

Psychological wellness, yoga and quality of life in patients affected by schizophrenia spectrum disorders: A pilot study

Pasquale Caponnetto,^{1,3}

Roberta Auditore,¹ Marilena Maglia,^{1,2}

Stefano Pipitone,^{4,5} Lucio Inguscio⁶

¹CTA-Villa Chiara Psychiatric Rehabilitation Clinic and Research, Mascalucia, Italy; ²Department of Clinical and Experimental Biomedicine, University of Catania, Italy; ³Institute for Social Marketing, University of Stirling, UK; ⁴Vidya Vahini Trust, Uttarkashi, Himalayas, India; ⁵Yoga Vidya, Siracusa, Italy; ⁶Department of Psychology, La Sapienza University, Rome, Italy

Abstract

Schizophrenia is a serious psychiatric disorder characterized by positive symptoms, negative symptoms and neurocognitive deficits. The aim of this study was to estimate relationships between wellness, yoga and quality of life in patients affected by schizophrenia spectrum disorders. Participants were 30 patients with a diagnosis of schizophrenia in care at the Rehabilitative Psychiatry and Research Villa Chiara Clinic in Mascalucia (Catania, Italy), after that randomly assigned to two groups. The first group followed the experimental treatment with sets of yoga exercises conducted by a yoga trainer and a psychiatrist or a clinical psychologist expert in yoga, while a second control group was treated with usual care. The results revealed a significant difference, before and after treatment, between the experimental group and the control group in quality of life.

Introduction

Yoga means union through discipline, as it harmonizes the body the mind and the emotions. Thus, the practice guides the brain, and body to work in harmony.¹

Schizophrenia is a severe psychiatric disorder, affects approximately 24 million people worldwide.² This disorder is characterized by i) positive symptoms such as hallucinations and delusions, ii) negative symptoms including affective flattening, alogia and avolition and iii) neurocognitive deficits including perception, memory and

attention.³ Negative and cognitive symptoms, emerging in the pre-psychotic stage, appear to be related,⁴ and cognitive symptoms are significantly associated with poorer functional outcome.^{5,6}

Several clinical and experimental articles showed that yoga reduces stress.⁷ Specifying the paths through which yoga may reduce stress will increase the likelihood that it will be recommended and implemented as a complement to psychological and pharmacologic therapy for stress-related conditions.⁸

Schizophrenia spectrum disorders have substantial impact on quality of life, well-being and social and occupational function^{9,10} and thus creates a considerable socio-economic burden.^{11,12}

The study conducted by Visceglia and Lewis (2010), showed that yoga adjunct to conventional psychiatric treatment, reduced psychopathology, distress and improved aspects of quality of life in inpatients with schizophrenia spectrum disorders. Specifically the yoga group obtained significant improvements in positive and negative symptoms of schizophrenia symptoms compared to control group, including PANSS scores on positive syndrome ($t=-2.64$, $P=0.02$), negative syndrome ($t=-3.04$, $P<0.01$), general psychopathology ($t=-3.74$, $P<0.00$), activation ($t=-2.29$, $P<0.04$), paranoia ($t=-2.89$, $P<0.01$), and depression subscales ($t=2.62$, $P<0.02$). PANSS total scores also decreased for the yoga group ($t=-4.54$, $P<0.00$). Yoga group had improved perceived quality of life in physical ($t=2.38$, $P<0.04$) and psychological domains ($t=2.88$, $P<0.01$).¹³

With this in mind we designed a small randomized pilot/feasibility study to assess relationships between wellness, yoga and quality of life in patients affected by schizophrenia spectrum disorders.

