Adolfo Piñón-Blanco[1,2,3];
Esperanza Vergara-Moragues[4];
Rafael Fernández-Martínez[2,5];
Olga Gutiérrez-Martínez[2,5];
María Álvarez-Couñago[6];
Cristina Martínez-Reglero[2];
Tania Rivera-Baltanás[2];
Francisco Otero-Lamas[1,2];
José M. Olivares[2,5];
Carlos Spuch[2]

Effectiveness of the "Trisquel" board game intervention program for patients with schizophrenia spectrum disorders

[1] Assistence Center for Substance Abuse Treatment of Council of Vigo, CEDRO, Vigo. Spain.
[2] Translational Neuroscience Research Group, Galicia Sur Health Research Institute. University of Vigo, CIBERSAM, Spain
[3] University of Santiago de Compostela.
[4] Department of Psychobiology and Methodology in Behavioral Sciences. Complutense University of Madrid (UCM). Madrid, Spain
[5] Psychiatry Department, Vigo Health área, Spain.
[6] Association of family members and the mentally ill LENDA, Redondela, Spain.

SUMMARY

Introduction. Schizophrenia spectrum disorders present emotional, cognitive and/or behavioural alterations related to daily functioning. Therefore, it is necessary to develop intervention programs focused on the improvement of these constructs. The aim of this work is to analyse the effect of the intervention program "Trisquel" on cognitive functioning, symptomatologic perception and psychosocial functioning.

Methodology. An experimental design was carried out with a total of 24 people with a diagnosis of schizophrenia spectrum disorder who were randomly assigned to the experimental/ "Trisquel" group and the control group. The "Trisquel" group carried out two structured sessions per week during three months, while the control group carried out cognitive stimulation sessions with the same frequency and intensity. Neuropsychological, clinical and functional tests were administered before and after the intervention.

Results. After the intervention program in the "Trisquel" group, statistically significant improvements were found in the WAIS-III LetterNumber subtest (p=0.029), in the WAIS-III Working Memory index (p=0.020) , in Interpersonal Sensitivity (p=0.015) and Paranoid Ideation (p=0.049) SCL-90-R and in psychosocial functioning EEAG (p=0.020). And in the control group, in WAIS-III Processing Speed index (p=0.034) WAIS-III and health perception SF-36 (p=0.017).

Conclusions. The results of this study suggest that "Trisquel" may be an effective intervention program to induce improvements in working memory, in the symptomatological dimensions of interpersonal sensitivity and paranoid ideation, and in psychosocial functioning in people diagnosed with schizophrenia spectrum disorder.

Key words: Schizophrenia spectrum disorders, cognitive impairment, cognitive rehabilitation, cognitive stimulation, Trisquel.

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RESUMEN

Introducción. Los trastornos del espectro de la esquizofrenia presentan alteraciones emocionales, cognitivas o conductuales relacionadas con el funcionamiento diario. Por ello, es necesario desarrollar programas de intervención enfocados a la mejora de estos constructos. El objetivo de este trabajo es analizar el efecto en el funcionamiento cognitivo, la percepción sintomatológica y el funcionamiento psicosocial del programa de intervención «El Trisquel».

Metodología. Se llevó a cabo un diseño experimental con un total de 24 personas con diagnóstico de trastorno del espectro de la esquizofrenia que fueron asignadas aleatoriamente al grupo experimental «El Trisquel» y al grupo control. El grupo «El Trisquel» realizó dos sesiones estructuradas semanales durante tres meses, mientras que el grupo control realizó sesiones de estimulación cognitiva con la misma frecuencia e intensidad. Se administraron pruebas neuropsicológicas, clínicas y funcionales antes y después de la intervención.

Resultados. Tras el programa de intervención, en el grupo «El Trisquel» se encontraron mejorías estadísticamente significativas en los subtests de letras y números (p = 0,029), en el índice de memoria de trabajo (p = 0,020) WAIS-III, en sensibilidad interpersonal (p = 0,015) e ideación paranoide (p = 0,049)

Institutions where the work has been done:
Association of family members and the mentally ill LENDA. Address: C/ Reveriano Soutullo, 57. CP 36800. Redondela. (Pontevedra).

Day Hospital. Hospital Nicolás Peña. Address: Av das Camelias, 109. CP36211. Vigo (Pontevedra)

Correspondence:

Adolfo Piñón Blanco.
Assistence Center for Substance Abuse Treatment of Council of Vigo CEDRO. C/Pintor Colmeiro Nº9, CP36211 Vigo (Pontevedra).
E-mail: adolfo.pb@icloud.com

SCL-90-R y en funcionamiento psicosocial EEAG (p = 0,020). Y en el grupo control, en velocidad de procesamiento (p = 0,034) WAIS-III y percepción de la salud SF-36 (p = 0,017).

