthapuram in the State of Kerala after Institutional Ethical committee approval. The institution is a 531 bedded tertiary care centre under the Government of Kerala which provides mental health services to a substantial number of patients from South Kerala and Tamil Nadu. The study sample consisted of patients selected from the out-patient wing of Mental Health Centre. The patients had already been diagnosed as having Schizophrenia and were currently on maintenance antipsychotic treatment. They were randomly assigned with fifty patients in the yoga group and fifty patients in waitlist group. Sample size was calculated setting two parameters, α (statistical significance level) fixed at 0.5% and power (1- β) kept at 80%. Sample size was calculated as 43 in each arm. In order to consider the dropouts during the course of study, sample size was estimated to be 50 in each arm.

Individuals with Schizophrenia and their caregivers who were willing to participate in study and who were on outpatient treatment in Mental Health Centre for at least past 1 month without any change in dosage of antipsychotics and who have not received electroconvulsive therapy for past 3 months were included in the study.

Patients who were physically challenged or unable to perform the yoga asanas and patients whose caregivers has any history of any major mental illness were excluded. The instruments used for assessment were the following:

1. Positive and Negative Syndrome Scale (PANSS)^[15]
2. Burden Assessment Schedule (BAS)^[16]

Patients and relatives were briefed on the nature of the intervention and consented voluntarily for the study. They were randomly allocated to the yoga and waitlist control groups. Those in the waitlist control group were provided the option of learning yoga at a later stage after the study.

A trained yoga instructor who has 15 years of experience in teaching yoga in a recognized institute trained the patients. This training was conducted using a yoga module which extended for about 45 minutes and consisted of flexibility exercises, yoga asanas and breathing exercises. The yoga module was prepared referring to a standard

manual used in Holistic and Psychosomatic Clinic of the Department of Psychiatry, Government Medical College, Trivandrum which was indeed prepared after discussion with various yoga teachers and referring to various textbooks belonging to Patanjali and Sivananda Schools of yoga. Six sessions were conducted over a period of 3 months (one session fortnightly) for the yoga group. The patients were instructed to practice at home under the supervision of care givers who witnessed the classes. The patients and care givers were instructed to practice at least 4 days per week at home and maintain records which most of the patients did not do. Subjects were enquired about the practice of yoga at home during each session. Patients in both groups were followed up after 3 months.

RESULTS

Results were analyzed statistically using independent sample t test for numerical variables and chi square test for categorical variables. Paired t test was used to analyze pre and post changes in scores.

The study group and waitlist control group included 50 subjects each. 6 patients from waitlist group and 7 patients from yoga group dropped out from the study. Rest of the patients (n=87) in the two groups were identical in the demographic details as shown in the table 1

The mean age in both groups was about 40 years. The male to female ratio is similar in both groups with males more in both groups. Majority belongs to Hindu religion in both groups and come from low socioeconomic status. In both groups the ratio of unmarried is higher. In both groups, majority has achieved secondary education, and the ratio of unemployed is higher and similar in both groups.

TABLE 1: Demographic Characteristics of the Patients

Variables	Yoga (N=43)	Waitlist group (N=44)	't'	'p'
*Age (yrs)	40.1(9.6)	39.6(8.9)	.265	.793
Sex ratio M:F	34:9	33:11	.203**	.652
Marital status Married: Widow: Divorced: Unmarried	13:0:4:26	12:2:4:26	2.029**	.566
Religion (Hindu: Muslim: Christian)	25:8:10	28:10:6	1.381**	.501
Socioeconomic status (Low: Middle: High)	38:5:0	39:4:1	1.113**	.513
Education (Primary: Secondary: Graduate)	3:40:0	1:42:1	2.038**	.361
Occupation (Unemployed: Employed)	33:10	33:11	.036**	.849

*Mean ± Std. dev **Chi square value All values except * are ratio

Table 2 shows the demographic characteristics of the caregivers. The mean age in both yoga group and waitlist group was 54 years. The male to female ratio was 1:1 in both groups. Majority belongs to Hindu religion in both groups. The ratio of married is higher in both groups. Majority of both groups had received secondary education and majority of the caregivers were employed (70%). Caregivers were mostly parents of patients.

TABLE 2: Demographic Characteristics of Caregivers.

Variables	Yoga (43)	Waitlist group (44)	't'	'p'
*Age (yrs)	54(10.8)	53.6(12.0)	.158	.875
Sex ratio M:F	22:21	22:22	.012**	.914
Marital status Married: Widow: Divorced: Unmarried	37:6:0:0	34:8:1:1	2.401* *	.493
Religion (Hindu: Muslim: Christian)	25:8:10	27:10:7	.817**	.665
Education (Illiterate: Primary: Secondary: Graduate)	0:8:35:0	1:11:31:1	2.705* *	.439
Occupation (Unemployed : employed)	13:30	13:31	.005**	.944

* Mean ± Std. dev **Chi square value All values except * are ratio

Table 3 shows the illness characteristics of the subjects. The age of onset was about 25 years in both groups and mean duration of illness was 15.8 years in yoga group and 13.9 years in waitlist group which was statistically similar.

