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Clinical trial

The effect of yoga on clinical insight and medication adherence in patients with schizophrenia - A randomized controlled trial

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ABSTRACT

Introduction: Schizophrenia is a chronic mental illness characterized by symptoms including hearing voices or seeing objects that do not exist, weak emotional reactions, and inadequate social relations. Schizophrenia is a long-term disease that is usually treated with anti-psychotic drugs. However, medication alone is insufficient for the treatment of patients with schizophrenia and alternative methods are needed. The aim of this study was to determine the effect that yoga has on the clinical insight and medication adherence in patients with schizophrenia.

Methods: This randomized controlled trial was conducted at the Community Mental Health Centre (CMHC). The study was conducted using a pretest / posttest and a control group. There were 50 patients with schizophrenia who participated, including 25 in the intervention group and 25 in the control group. The patients in the intervention group participated in group yoga practices every weekday for 8 weeks. No intervention was applied to the control group, and they received the CMHC's routine care. The Descriptive Characteristics Form, Birchwood Insight Scale, and Morisky Medication Adherence Scale were used to collect data.

Results: The difference between the pretest and posttest mean scores for the insight and medication adherence scales was statistically significant in the intervention group ($p < 0.01$). There was also a statistically significant difference between the control group and intervention group for the pretest-posttest total mean scores on the insight and medication adherence scales ($p < 0.01$).

Conclusion: Yoga appeared to be effective for increasing medication adherence and clinical insight in patients with schizophrenia. It is recommended that yoga should be integrated within the rehabilitation period.

1. Introduction

Schizophrenia is a common life-long psychiatric disorder that occurs in between 3% and 6% of the population [1]. Schizophrenia is seen in between 10.2 and 22.0 people per 100,000 [2]. The prevalence of the disease in Turkey is 8.9% [3]. Schizophrenia is a chronic psychological disorder where the relationship with reality is impaired and distortions occur in feelings, thoughts, and behaviors, accompanied by cognitive, negative, and positive symptoms [4]. The cognitive symptoms include difficulties with focus, concentration, understanding information, and making decisions. The negative symptoms include introversion, isolation from society, depletion in speaking, and decreased emotional reactions, while the positive symptoms include hallucinations, delirium, and disorganized speech and behaviors [4–6].

The World Health Organization has indicated that majority of patients with schizophrenia lack clinical insight [6]. Clinical insight is an acceptance and awareness of the illness and its symptoms and treatment [7]. Danki et al. have determined that clinical insight is insufficient in patients with schizophrenia. In addition, this lack of clinical insight in patients with schizophrenia negatively affects medication adherence [1]. The rate of medication non-adherence among patients with schizophrenia has been estimated at approximately 50%, leading to higher rates of relapse and hospitalization as well as a decreased cognitive and functional prognosis. Clinical insight has also been found to be strong predictor for medication adherence [8]. Poor clinical insight is an important problem as it leads to a delay in access to treatment and poor treatment compliance. The presence of clinical insight in patients positively affects treatment efficacy [1,7,8].

While antipsychotic drug treatments in patients with schizophrenia are effective for reducing the positive symptoms, they do not show any significant effect on the negative or cognitive symptoms or on forming insight [9]. In addition, antipsychotics negatively affect the patients'

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physical and psychosocial well-being [10]. Mostly, patients do not want to use drugs because of their long-term effects and side effects. Alternative approaches should be used along with medication in patients with schizophrenia in order to increase clinical insight and medication adherence, improve negative and cognitive symptoms, and provide physical and psychosocial well-being [6–10].