Materials and Methods

Participants

For the present study, a sample of 30 patients in rehabilitation at “Villa Chiara” Psychiatric Rehabilitation and Research, Mascalucia (Catania, Italy), aged between 18 and 65 years with a diagnosis of schizophrenia in line with the DSM-V criteria (American Psychiatric Association, 2013), was selected. After informed consent has been obtained, the patients were tested in the areas of specific interest to the goals of the research work and were then randomly assigned to one of the treatment conditions, 15 experimental treatment (yoga + usual

Correspondence: Marilena Maglia, CTA-Villa Chiara Psychiatric Rehabilitation Clinic and Research, Via del Bosco, 243, 95030 Mascalucia (CT), Italy.
Tel.: +39.095.7910366.
E-mail: m.maglia@unict.it

Key words: Yoga, cortisol, quality of life, stress, well-being.

Contributions: the authors contributed equally.

Conflict of interest: the authors declare no potential conflict of interest.

Funding: none.

Received for publication: 31 January 2019.

Revision received: 15 March 2019.

Accepted for publication: 20 March 2019.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0).

©Copyright P. Caponnetto et al., 2019

Licensee PAGEPress, Italy

Mental Illness 2019; 11:8003

doi:10.4081/mi.2019.8003

care) or 15 control group (usual care), on the basis of the following inclusion/exclusion criteria. The participants were assigned to two groups with a 1:1 ratio.

As main criteria for inclusion, in addition to the first one, represented by the diagnosis of schizophrenia according to DSM-V criteria, the following were considered: i) Pharmacological treatment unchanged for at least six months and responsivity to the same in clinical stable conditions; ii) Willingness to take part in the study with constancy for 90 minutes, one time a week for three months.

Patients presenting the following were excluded: i) Psychopathological, neurological comorbidity and epilepsy; ii) $QI<70$

Objectives

The primary goal was represented by improving the wellness perception (quality of life, stress self-perception, blood cortisol levels and blood Dehydroepiandrosterone (DHEA) level).

Secondary goals are: i) Improvement of the general psychopathological functioning;¹⁴ ii) Improvement of the adaptive functioning.^{15,16}

Assessment

During the assessment phase, the data collection related to the personal, family and pathologic history of each patient was

initially gathered. At baseline (T0) the following profiles were evaluated: blood cortisol and Dehydroepiandrosterone (DHEA) level, quality of life by the EuroQol VAS,¹⁷ stress perception by Perceived Stress Scale (PSS),¹⁸ Psychopathological by PANSS,¹⁴ as well as adaptive functioning through the Mini-ICF-APP.^{15,16} The yoga training allows sets of exercises to be created on the basis of limits and resources observed in assessment. The results obtained after 12 weeks of yoga were then compared with those obtained at baseline in order to evaluate the effect of the experimental treatment and monitor effects obtained among participants.

Materials

Stress was assessed by the Perceived Stress Scale (PSS). The PSS is the most widely used psychological instrument for measuring the perception of stress.¹⁷ The PSS was designed to determine “the degree to which situations in one’s life are appraised as stressful”.¹⁷ On the basis of the transactional model of stress and coping, the PSS was designed to measure the degree to which an individual believes his/her life has been unpredictable, uncontrollable and overloaded during the past month.¹⁷

Quality of life was assessed by EQ-5D, EQ Visual Analogue scale (EQ VAS) (EuroQol).¹⁸ The EQ VAS records the respondent’s self-rated health on a 20 cm vertical, visual analogue scale with end points labeled *the best health you can imagine* and *the worst health you can imagine*. The EQ VAS scores are anchored on 100 = the best health you can imagine and 0 = the worst health you can imagine. It is a standardized instrument for use as a generic measure of health outcome, quality of life.

The Positive and Negative syndrome scale (PANSS)¹⁴ has 30-item, each item on the PANSS is accompanied by a complete definition as well as detailed anchoring criteria for seven rating points, which represent increasing levels of psychopathology: 1 = absent, 2 = minimal, 3 = mild, 4 = moderate, 5 = moderate-severe, 6 = severe, and 7 = extreme.

The PANSS ratings is based on all information pertaining to a specified period. All ratings accrue from a 30 to 40-minute semi-formalized psychiatric interview that permits direct observation of affective, motor, cognitive, perceptual, attentional, integrative, and interactive functions.