TABLE 3: Illness Characteristics

Variables	Yoga group	waitlist group	't' value	p-value
Duration of illness(years)	15.8(8.0)	13.9(7.3)	1.131	.261
Age of onset	24.3(6.9)	25.7(8.0)	-.833	.407

Table 4 shows the baseline psychopathology and Burden Assessment Schedule Scores. Subjects in the two groups were similar in psychopathology scores like positive score, negative score, general psychopathology and total PANSS. Caregiver burden scores (BAS) were also similar in both groups.

TABLE 4: Baseline psychopathology and Burden Assessment Schedule (BAS) scores

Variable	Yoga group	waitlist group	't' value	p-value
Positive syndrome	15.05(2.1)	15.32(2.09)	-.598	.551
Negative syndrome	18.12(2.24)	17.59(2.0)	2.922	.230
General psychopathology	32.23(4.3)	31.84(3.85)	.449	.655
Total PANSS	65.4(7.16)	64.75(5.04)	.487	.627
BAS (caregivers)	79.84(3.47)	80.43(3.51)	.794	.429

Table 5 shows the comparison of demographic characteristics between dropouts and the subjects who completed the study. Demographic characteristics of both groups were similar and not statistically significant differences were noted

TABLE 5: Comparison of demographic characteristics between dropouts and completed groups

Variables	completed (87)	dropout (13)	't'	'p'
*Age (yrs)	39.8(9.2)	40(11.7)	.061	.952
Sex Male : female	67:20	9:4	.375**	.54
Religion (Hindu : Christian : Muslim)	53:18:16	10:3:0	2.881**	0.237
Socioeconomic status (Low : middle : high)	77:9:1	10:3:0	1.852**	.396
Marital status (married:widow:divorced:un married)	25:2:8:52	4:0:1:8	.349**	.951
Occupation (Unemployed : employed)	66:21	9:4	.265**	.607
Education (primary : secondary : graduate)	4:82:1	0:12:1	3.023**	.221

*Mean ± Std. dev **chi square value
All values except* are ratios

Table 6 shows the comparison of illness characteristics between the dropouts and the subjects who completed the group. Age of onset was about 25 years in both groups. Duration of illness was about 14.8 years in completed group and 15.3 in drop out group.

TABLE 6: Comparison of illness characteristics between dropouts and completed group

Variables	completed	Dropout	't'	'p'
Age at Onset	25(7.5)	24.7(6.8)	.140	.889
Duration of illness	14.8(7.7)	15.3(8.1)	.209	.835

Table 7 shows the comparison of baseline psychopathology scores and BAS Scores between dropouts and the subjects who completed the study. As shown in the tables, the patients who dropped out of the study did not have any clinically significant differences in any of the psychopathology scores. But the BAS scores in caregivers of drop outs were lesser compared to completed groups which was statistically significant.

TABLE 7: Comparison of baseline psychopathology scores and BAS scores of dropouts and completed group

Variable	completed	Dropouts	't'	'p'
	Mean(SD)	Mean(SD)		
Positive syndrome	15.12(2.11)	15.38(1.8)	-.325	.746
Negative syndrome	17.85(2.03)	17.23(3.61)	.913	.364
General sychopathology	32.03(4.05)	33.08(5.22)	-.833	.407
Total PANSS	65.07(6.15)	65.69(8.9)	-.320	.750
BAS (caregivers)	80.14(3.48)	78(3.96)	2.028	.044

Table 8 shows the psychopathology and BAS Scores at the end of 3 months. Table 9 shows the difference in psychopathology and BAS Scores across both groups. At the end of three months, eighty seven (87%) patients and their caregivers came for follow up. Score difference following intervention was analyzed and compared in each group. Significant reduction was observed in yoga group compared to waitlist group in negative symptom score, general psychopathology scores, total PANSS scores and BAS scores. There were no relapses during the study.

TABLE 8: Psychopathology and BAS scores at the end of 3 months

Psychopathology	YOGA		WAITLIST	
	Mean	SD	Mean	SD
Positive Symptoms	14.3	2.08	14.64	1.92
Negative Symptoms	16.93	2.00	16.91	1.91
general symptoms	27.35	4.12	30.95	3.75
Total PANSS	58.58	6.37	62.5	4.72
BAS	76.33	3.42	79.30	3.29

TABLE 9. Difference in psychopathology and BAS scores across both groups

Psychopathology	Yoga		Waitlist		t	p
	Mean	SD	Mean	SD		
Positive Symptoms	.74	.7	0.68	.56	.425	.672
Negative Symptoms	1.19	.79	.68	.56	3.425	.001
General symptoms	4.88	1.88	.89	.89	12.71	<.001
Total PANSS	6.81	2.28	2.25	1.26	11.588	<.001
BAS	3.51	1.45	1.14	1.0	8.891	<.001

DISCUSSION:

This study is an attempt to examine the positive effects of yoga in negative symptoms in stabilized outpatients with schizophrenia and its secondary effects on caregivers.