For many diseases, methods including relaxing exercise, yoga, music therapy, massage, reflexology, and aromatherapy are alternatives which are applied in addition to medication [11]. Yoga, one of these alternative approaches, is both a lifestyle and ancient Indian art. Yoga refers to physical techniques designed to improve individual consciousness or soul unity. In the Western world today, yoga is often used as an exercise method that provides relief and relaxation [12]. The use of postures in yoga increases flexibility, coordination, strength, and power, while the use of breath control provides respiratory control, relief, and concentration [13,14]. Recent studies have shown that yoga can be an effective method for treating both physical and mental disorders, including depression, schizophrenia, and anxiety disorders [3,15–19]. Behere et al. demonstrated that yoga therapy could be a useful add-on treatment to improve facial emotion recognition deficits, psychopathology, and socio-occupational functioning in antipsychotic-stabilized patients with schizophrenia [20]. Yoga-related improvements have been reported for global cognition and several neuropsychological domains, including immediate and delayed recall, verbal and visual memory, attention, working memory, verbal fluency, executive function, and processing speed in patients both with and without cognitive decline [12–20].

When yoga is applied in addition to drug treatments patients, it has positive effects on negative, cognitive, and positive symptoms, insight formation, social functionality, treatment efficacy, quality of life, and daily living activities [21–23]. Varambally determined that yoga decreased the negative and positive symptoms in patients with schizophrenia [21]. Verma determined that yoga positively affected the cognitive symptoms in patients with schizophrenia [22]. Furthermore, Visceglia and Lewis found that yoga increased the medication adherence in patients with schizophrenia [23]. Yoga practice typically involves a series of physical postures (i.e., asanas, Surya Namaskar, and sitting, prone, and supine postures), breathing techniques (pranayama), and meditative/mindfulness practices (dyana), and yoga is often perceived as a form of therapy to self-manage health-related concerns. These limbs of yoga provide several self-regulatory strategies that are ultimately designed to quieten the dysfunctional thoughts and ruminations of the mind thereby encouraging mind-brain-body wholeness and wellness [24].

The number of studies on yoga either from Turkey or worldwide is limited. No study was found in the literature that investigated the effects of yoga on clinical insight and medication adherence in schizophrenic patients. The results of this study are expected to make a positive contribution to the health of patients with schizophrenia as well as to the healthcare professionals and family members who provide care to them. For psychiatric nurses, it is important for patients to feel good, reduce disease symptoms, and gain insight to support medication adherence. Yoga improves the effectiveness of treatments by making patients feel better, reducing disease symptoms, and providing insight to patients [20–24]. This study was based on the hypothesis that yoga increases clinical insight and treatment adherence levels in patients with schizophrenia.

2. Patients and methods

2.1. Patients

This randomized controlled trial was conducted in a Community Mental Health Centre (CMHC). The center provides facilities to patients with severe mental disorders (usually schizophrenia). For this purpose, the disease status of the patients are evaluated, their follow-up and treatment are done and rehabilitation services are provided in the centers. All centers consist of a reading room, kitchen, sports room, training room, work room, television lounge and dining room. Patients are taught to adapt to society and are provided with social activities (music, painting, exercise). Psychiatrists, psychologists, nurses, secretaries and art, music, gym teachers are employed in the centers. Patients continue to use antipsychotic drugs in these centers and patients are stable. Patients are brought to these centers from their homes at 09.00 in the morning via CMHC's bus services and taken to their homes again at 16.00 in the evening. For this, the CMHC does not charge any fee.

To locate patients who had been diagnosed with schizophrenia according to the DSM-5, the researchers contacted 240 of the 270 patients with schizophrenia who were registered with the CMHC. When the patients' files were examined, 50 patients were identified that did not meet the inclusion criteria. Thus, 190 patients remained for inclusion in our study sample. Based on the testing properties of our power analysis, the sample size required a minimum of 50 patients with schizophrenia (25 for the control group and 25 for the intervention group) to obtain a significance level of 0.05, effect size of 0.8, and ability of representing the population of 0.95 [25,26]. The initial study sample was composed of a total 60 patients (30 in the control group and 30 in the intervention group) who met the eligibility criteria. However, for various reasons during the application process, five participants left each the control group and intervention group. The study was thus completed with 50 patients (25 in each group). Matching and randomization methods were used together in the study. For this, first a pretest was conducted with all patients who had agreed to participate in the study. After being matched for age illness duration, marital status, educational level and gender, individuals meeting the inclusion criteria were randomly allocated to either an intervention group or a control group. Each patient was numbered and assigned to a group using a random table of numbers.