The PANSS is scored by summation of ratings across items, such that the potential ranges are 7-49 for the Positive and Negative Scales and 16-112 for the General Psychopathology Scale.

The Mini-ICFAPP is an instrument cre-

ated to assess limits and resources in people with serious mental disorders;¹⁵ these are rated in terms of competence throughout thirteen aspects: namely adherence to regulations, planning and structuring of tasks, flexibility, competency, endurance, assertiveness, contact with others, group integration, intimate relationships, non-work activities, self-care, mobility and competence to judge and decide. This dimension is evaluated on a five-point Likert scale (0 = no impairment; 5 = total disability). Assessment is based on information provided by patients, care givers, clinical records, as well as direct subjects’ clinical observation.

Procedures

Patients involved in our research work were assigned to two separated groups that followed for three months a yoga program in addition to standard rehabilitation (SRT) or SRT alone. The participants were randomly assigned to each group, and the blood cortisol, and Dehydroepiandrosterone (DHEA) levels, the EuroQol VAS, PSS, PANSS and Mini-ICF-APP were evaluated and compared at *baseline* (T0) and after three months (T1).

After checking that all the necessary criteria for inclusion (or exclusion) had been met, patients were first admitted to the study and subsequently assigned to the experimental group or to the control group, thanks to the computer-generated random number tables, and therefore any statistically significant differences between the two groups at *baseline* were excluded.

The experimental condition (yoga + usual care) consisted of one weekly sessions of one and half hour for a total duration of 12 weeks. The training was modelled on the participants, considering the *baseline* assessment.

Yoga is a series of postures where the body is being stabilized through breathing pattern, with a positive or healthy attitude. Nowadays, there are many methods of teaching Yoga.

The method of teaching adopted during the study is named as Yoga Vidya and it is founded by Swami Ananda Saraswati. Yoga teachers were provided by the association Yoga Vidya Onlus (Syracuse).

A session of Yoga Vidya method involves postures (*asana*, in Sanskrit), breathing exercises (*pranayama*, in Sanskrit), some concentration exercises (meditation) and relaxation.¹⁹

According to the pathology of *schizophrenia*, there were selected some specific postures, breathing exercises and meditation.

Particularly, the Yoga Vidya classes for

schizophrenic patients concerned postures as:

1. Sun Salutation, (*Surya namaskara* in Sanskrit, it is a series of 12 postures performed in a single graceful flow where the movement is coordinated with the breath);
2. Single Leg Lift, (*Eka-pada-utthanasana* in Sanskrit);
3. Leg Lock Pose (*Apanamuktasana* in Sanskrit);
4. Universal Spinal Twist (*Udara-karsanasana*, in Sanskrit);
5. Bridge Posture (*Setu-Bandha-asana*, in Sanskrit);
6. Back Stretching pose (*Pascimottanasana*, in Sanskrit);
7. Tree Posture (*Vrksasana*, in Sanskrit).

Regarding the breathing exercise (*pranayama*), there have been selected five breathing exercises:

1. Diaphragmatic Breathing;
2. Complete Breathing;
3. *Anuloma-Viloma*, (it is a breathing exercise where the breath is guided with a specific rhythm, counting from 1 to 10 during the inhalation and from 10 to 1 during the exhalation);
4. *Kapalabhati*, (it is a breathing exercise that involves a forceful exhalation before an automatic natural inhalation. After a given series of exhalations and inhalations, the breath is hold as long as possible);
5. *Nadisuddhi*, (it is an alternate nostril breathing exercise where the rhythm of inhalation, retention and exhalation uses a given ratio that is 1:4:2 – one beat inhale, four beats retention, two beats exhale. As for example, counting from 1 to 3 (inhale), 1-12 (retention), 1-6 (exhale).