A. Demographic details of patients

The mean age group (30-40 years) in current study was similar to previous study by Varambally et al^[10]. Overall, males were more in the sample as compared to females, which is similar to previous studies. The reason was that the patients who gave consent for the study were mostly males and this might also reflect the care and support received by males in the society compared to females. Patients were mostly from low socioeconomic status which is expected in schizophrenic patients and in sample from a Government mental health center.

60% of the subjects in both groups were unmarried. This may reflect the stigma prevalent in society regarding mental illness and the high morbidity in schizophrenic patients. The number of patients getting divorced in both groups is also significant (10%). Most of the people had education up to secondary level indicating the high literacy rate in Kerala. Majority of the patients were unemployed which is similar to previous studies indicating the morbidity of schizophrenic illness.

B. Demographic details of caregivers:

Age of caregivers was mostly in and around 54 years in both groups. The male to female ratio in caregivers were almost 50:50 which reflects that even though greater care is provided to patients, females as caregivers has equal role in the society. More than 80% of caregivers were married in both groups and most of them had received secondary education.

Majority of caregivers were employed in both groups (70%) which reflect the burden on caregivers due to majority of unemployed patients in their family. Caregivers were mostly parents in both groups which is reflected in the age group and marital status of the patients.

C. Illness characteristics:

The mean age of onset in both groups was about 25 years of age which

is similar to previous studies in schizophrenia. Duration of illness was 15.8 years in yoga group and 14 years in waitlist group. This shows that most of the patients in both groups had chronic illness.

D. Dropouts:

7 patients from yoga group and 6 patients from waitlist group had dropped out by the end of the study. Patients who dropped out from the study had no significant differences from the completed group for demographic characteristics, illness characteristics and psychopathology scores. But the BAS scores of drop outs in caregivers were lesser compared to completed group and this might explain the reason for discontinuation of the study due to less care giver burden.

E. Psychopathology:

Baseline psychopathology scores were comparable in both study groups due to randomization. The psychopathology scores decreased significantly in both groups in all both groups in all domains after 3 months which is similar to previous studies and significant differences were seen between two groups namely yoga group and waitlist group. Differences in scores between 2 groups at the end of 3 months showed that statistically significant difference was observed in negative symptoms, general psychopathology scores, and total PANSS scores in yoga group compared to waitlist group. This was similar to previous studies conducted by Varambally et al in 2012^[10]. Improvement in positive symptom score were mainly noted in previous studies where scores were high like Visceglia et al, 2011^[9] and Duraiswamy et al^[8] but not obtained in current study probably due to baseline low positive symptom score. This study also proves that yoga therapy done with 6 sessions over a period of 3 months (fortnightly one session each) has a positive effect on patients compared to waitlist group.

Yoga administered in out-patients also reduced caregiver burden in relatives. Previously Varambally et al, 2013 had found out that yoga administered in caregivers of outpatients with psychosis had reduced caregiver burden and improved quality of life^[14]. Here we had administered yoga in patients and so this concludes that overall symptom reduction in patients leads to reduced care giver burden. This is in consistent with previous studies like Lowyck et al^[7], where the overall symptom reduction must have contributed to the reduced care giver burden.

It is exactly not known how yoga produces neurobiological effect on symptoms of schizophrenia. One of the proposed mechanisms is elevation of oxytocin^[17]. Research needs to be continued in this area.

CONCLUSION

Yoga therapy may be introduced as an add-on intervention in management of stabilized chronic schizophrenia patients to improve negative symptoms and also to improve care giver burden. The current study was mainly used to assess improvement in negative symptoms and care giver burden when yoga was added. This is the first kind of study to assess outcome of yoga therapy administered in outpatients on caregiver burden. No changes in medication were needed during the course of study. The drop out group was similar to completed group in all variables except in case of care giver burden scores. Fortnightly yoga sessions were done so that patients could be motivated and they could memorize the module.

The limitation of the study was that blinding could not be conducted in the study as the investigator was the only person involved in this large study apart from the yoga therapist. Even if the rater had been blind to the study, it would not be fool proof as there is a chance of patients expressing the therapy they are getting involved. In yoga therapy, the main limitation is patient cannot be made blind to the study as Indians are quite aware of Yoga and this may increase expectation effects which is well pointed out in previous studies like Gangadhar and Varambally^[18]. Subtypes of various categories of schizophrenia and the effect of Yoga on each category were not assessed. Yoga therapy was not compared with another form of intervention like a simple aerobic exercise module which was another limitation of this study.