Inclusion criteria of study were as follows: giving consent to participate in the study, aged between 18 and 65 years, residing in Malatya city center and registered at the CMHC, having been followed up with the diagnosis of schizophrenia according to diagnostic criteria in the *Diagnostic and StatisticalManual of Mental Disorders* by a psychiatrist, being in an euthymic state (in remission), not having been included in a similar yoga program directed at the condition within the past 6 months, and being open to cooperation and communication.

2.2. Ethical considerations

In order to conduct the study, approval from the Ethics Committee of the Faculty of Health Sciences in the University (Approval No: 2018/14-9) and legal permission from the relevant institutions were obtained. The patients were informed that their information would be kept confidential, not be used in elsewhere and they had the right to withdraw from the study whenever they want. Before starting the study, consents of the patients, their relatives and doctors were obtained. The study was conducted on the basis of voluntary principles.

2.3. Data collection

2.3.1. Demographic and clinical characteristics form

The form (gender, age, educational background, income level, marital status, history of mental illness in the family, duration of disease) was prepared by the researcher taking in the context of the literature and included 7 questions.

2.3.2. Birchwood insight scale

This scale was developed by Birchwood et al., in 1994 and the Turkish validity and reliability study of the scale was conducted by Sakarya and Devrimci-Ozguven in 2012. In the scale, items 1 and 8 evaluate symptoms, items 2 and 7 evaluate the disease, and items 3, 4,

5, and 6 assess the awareness of treatment needs. 0, 1, 2 points can be obtained from all items; scores of the items 1, 2, 7, and 8 directly contribute to the total score. However, the scores taken from the items 3, 4, 5, and 6 are summed and divided by two and the resultant number contributes to the total score. While the highest score to be obtained from the scale is 12,the lowest one is 0 point. While 12 points refer to full insight, 0 point refers to the lack of clinical insight. In the present study, Cronbach's alpha value of the Birchwood Insight Scale was calculated as 0.81.

2.3.3. Morisky medication adherence scale

The scale was developed by Morisky et al., in 1986 and its Turkish validity and reliability study was conducted by Yılmaz in 2004.The Cronbach's alpha coefficient of the scale ranges between 0.64 and 0.96. The scale consists of four questions measuring medication adherence. The questions are answered as "yes / no". Medication adherence is evaluated as high if all questions are answered as "no", moderate if one of two questions are responded to as "yes", and low if three or four questions are responded to as "yes". Low adherence is 0–1 scores; Moderate adherence is 2–3 scores, High adherence is 4 score. In this study, the Cronbach's alpha coefficient of the scale was found as 0.86.

Firstly, the interview room for the patients was adjusted.The interview room was silent and the patients were alone. The patients were taken to the interview room one by one by the first researcher. The questionnaire and the scales were read by the first researcher through face-to-face with the patients in a specific interview room using therapeutic communication techniques. The responses of the patients were marked on the forms. Questions which the patients did not understand were explained without making any comment. It took approximately 20 min to collect the data. The Birchwood Insight Scale and Morisky Medication Adherence Scale were applied at the end of the first (pretests) and final session (posttests) to both the control and intervention groups.