Conclusiones. Los resultados de este estudio sugieren que «El Trisquel» puede ser un programa de intervención eficaz para inducir mejoras en el funcionamiento de la memoria operativa, en las dimensiones sintomatológicas de sensibilidad interpersonal e ideación paranoide y en el funcionamiento psicosocial en personas con diagnóstico de trastorno del espectro de la esquizofrenia.

Palabras clave: trastornos del espectro de la esquizofrenia, deterioro cognitivo, rehabilitación cognitiva, estimulación cognitiva, El Trisquel.

INTRODUCTION

Mental illness or disorder is an emotional, cognitive and behavioural disturbance in which basic psychological processes such as emotion, motivation, cognition, awareness, behaviour, perception, learning or language are affected. All this can seriously damage the daily functioning of these people and, therefore, their quality of life[1,2].

Within mental illnesses are those related to the psychotic spectrum. The DSM-5 includes this group in the diagnostic category "spectrum of schizophrenia and other psychotic disorders" with a variety of common symptoms such as delusions, hallucinations, or negative symptoms[3]. They may vary in nature, onset, course or severity, but all ultimately interfere with the functioning and quality of people's lives. The most frequent pathology on this spectrum is schizophrenia, whose prevalence is around 1% worldwide[4], and around 0.8% in Spain with an annual incidence of 0.2%[5].

Cognitive impairment appears to be a relatively stable feature of schizophrenia spectrum disorders that may underlie the disorder given its primary, independent, persistent and prognostically determinant nature[6].Some authors describe that the cognitive, emotional and behavioral alterations would be present years before the appearance of the pathology[7], others postulate that it would be mental illness that produces the cognitive problems[8] . In this sense, cognitive deficits and their impact on the functionality and quality of life of patients justify and explain the application of cognitive rehabilitation programs within the treatment of psychotic disorders[15]

The literature review highlights the relevance of cognitive rehabilitation in schizophrenia spectrum disorders[16] showing itself effective in the improvement of some cognitive domains such as attention and verbal memory, as well as, in the reduction of symptomatology and in some areas of social functioning[17].In addition, it has also been shown to have an impact on brain activity[18], with increased activity in the frontal and prefrontal regions, as well as in the anterior cingulate cortex[19].Evidence of beneficial neural effects indicating neuroplasticity is increasing lately[20].

Different studies report that the most effective interventions are multivariate, social skills oriented[21]and comprehensive approaches in which cognitive rehabilitation is carried out through different techniques that reinforce cognitive skills by working on aspects such as motivation, effort, practice and acquisition of compensatory techniques[22,23]. In this sense, clinical reality and scientific evidence show the need to establish a comprehensive approach to patient health as a way to achieve functional recovery[24].

In our country, several studies have been carried out with the CRT-Cognitive Remediation Therapy[25], the evaluation of the effectiveness of Attention Process Training[26], the cognitive rehabilitation program in psychosis REHACOPwhich has been shown to be effective in inducing improvements in neuropsychological impairment in people with schizophrenia[27] and the online rehabilitation program e-Motional Training which has shown beneficial results in all domains of social cognition and general symptomatology in people with schizophrenia[28].

Intervention programmes in board game format have been used for aspects such as improving adherence, psycho-education, stimulating cognitive processes, energising interventions and working on social skills[29]. These types of intervention programs have also been used in educational, psycho-educational and integrative activities[30]. Previous experiences such as "The Triviality of Consciousness"[31], "Escalation of consciousness"[32] o "Train"[33], are examples of how a board game can be a rehabilitation tool. Specifically, "The Train" has proven effective in the treatment of social skills in people diagnosed with schizophrenia[33]. In addition, at present various interventions have also used electronic and virtual reality games (serious games) for the treatment of various psychopathological disorders in the area of mental health for various therapeutic purposes[34].

Taking into account the above, the intervention program "Trisquel" was developed in a board game format. This program arises from the clinical need to dynamize therapeutic interventions and to implement neurorehabilitative interventions combining psychoeducation and cognitive stimulation strategies[35]. "Trisquel" has been used in other populations with positive effects[36,37] but this would be the first time it has been used in people with schizophrenia spectrum disorders. The aim of this study is to analyze the effect of the intervention program in board game format "Trisquel" on people with schizophrenia spectrum disorders and other psychotic disorders, with respect to cognitive performance, symptomatic perception and daily functioning.