Moreover, *postures* (*asana*) work on the various systems of the body, so that each posture involves a given breathing pattern, stimulating and balancing all the systems of the body, including the endocrine, circulatory, respiratory and digestive ones. The breathing exercises (*pranayama*) are focused on the respiratory system, regulating the deep oxygen exchange. Accordingly, the first result is a more relaxed and clear brain. At the same time, the vital energy of the practitioners is recharged. Secondly, the practitioners gain a physical, physiological, and emotional steadiness.¹⁹

Results

The IBM software *SPSS 24* was used

for statistical analysis, with the objective of assessing over time variations of the results obtained through the administration of the rating scales used at *baseline* (T0) and after 3 months (T1). To ensure the similarity in the characteristics of the two samples in statistical terms at *baseline*, these were compared using analysis of variance and a t-test for independent samples; no statistically significant difference between the two samples was found with the alpha level of significance defined at 5% ($P < 0.05$).

An analysis of variance (ANOVA) mixed with repeated measures was performed (with the two types of treatment applied as factors *between subjects* and the two temporal observations (T0 and T1) as factors *within subject*, and also by analyzing the “interaction time X treatment”) in order to assess the impact of the yoga intervention. All the patients completed the study.

The 30 participants enrolled in this study were divided into two groups of the same size, equal to 15. All participants equally divided for gender, in fact 15 were male and 15 females (Table 1), with a mean age of 37.1 years 36.9 for the experimental group and 37.2 for the control group (Table 2).

Analyzing the entire sample data (intervention, non-intervention) at *baseline* (T0), we observed: blood cortisol levels were 343.3 nanomoles (SD 107.15); blood Dehydroepiandrosterone (DHEA) levels were 1.95 nanomoles (SD 0.55); the overall score for the EuroQol VAS results were 41.1 (SD 29.3); The PANSS total score was 120.4 (SD 40.5); The MINI-ICF-app total score was 32.5 (SD 9.7); the PSS total score was 19.9 (SD 7.1)

Table 3 shows a comparison of the EuroQol VAS, PSS, Total PANSS and Mini-ICF-APP scores and blood cortisol levels recorded after three months (T1) between the two groups.

The median PSS score before the intervention in the intervention group was 21.5 nanomoles, and decreased to 18.1 after the intervention ($P < 0.007$).

The statistical analysis did not reveal a significant difference between the stress perception assessed by PSS in the two groups either before or after the intervention.

For other psychological measures we observed a significant difference between yoga group vs control group in Quality of Life as assessed by EuroQol VAS ($P < 0.001$).

Moreover, in the experimental group a significant decrease in the PANSS score was also observed, this could represent a sign of potential psychopathological improvement. A not significant improve-

ment was reported in the control group. Even more encouraging is the decrease in the Mini-ICF-APP scores (more significant for the yoga group).

Table 4 shows a comparison of the blood cortisol and blood DHEA levels recorded after three months (T1) between the two groups.

The median blood cortisol level before the intervention in the group that received yoga was 417.7 mg/dL, and decreased to 341.5 after the yoga intervention ($P < 0.006$). The median blood cortisol level before the intervention in the group that not received yoga was 268.8 mg/dL, and increased to 319.8 after the intervention ($P < 0.001$). The statistical analysis reveals a significant difference between the cortisol level in the two groups either before and after the intervention.

The median blood DHEA level before the intervention in the group that received yoga was 2.4 ug/mL, and was decreased to 1.7 after the intervention ($P < 0.001$). The median blood DHEA level before the intervention in the group that not received yoga was 1.5 ug/mL, and was slowly decreased to 1.2 after the intervention ($P < 0.031$). The statistical analysis reveals a significant difference between the DHEA level only in the

yoga group before and after the intervention. Therefore, it's possible sustain that it is likely that the yoga activity determined a positive effect on physical stress levels as objectively measured principally by cortisol blood levels.

Discussion and Conclusions

In the present study, yoga has been integrated with the standard treatment. The research investigated how the integration between yoga and standard care, led to improvements in quality of life, stress biological parameter and psychopathological and adaptive functioning. The sample consisted of residential patients with a diagnosis of schizophrenia. The place where the treatment was administered (Villa Chiara) is

Table 1. Demographic characteristic of the two groups. Composition of the sample: sex.