2.4. Intervention

2.4.1. Intervention group (Yoga Group)

The yoga program was run by the first author, a certified yoga instructor. We prepared the yoga program according to a validated integrated yoga module for schizophrenia [24]. The details of the yoga program are given in Table1. The module consisted of physical relaxation exercises, Surya Namaskara, Asana, and Pranamaya. The yoga was administered to the intervention group by the first author each weekday for 8 weeks in the exercise room and garden of the CMHC. The patients in the intervention group were initially divided into four smaller groups. Each group consisted of approximately five to six patients. For each yoga group, the duration of each group-based yoga practice was 50–55 min, comprised of 5 min physical relaxation, 5 min Surya Namaskara, 20 min poses (asanas), 20 min pranayama, and 5 min meditation. At the end of the 8 weeks, CDs containing yoga videos were given to the patients of the intervention group for practicing yoga at home. The patients in both groups (control and intervention) continued to attend their usual treatments at the center during the research process, which included pharmacology and psychosocial intervention (case management by a social worker, occupational therapist,psychiatric nurse e.g.).

Table 1
Yoga program (Physical and spiritual relaxation by providing body awareness).

1. Physical Relaxation	5 min
2. *Surya Namaskara* 4 rounds slow 4 rounds fast	5 min
3. Asanas	20 min.
Sitting posture	
– Vakrasana	
– Ardha uṣtrasana	
Prone posture	
– Bhujaṁgasana	
– Śalabhasana	
Supine posture	
– Viparitakaraṇiasana	
– Matsyasana	
4. Pranayama	10 min
Sukhasana	
Kumbhaka,	
Antara Rumbaka,	
Nadi shodhana(2 rounds)	
Bhastrica Pranayama(2 rounds)	
5. Meditation	10 min

2.5. Yoga program

Physical Relaxation: The physical muscle relaxation technique consists of a systematic program of contraction and relaxation of muscle groups (face, neck, shoulders, arms, forearms, hands, back, abdomen, buttocks, thighs, legs and feet. During training, participants tightened each muscle group progressively after reaching a maximal contraction.

Surya namaskara: This is a set of 12 yoga asanas which bring your body,breath and mind together.When performed in the morning, it revitalies your body and refreshes your mind, leaves you feeling energetic throughout the course of the day.

Asanas: Asanas are physical movements based on stretch and balance applied in yoga.In this posture all attention is directed to the body. Asanas provide physical and spiritual relaxation. The aim was to try and teach all patients to move to the body, to stand in balance and to relax with asanas.

Vakrasana, Ardha Ustrasana, Bhujangasana, Salabhasana Viparitakaraniasana, and Matsyasana positions were used, which relieve stress and fatigue, elevate mood, regulate emotions and stress, and calm the mind [28,29].

Pranayama: Pranayama is a respiratory control. Breathing controls were provided for patients with Pranayama. For this purpose, it was taught that patients become aware of their bodies. There is an intimate relationship between your breath and your mind. When your mind is centered and quiet, so is your breath. When your mind is turbulent, your breathing becomes disordered. Regulating your breath enhances your physical, emotional, and spiritual well-being [28,29].

Sukhasana, Kumbhaka, Antara Rumbaka, Nadi shodhana positions were used.

Kumbhaka and Antara rumbaka improve concentration, clears and stills the mind. *Nadi shodhana:* Alternate nostril breathing helps sharpen your concentration and mental clarity when your mind is dull. It provides equal amounts of oxygen to both sides of your brain. The ancient yogis taught that if you can learn to regulate the way you breathe, you can gain greater control over your mind as well. This is particularly helpful when you experience times of stress or anxiety. Alternate nostril breathing also helps soften the intensity of an overly reactive emotional state.*Bhastrica Pranayama:*Bellows breath pranayam is beneficial in relieving all brain-related illnesses. It enhances the oxygen level of the body[HYPERLINK \l "Ref28″ \o " [28] B. Paikkatt, A.R. Singh, P.K. Singh, M. Jahan, *J*.K. Ranjan. Efficacy of Yoga therapy for the management of psychopathology of patientshaving chronic schizophrenia, Indian *J* Psychiatry 4 (2015) 57.″ \h 28–30].