METHODOLOGY

Design

A multicenter randomized clinical trial was conducted with two randomized groups (control and experimental) with pre and post measures.

Participants

The participants were selected among those outpatients who attended the psychosocial rehabilitation centre of the association of relatives and mental patients LENDA (Redondela, Spain) and the day hospital of the hospital Nicolás Peña (Vigo, Spain). The inclusion criteria were: 1) diagnosis of schizophrenia spectrum disorder and other psychotic disorders according to DSM-5[3], 2) have the capacity to consent (competence), 3) read project information sheet and sign informed consent, 4) be of legal age, 5) be able to read and write. The exclusion criteria were: 1) illiteracy, 2) diagnosis of mental retardation (IQ<70), 3) moderate or severe neurological impairment, 4) suffering from an acute psychiatric process, 5) inability to be evaluated, 6) no cognitive impairment on the Montreal Cognitive Assessment (MOCA ≥ 26). Of the total 31 people evaluated, 27 met the inclusion criteria and were invited to participate in the study. Of these, 1 person declined to participate due to lack of interest in the study and 2 others dropped out before beginning the interventions. The final sample for this study was 24 people between the ages of 21 and 59. Participants met diagnostic criteria for schizophrenia spectrum disorder and other psychotic disorders: 14 (58.3%) paranoid schizophrenia, 7 (29.2%) schizoaffective disorder, 2 (4.2%) atypical psychosis, and 1 (2.4%) residual schizophrenia. 6 (25%), had a history of substance use, 3 (7.1%) THC and 3 (7.1%) alcohol.

Table 1 Neuropsychological Assessment Protocole

Cognitive domain	Tools
Mild Cognitive Impairment Screening	**Montreal Cognitive Assessment (MOCA)** (Nasreddine *et al*., 2005)
	WAIS-III (Wechsler, 2001)
Psychomotor processing speed and visomotor coordination	Coding
Mental calculation and Working Memory	Arithmetic
Focalized attention, Sustained attention and Working Memory	Digit Span
Visual perception, Psychomotor processing speed	Symbol Search
Working memory	Letter-Number Sequencing
Psychomotor processing speed	Processing Speed Index (PSI)
Working memory	Working Memory Index (WMI)
	STROOP Test (Golden, 2001)
Reading processing speed	Words
Selective Attention	Color
Cognitive inhibition	Word-color
	Trail Making Test (TMT) (Reitan&Wolfson, 1993)
Sustained attention, motor and visuo-spatial visual searching skills	Part A
Alternating attention and cognitive flexibility	Part B
	Verbal Fluency Test
Frontal lobe Functioning	**Phonemic Fluency** (Benton&Hamsher, 1989)
Temporal lobe Functioning	**Semantic Fluency**
Psychopathological Symptoms	**SCL-90** (Derogatis, 1977)
Index for Current severity level of discomfort	Global Severity Index (GSI)
Total nº of positive items (symptoms)	Positive Symptom Distress Index
(PSDI)	Índice de malestar positivo (PST)
Response style	Positive Symptom total (PST)
Global Assessment of Functioning	**GAF** (American PsychiatricAssociation, 1987)
Health Questionnaire	**SF-36** (Ware, Snow, Kosinski & Gandek, 1993)

Measuring instruments

A sociodemographic data collection questionnaire and a battery of standardized neuropsychological, clinical and functional tests were developed. Table 1 shows the tests used and the domains assessed.

- ***Montreal Cognitive Assessment, MoCA*[38,39].** The Spanish version of the MoCA test designed by Nasreddine was used. With a maximum score of 30, being the cut-off points suggested by the author, 25/26 for mild cognitive impairment and 17/18 for dementia.

- ***Wechsler Adult Intelligence Scale (WAIS III)*[40].** The subtests of digit-symbol coding and symbol search (processing speed index), letter-number, digit span and arithmetic (working memory index) were used.

- ***STROOP test*[41,42].** It is an instrument that allows the evaluation of reading processing speed, selective attention and resistance to interference. The reliability of the test using the test-retest method is .89 for Stroop-P, .84 for Stroop-C and .73 for Stroop-PC.

- ***Trail-making test (TMT)*[43,44L].** Part A of the TMT evaluates visual and processing speed and part B cognitive flexibility.

- ***Verbal fluency test.*** The Phonemic Fluidity test was used[45,46], task of oral production of words before phonetic instructions and the Semantic Fluency test (animals), task of linguistic production that requires the implementation of the mechanisms of access to the lexicon.