Group	Males	Females	Total
Intervention	8	7	15
Control	7	8	15

Table 2. Demographic characteristic of the two groups. Composition of the sample: age.

Group	Mean	SD	Min	Max
Intervention	36.9	9.1	21	58
Control	37.2	9.5	22	59

SD, standard deviation.

Table 3. Comparison between the two groups.

Group	Mean (active)	SD (active)	Mean (control)	SD (control)
EuroQol VAS	55.3	21.3	34.2	35.4
PSS	18.1	9.5	18.9	9.3
Total PANSS	95.5	35.2	101.1	28.2
Mini-ICF-APP	27.6	9.1	30.2	8.7

SD, standard deviation.

Table 4. Comparison of the blood cortisol and blood DHEA levels recorded after three months (T1) between the two groups.

	Group	Mean	SD
Cortisol Baseline	Yoga group	417.7	112.2
Cortisol Retest	Yoga group	341.5	115.7
Cortisol Baseline	No Yoga group	268.8	102.1
Cortisol Retest	No Yoga group	319.8	109.8
DHEA Baseline	Yoga group	2.4	9.3
DHEA Retest	Yoga group	1.7	0.9
DHEA Baseline	No Yoga group	1.5	0.8
DHEA Retest	No Yoga group	1.2	0.6

SD, standard deviation.

conceived to harmonize therapeutic-rehabilitation with socio-rehabilitative practices, which allows patients to regain their interpersonal relationships by supporting the achievement of the main clinical goals.

Particular yoga program for patients with mental illness is based on the Yoga Vidya model. Almost all packages include some pranayama/breathing and asanas patterns but not meditative practices, because meditation has been shown to worsen/provoke psychosis in patients with mental illness.²⁰ A study by researchers at the Swami Vivekananda Yoga Anusandhana Samsthana (SVYASA) was likely the first to scientifically test such a program in chronically ill patients. In this study, institutionalized patients with mental illness, specifically with schizophrenia, were able to learn the yoga under supervision and the *yogasana* program produced some cognitive benefits in schizophrenia patients without causing disturbing side effects.²¹

Our research goal was to detect which result a yoga approach might have on the biopsychological, psychopathological and adaptive functioning, together with the standard treatment, employed in the treatment of residential patients afflicted by schizophrenia.

The whole sample was randomly divided in two groups of equal size. The experimental group (n:15) participated to a treatment organized over 12 weeks, with 1 weekly sessions of one hour and half, devoted to the completion of the yoga exercises, for a total of 18 hours. The control group (n:15) undertook the usual generic treatment. At T1, patients were again evaluated using the same tests administered at *baseline*. The addition of *yoga* therapy to the standard intervention resulted in a significant well-being improvement. Alongside the improvement in neuro-cognitive functioning obtained in the experimental group, an improvement in the psychopathological (reduction in total PANSS score) and adaptive functioning (reduction in Mini-ICF-APP score) was simultaneously recorded.

The reduction of Mini-ICF-APP score is of particular importance remembering the residential context of patients.

Further researches on this field may be necessary in order to deepen and validate the results produced by the use of yoga other standard rehabilitation treatments. This can lead researchers to derive the best rehabilitative approaches supporting a wider well-being and a generalization of the clinical outcomes on patients' daily life.

Because of its design, there are a num-

ber of limitations that must be considered when interpreting the findings of this study (e.g. the small sample size). Some characteristics of the sample limit generalization of the findings; all participants were inpatients. Last but not least, the findings reported from urban Sicilian residents in this study may not be valid for other population samples. Nonetheless, our study indicated that yoga is a safe and inexpensive strategy that can be quite effective for people with schizophrenia. This can represent a good starting point for new studies to improve yoga intervention for this special population. However, large and carefully conducted RCTs will be required before a definite answer about the efficacy and safety of these approach be formulated.