Meditation: Meditation is voluntarily focused on thoughts.A quiet environment has been created for patients.During the meditation, all the senses and movement organs were silenced and their thoughts concentrated. It is aimed to focus on the thoughts of patients and to create differences in perception and attention power.In meditation the eyes are closed and stretched to a suitable place. The eyes are left to their own minds before they open. After the meditation, it feels very relaxed, rested and relaxed. Practice will increase body awareness and interoception. Interoception is insight on the physiological condition of the body and is associated with the autonomic nervous system and autonomic motor control [30].

Table 2
. Demographic and Clinical Characteristics of the Patients in the Control and Intervention Groups (n = 50).

Demographic Characteristics	Control Group (n = 25)		Intervention Group (n = 25)		Test Value and Significance
	n	**%**	**n**	**%**	
Age Group					
18-28	6	24.0	5	20.0	$X^2 = 1.203$
29-39	8	32.0	9	36.0	p = 0.23
40-50	9	36.0	10	40.0	
51-61	2	8.0	1	4.0	
Gender					
Female	12	48.0	11	44.0	$X^2 = 1.078$
Male	13	52.0	14	56.0	p = 0.12
Marital Status					
Married	13	52.0	12	48.0	$X^2 = 2.013$
Single	12	48.0	13	52.0	p = 0.74
Educational Level					
Illiterate	7	28.0	7	28.0	
Literate	10	40.0	9	36.0	$X^2 = 0.578$
Primary education	6	24.0	7	28.0	p = 0.07
Secondary education	2	8.0	2	8.0	
Income Level Perception					
Low	6	24.0	5	20.0	
Middle	15	60.0	17	68.0	$X^2 = 3.023$
High	4	16.0	3	12.0	p = 0.60
History of Mental Illness in the Family					
Yes	9	36.0	5	20.0	$X^2 = 0.903$
No	16	64.0	20	80.0	p = 0.13
Have a diagnosis of schizophrenia					
0-5 years	3	12.0	6	24.0	
6-11 years	15	60.0	12	48.0	$X^2 = 1.025$
12-17 years	5	20.0	5	20.0	p = 0.08
18-23 years	2	8.0	2	8.0	

2.6. Data analysis

The data obtained from the study were evaluated in the SPSS 22 statistical package program. The strength of association was expressed as odds ratios with 95% confidence interval. Cronbach's alpha was used to assess the internal consistency of the scales. Significance in the study was evaluated as $p < 0.05$; $p < 0.01$. Chi-square for the comparison of the descriptive characteristics of the control and intervention groups, paired sample *t*-test for the comparison of pretest and posttest, and independent samples *t*-test for the comparison of the control and intervention groups were applied to assess the data.

3. Results

3.1. Descriptive and clinical characteristics of the control and intervention groups

Table 2 the analysis of the descriptive characteristics of the participants in the intervention group and the control group showed that: of the controls, 36% were in the age group of 40–50 years, 52% were male, 48% were single, 40% were literate, 60% had middle income level, 36% had a history of mental illness in their family and 60% were ill for 6–11 years. Of the intervention group were 40% of the patients in 40–50 year age range, 56% were male, 52% were single, 36% were literate, 68% had a middle income level, 20% had history of mental illness in their family and 48% had been ill for 6–11 years (Table 2). There was no statistically significant difference between the control and intervention groups in terms of their descriptive characteristics ($p > 0.05$). Control and intervention groups were homogeneous (Table 2).

3.2. Effect of yoga

In the comparison of differences between the groups; patients in the control group had a mean pre-test insight score of 2.98 ± 0.41, while the intervention group had a mean pre-test insight score of 3.16 ± 1.27.; the difference between the mean scores was not statistically significant ($p > 0.05$). As for patients in the intervention group, their mean post-test insight score was 6.68 ± 1.72; the difference between this score and the control group's mean post test score (2.98 ± 0.40) was significant ($p < 0.01$) and the patients in the control group had the lower mean insight score compared with the patients in the intervention group.

According to the intragroup comparison of the insight scale mean score of patients in the control group, a statistically significant difference was not found among the pretest and posttest ($p > .05$). Insight scale mean score did not change as significantly in the control group.