- ***Questionnaire SCL-90-R*[47].** Instrument of recognized utility for the detection of a wide range of psychopathological symptoms and for the evaluation of symptomatic changes produced by the treatment or for the follow-up of diverse chronic cases.

- ***Global Activity Evaluation Scale EEAG*[48].** Measures the subject's overall activity level on a scale from 1 to 100, with increased scores denoting decreased levels of psychopathology and improved psychosocial functioning.

- ***Health Questionnaire SF-36*[49].**It is a generic scale that provides a profile of health status, useful for assessing health-related quality of life in the general population and in specific subgroups.

Procedure

The professionals who participated in the project received training before the start of the programme on the project methodology and the theoretical and practical contents of the "Trisquel" intervention programme. Subsequently, each centre designated, on the one hand, a professional in charge of carrying out the recruitment, the intervention sessions with "Trisquel" and the pre-post intervention assessments and, on the other hand, a professional in charge of carrying out the cognitive stimulation sessions, both professionals being unaware of the assignment of the subjects to the different experimental conditions. All outpatients were recruited at the psychosocial rehabilitation center (LENDA) and at the day hospital (Nicolás Peña). A simple random sampling technique was applied until the estimated sample size was reached (maximum 14 persons per centre) to identify the cases that met the inclusion criteria and on this filtered census. People were then assigned to the experimental and control group using a simple random sampling technique. According to the application rules and correction criteria of each manual, all participants were given a battery of tests before and one week after the last intervention session. All tests were applied in two evaluation sessions of 60 minutes each under similar conditions. The data were collected under the protection of the Organic Law 1/1999 of 13 December on the protection of personal data

Ethical considerations and protection of personal data

This project was approved by the Galician Autonomous Committee of Research Ethics (Registration Code: 2016/268). All patients were informed about the rehabilitation program before its start. Patients read and signed the informed consent form, voluntarily accepted their participation in the study and did not receive any financial or other incentives.

Cognitive rehabilitation

Patients randomly assigned to the experimental group "Trisquel" and the control group received cognitive rehabilitation in the context of a biopsychosocial treatment, consisting of support programs for psychosocial rehabilitation through individual and group interventions implemented by a multidisciplinary team (psychiatrist, clinical psychologist, nurse, occupational therapist, etc.).

Experimental group ("Trisquel"). The "Trisquel" is an intervention program in a board game format that combines psychoeducation and cognitive stimulation strategies. It consists of a board, tokens and thematic blocks of cards with 1,105 theoretical and practical tests. Although "Trisquel" includes additional thematic blocks, for the purpose of this study the following blocks were used: mental health, health interventions (sleep hygiene, nutrition), smoking

(information, prevention and treatment), social and pragmatic communication skills, cognitive non-manipulative tests (attention sub-processes, verbal memory, verbal comprehension, visual memory, operational memory), manipulative cognitive tests (viso-constructive praxis, fine and gross motor skills, verbal understanding of written commands, sequencing of tasks, evocation and recognition of images), tests of executive functions (inhibition, planning, decision making, updating information), emotions (prosody, expression and emotional recognition) and theory of mind The dynamics and rules of the program are described in the practitioner's manual[34]. Each session is structured in terms of working on the theoretical and practical aspects. The blocks of cards are ordered numerically (from simple to complex) by topics to be covered. Most of the theoretical-practical tests of the intervention program can be the reason for therapeutic intervention by the professional, making clarifications on some theoretical or practical concept, behavioural modifications of the maladaptive behaviours that arise in role-playing or positive modelling of such behaviours. The intervention program consisted of 24 sessions of +/- 60 minutes with the intervention program in board game format "Trisquel" during 3 months and with a weekly frequency (2 sessions per week). The sessions are carried out in groups of a maximum of 6/7 patients. For a more detailed description of the program and its characteristics, we recommend the following review[50].

Control group. An active control group was created that carried out cognitive stimulation sessions with techniques for restitution of the attention sub-processes (pencil and paper tasks) with the same number of sessions[24], with the same duration (+/-60 minutes) and frequency (2 sessions per week) as the experimental group. The sessions were carried out in groups of a maximum of 6/7 patients. At the end of the study, all the subjects in the control group were offered the rehabilitation program of the experimental group.

Data analysis

A descriptive analysis of the data was carried out. For qualitative variables, frequencies and percentages were calculated. For quantitative variables, means and deviations were calculated. The normality of the variables in each of the study groups was checked by means of the Shapiro-Wilks test. For the identification of differences between the two groups (Experimental and Control) the Mann-Whitney U test or the T test for independent samples was performed. The Wilcoxon test or the T-test for related samples was used for pre-post comparison. Cohen's D was also calculated to quantify the effect size. The programs used were SPSS v.19 and G-power.