The effect of various antipsychotics and its correlation to symptom domains was not done. Changes in other domains like physical, physiological and metabolic variables as well as cognitive functions were not measured which might have shown a difference between two groups. In future studies long duration of follow up is needed to assess whether the improvement persists for longer periods. Presence of positive family history of schizophrenia or other mental illness needs

to be assessed and correlated systematically with care giver burden. The dosages of antipsychotics given need to be systematically correlated with improvement in each domain of the symptoms while studying yoga as an add-on intervention in any future studies.

REFERENCES

- Murray CJL, Lopez AD.(1996). The Global Burden of Disease; A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries and risk factors in 1990 and projected to 2020. Harvard University Press, Cambridge, MA.
- Saha S,Chant D,Welham J,Mc Grath J.(2005). A systematic review of the prevalence of schizophrenia.PLoS Med ,2:e141
- Meltzer H,Sommers AA,Luchins DJ.(1986). The effects of neuroleptic drugs and other psychotropic drugs on the negative symptoms in Schizophrenia. J Clin Psychopharmacol,6,329-338.
- Cassens G, Inglis AK, Appelbaum PS.(1990). Neuroleptics: effects on neuropsychological functions in chronic Schizophrenia patients. Schizophrenia Bul,16 ,477-499.
- Bobes J,Arango C,Garcia M,Rejas J.(2010). Prevalence of negative symptoms in outpatients with schizophrenia spectrum disorders treated with antipsychotics in routine clinical practice:findings from CLAMORS study. The Journal of clinical Psychiatry,71(3),280-286
- Magliano L, Fiorillo A, De Rosa C, Malangone C, Maj M.(2005). Family burden in long-term diseases: a comparative study in schizophrenia vs. physical disorders.Social Science and Medicine,61,313-322.
- Lowyck B, De Hert, M,Peeters E, Wampers, M, Gilis P, Peuskens J.(2004). A study of the family burden of 150 family members of schizophrenic patients. European Psychiatry,19(7),395-401.
- Duraiswamy G, Thirthalli J, Nagendra, H R,Gangadhar B N.(2007). Yoga therapy as an add on treatment in the management of patients with schizophrenia-a randomized controlled trial. Acta Psychiatrica Scandinavica,116(3), 226-232.
- Visciglia E, Lewis S.(2011) Yoga therapy as an adjunctive treatment for schizophrenia: a randomized, controlled pilot study. The Journal of Alternative and Complementary Medicine,17(7), 601-7.
- Varambally S, Gangadhar BN, Thirthalli J, Jagannathan A, Kumar S, Venkatasubramanian G, Nagendra H R.(2012). Therapeutic efficacy of add-on yogasana intervention in stabilized outpatient schizophrenia:Randomized controlled comparison with exercise and waitlist. Indian Journal of psychiatry,54(3),227.
- Behere R. V, Arasappa R, Jagannathan A, Varambally S, Venkatasubramanian G, Thirthalli J, Gangadhar B N.(2011). Effect of yoga therapy on facial emotion recognition deficits, symptoms and functioning in patients with schizophrenia. Acta Psychiatrica Scandinavica,123(2), 147-153.
- Manjunath RB, Varambally S, Thirthalli J, Basavaraddi IV, Gangadhar BN.(2013). Efficacy of yoga as an add-on treatment for in-patients with functional psychotic disorder. Indian Journal of psychiatry,55(Suppl 3), S374.
- Jagannathan A, Hamza A, Thirthalli J, Nagendra H, Nagarathna R, Gangadhar BN.(2012). Development and feasibility of need-based yoga program for family caregivers of in-patients with schizophrenia in India. International Journal of Yoga. , 5, 42-47.
- Varambally S, Vidyendaran S, Sajjanar M, Thirthalli J, Hamza A, Nagendra H R.,Gangadhar BN.(2013). Yoga-based intervention for caregivers of outpatients with psychosis: a randomized controlled pilot study.Asian Journal of Psychiatry,6(2),141-145.
- Kay SR,Fiszbein A,Opler LA.(1987). The positive and negative syndrome scale(PANSS) for schizophrenia. Schizophrenia Bulletin,13(2),261-276.
- Thara R, Padmavati R, Kumar S, Srinivasan L.(1998). Instrument to assess burden on caregivers of chronic mentally ill. Indian Journal of Psychiatry, 40(1),21.
- Rao NP, Varambally S, Gangadhar BN.(2013). Yoga school of thought and psychiatry:Therapeutic potential. Indian J Psychiatry,55:145-149.
- Gangadhar BN, Varambally S.(2011). Yoga as therapy in psychiatric disorders: past, present, and future. Biofeedback,39,60-63.