According to the intragroup comparison of the insight scale mean score of patients in the intervention, a statistically significant difference was found among the pretest and posttest($p < 0.01$). Posttest insight of the intervention group increased compared to pretest insight.

In the comparison differences between the groups; patients in the control group had a mean pre-test medication adherence score of 1.26 ± 0.32, while the intervention group had a mean pre-test medication adherence score of 1.78 ± 0.53; the difference between the mean scores was not statistically significant ($p > 0.05$). As for patients in the intervention group, their mean post-test medication adherence score was 2.96 ± 1.49; the difference between this score and the control group's mean post test score(1.26 ± 0.32) was significant ($p < 0.01$) and the patients in the control group had the lower mean medication adherence score compared with the patients in the intervention group.

According to the intragroup comparison of the medication adherence scale mean score of patients in the control group, a statistically significant difference was not found among the pretest and posttest. ($p > .05$). Adherence treatment scale mean score did not change as significantly in the control group.

According to the intragroup comparison of the medication adherence scale mean score of patients in the intervention group, a statistically significant difference was found among the pretest and posttest ($p < 0.01$). Posttest medication adherence of the intervention group increased compared to pretest adherence (Tables 3–5).

4. Discussion

At baseline, clinical insight and medication adherence scores (pretest) of the patients were found to be low in both the control and intervention groups. Previous studies have shown that patients with schizophrenia have low levels of clinical insight and treatment adherence, negatively affecting their quality of life, sense of hope, self-esteem, and internalized stigma [6–8,31–33]. Perkins stated that patients with schizophrenia had no medication adherence [5]. Uzun et al. also found that patients with schizophrenia did not show medication adherence, while Yılmaz et al. observed that medication adherence in psychotic patients was low and that it was a significant problem

Table 3
Comparison of Pretest-Posttest Total Mean Scores of the Patients in Control Group from Insight and Medication Adherence Scale.

	Insight Scale Total Score (0-12) Mean ± SD	Medication Adherence Scale Total Score (0-4) Mean ± SD
Pretest	2.98 ± 0.41	1.26 ± 0.32
Posttest	2.98 ± 0.40	1.26 ± 0.32
Test Value	*t* = 0.368	*t* = 0.543
p Value	0.11	0.38

Table 4
Comparison of the Pretest-Posttest Total Mean Scores of the Patients in the Intervention Group for the Insight Scale and Medication Adherence Scale.

	Insight Scale Total Score (0-12) Mean ± SD	Medication Adherence Scale Total Score (0-4) Mean ± SD
Pretest	3.16 ± 1.27	1.78 ± 0.53
Posttest	6.68 ± 1.72	2.96 ± 1.49
Test Value	t=1.648	t=1.669
p Value	**0.00**	**0.00**

Table 5
Comparison of the Pretest-Posttest Total Mean Scores of the Patients in the Control and Intervention Groups from the Insight Scale and the Medication Adherence Scale.

	Insight Scale Total Score (0-12)		Medication adherence Scale Total Score (0-4)	
	Pretest Mean ± SD	Posttest Mean ± SD	Pretest Mean ± SD	Posttest Mean ± SD
Control Group	2.98 ± 0.41	2.98 ± 0.40	1.26 ± 0.32	1.26 ± 0.32
Intervention Group	3.16 ± 1.27	6.68 ± 1.72	1.78 ± 0.53	2.96 ± 1.49
Test Value	t=1.631	t=1.254	t=2.023	t=0.195
p Value	0.17	**0.00**	0.61	**0.00**

[31,33]. In a study conducted by Dikec and Kutlu with a group of individuals diagnosed with schizophrenia, the most important factor affecting medication adherence was clinical insight and that the insight of the patients was low [2]. The results of these studies support the results of the present study.