References

1. Paikkatt B, Singh AR, Singh PK, et al. Efficacy of Yoga therapy for the management of psychopathology of patients having chronic schizophrenia. *Indian J Psychiatry* 2015;57:355-60.
2. Abi-Dargham A. Schizophrenia: overview and dopamine dysfunction. *J Clin Psychiatry* 2014;75:e31.
3. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*. Washington, DC: American Psychiatric Organisation; 1994.
4. Strassnig MT, Raykov T, O'Gorman C, et al. Determinants of different aspects of everyday outcome in schizophrenia: the roles of negative symptoms, cognition, and functional capacity. *Schizophr Res* 2015;165:76-82.
5. Lepage M, Bodnar M, Bowie CR. Neurocognition: clinical and functional outcomes in schizophrenia. *Can J Psychiatry* 2014;59:5-12.
6. Ventura J, Helleman GS, Thames AD, et al. Symptoms as mediators of the relationship between neurocognition and functional outcome in schizophrenia: a meta-analysis. *Schizophr Res* 2009;113:189-99.
7. Chong CS, Tsunaka M, Tsang HW, et al. Effetti dello yoga sulla gestione dello stress negli adulti sani: una revisione sistematica. *Altern Ther Health Med* 2011;17:3238.
8. Riley KE, Park CL. How does yoga reduce stress? A systematic review of mechanism of change and guide to future inquiry. *Health Psychol Rev* 2015;9:379-96.
9. Pitkänen A, Hätönen H, Kuosmanen L, Välimäki M. Individual quality of life of people with severe mental disorders. *J Psychiatr Ment Health Nurs* 2009;16:3-9.
10. Boyer L, Caqueo-Urizar A, Richieri R, et al. Quality of life among caregivers of patients with schizophrenia: a cross-cultural comparison of Chilean and French families. *BMC Fam Pract* 2012;13:42.
11. Zeidler J, Slawik L, Fleischmann J, Greiner W. The costs of schizophrenia and predictors of hospitalisation from the statutory health insurance perspective. *Health Econ Rev* 2012;9:8.
12. Wyatt RJ, Henter I, Leary MC, Taylor E. An economic evaluation of schizophrenia. *Soc Psychiatry Psychiatr Epidemiol* 1995;30:196-205.
13. Visceglia E, Lewis S. Yoga therapy as an adjunctive treatment for schizophrenia: a randomized, controlled pilot study. *J Altern Complement Med* 2011;17:601-7.
14. Kay SR, Fiszbein A, Opler LA. The Positive and Negative Syndrome Scale (PANSS) for Schizophrenia. *Schizophr Bull* 1987;13:261-76.
15. Linden M, Baron S. [The "Mini-ICF-Rating for Mental Disorders (Mini-ICF-P)". A short instrument for the assessment of disabilities in mental disorders]. *Rehabilitation (Stuttg)* 2005;44:144-51. [Article in German]
16. Molodynski A, Linden M, Juckel G, et al. The reliability, validity, and applicability of an English language version of the Mini-ICF-APP. *Soc Psychiatry Psychiatr Epidemiol* 2013;48:1347-54.
17. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav* 1983;24:385-96.
18. Rabin R, De Charro F. EQ-5D: A Measure of Health Status from the EuroQol Group. *Finnish Med Soc Duod Ann Med* 2001;33:337-43.
19. Saraswati SA. La vita è una serie di scelte. *Yoga Vidya Gurukulam. Uttarakhand, Himalayas, India*, 2017.
20. Walsh R, Roche L. Precipitation of acute psychotic episodes by intensive meditation in individuals with a history of schizophrenia. *Am J Psychiatry* 1979; 136:1085-6.
21. Nagendra HR, Telles S, Naveen KV. An integrated approach of Yoga therapy for the management of schizophrenia. Final Report submitted to Dept. of ISM and H, Ministry of Health and Family Welfare, Government of India New Delhi. 2000.