In the comparison between the intervention group and the control group of this study, there were significant differences found between the mean clinical insight and treatment adherence scores in the posttest. The intervention group's mean insight and adherence treatment scores in the posttest increased significantly as compared to the control group. In an intragroup comparison of the pretest-posttest mean scores, a significant difference was found between the intervention group's pretest and posttest mean scale scores for insight and adherence treatment. The scale scores in the posttest had increased significantly over the pretest. These results support our hypothesis that yoga is effective for increasing clinical insight and treatment adherence levels in patients with schizophrenia. Insight is conceptualized as an ability to evaluate and correct one's own distorted beliefs and misinterpretations [29]. Yoga practices have an effect on patients' clinical insight processes, allowing them to accept negative ideas on which they formerly ruminated and to recognize harmful implications [30]. The breathing exercises, body poses, and medication in yoga create an awareness of thoughts, feelings, and behaviors [11,16]. Individuals performing yoga recognize their own feelings, thoughts, and behaviors and turn inward [12,13]. This is thought to lead to an increase in the insight of patients. Jayaram et al. determined that yoga increased awareness in patients with schizophrenia [34]. Yoga provides share a fundamental belief in "mindful" awareness of experiences and emotions as they arise, without having to change them, yoga is similar mechanisms awareness practices [29]. In a study conducted by Manjunath and Varambally on patients with schizophrenia, they found that yoga raised awareness in the behaviors, thoughts, and emotions of patients [15]. Verma and Basu determined that yoga increased the acceptance of the illness and its symptoms and treatment in patients with schizophrenia [22]. These studies are in parallel with the results of the present study.

Yoga practices have an effect on the clinical insight processes of patients, allowing them to accept the negative ideas on which they had formerly ruminated and recognize the harmful implications [34]. An increase in self-awareness allows patients to take opportunities to improve their lives and better cope with their problems [28,29].Yoga decreased the paranoid thoughts of patients and increased their ability to control their thoughts [20,22,23]. Manjunath and Varambally determined that yoga increased the medication adherence of patients with schizophrenia [15]. Ikai et al. found that yoga increased medication adherence in patients with schizophrenia by reducing the side effects of medication [35]. In a study conducted by Gaiswinkler et al. it was determined that yoga increased medication adherence and decreased the required drug dose [36].

Shortway et al. found that the patients in their yoga practicing intervention group had increased awareness as compared to a control group [9]. Snaith et al. noted that yoga provided awareness by reducing stress, anxiety, and depression symptoms in their intervention group as compared to a control group [19]. Several systematic reviews have produced inconclusive findings regarding yoga's utility as an add-on therapy for schizophrenia [12,13,22–24,27,28]. Furthermore, Cramer et al. systematically reviewed the effects of yoga on the symptoms of schizophrenia, quality of life, function, and hospitalization in patients with schizophrenia, that yoga, especially a sustained practice, may improve self-regulatory skills and reduce aversive emotional states thereby conferring cognitive benefits [37]. Verma et al. used a yoga module (consisting of asanas, pranayama, relaxation techniques, and chanting) for managing antipsychotic-induced side effects in patients with schizophrenia, providing the participants an opportunity to learn to increase their awareness of the ongoing situation and to reduce the automatic modes of cognitive-affective processing, especially increasing social functioning, clinical insight, and the recovery level of daily life skills. In this way, the individuals gradually accepted their present life experience and were less depressed [38]. In the study conducted by Visceglia and Lewis, patients with schizophrenia in a yoga group had their positive and negative symptoms decreased and their treatment efficacy increased [39].

5. Limitations

Yoga interventions were provided only for a limited period of time. In addition, the post-tests evaluation were conducted only once and the long term effects of the use or efficacy of yoga were not assessed.

6. Conclusion

The results of this study suggest that yoga may increase clinical insight and medication adherence in patients with schizophrenia. These results suggest that yoga may serve as an effective adjunct to standard care in schizophrenia treatment at the CMHC and potentially in post-hospital rehabilitation settings.

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Declaration of Competing Interest

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