Results

Experimental group consisted of 13 people with an average age of 40.2±8.4, of whom 11 (84.6%) were men and 2 (15.4%) women and their average MOCA cognitive impairment was 21.3±3.5. Control group was formed by 11 people with a mean age of 36.2±12.7, of whom 9 (81.8%) were men and 2 (18.2%) women and their mean MOCA cognitive impairment was 21.3±2.7. Table 2 shows the descriptive analysis of the sociodemographic variables of each group in the sociodemographic variables. There were no significant differences in the sociodemographic characteristics between the groups.

Intergroup differences

No statistically significant pre-intervention differences were found between the Trisquel and Control groups in relation to socio-demographic, clinical and functional variables. In relation to cognitive performance, pre-intervention inter-group mean differences in TMT-A were found (p=0.046). In the post-intervention evaluation, no mean inter-group differences were found in the cognitive, clinical and functional variables.

Intra-group differences after intervention

In the cognitive performance of the Trisquel group, statistically significant intragroup mean differences were found in the WAIS-III letternumber subtest (p=0.029), with a moderate effect size (d=0.623) and in the WAIS-III working memory index (p=0.020), with a moderate effect size (d=0.743). In clinical and functional variables, pre-post intervention intragroup analyses reflect mean differences in symptomatological perception, showing an improvement without statistical significance, with a moderate effect size in the symptomatological dimensions of Obsession/compulsion (d=0.520), global severity index (d=0.436), total positive symptoms TSP (d=0.540) and psychoticism (d=0.395). It was found statistically significant differences in the dimensions of: symptomatological perception of SCL-90-R interpersonal sensitivity (p=0.015) with a moderate effect size (d=0.789) and paranoid ideation (p=0.049) with a moderate effect size (d=0.419), as well as, improvements in psychosocial functioning measured through the EEAG (p=0.020), with a moderate effect size (d=0.678).

In the cognitive performance of the control group, statistically significant intra-group mean differences were found in the WAIS-III processing speed index (*p*=0.034), with a moderate effect size (d=0.740). And for clinical and functional variables, pre-post intervention intragroup analyses

Table 2 Sample´s Sociodemographic characteristics

	Trisquel Group N = 13	Control Group N = 11	p
Age[a]	40,2±8,4	36,2±12,7	0,372[d]
Sex[b]			
Male	11 (84,6 %)	9 (81,8 %)	1000[c]
Female	2 (15,4 %)	2 (18,2 %)	
Cognitive Impairment (MOCA)[b]	21,3±3,57	21,3±2,73	0,838[c]
Education Level[b]			
6-8 Years of school	2 (15,4 %)	4 (36,4 %)	0,357[c]
9-12 Years of school	11 (84,6 %)	7 (61,1 %)	
Medication[b]			
Psycholeptics	13 (100 %)	11 (100 %)	1000[c]
Psychoanaleptics	8 (61,5 %)	8 (72,7 %)	0,679[c]
Antiepileptics	3 (23,1 %)	3 (27,3 %)	1000[c]
Anticholinergics	9 (69,2 %)	4 (36,4 %)	0,217[c]
Other meds	4 (30,8 %)	3 (27,3 %)	1.000[c]
Years since diagnostic[a]	18±10,1	13±9,2	0,277[d]
Nº of internalizations in the last year[a]	0,6±0,9	0,8±1,1	0,848[c]

[a]Values expressed as mean ± standard deviation; [b]Values expressed as frecuencies y porcentages; [c]Fisher exact test; [d]T Test for independent samples; [e]Mann-Whitney U test

show statistically significant improvements in SF-36 health perception (p=0.017), with a large effect size (d=1,070). Tables 3 and 4 show the mean scores and standard deviations for each group before and after treatment.

Discussion

The aim of this paper was to analyse the effect of the intervention program in board game format "Trisquel" on people with schizophrenia spectrum disorders and other psychotic disorders with respect to cognitive performance, symptomatologic perception and daily functioning, comparing it with a control group. In the "Trisquel" intervention group, significant improvements were found in cognitive performance (working memory), in perceived psychopathological symptoms (interpersonal sensitivity and paranoid ideation) and in psychosocial functioning. And in the control group, improvements were found in cognitive performance (processing speed) and health perception.

In relation to the cognitive functioning of the "Trisquel" group, although only statistically significant improvements were found in working memory, this should not be considered a minor result, since, on the one hand, working memory is considered a system that intervenes in important cognitive processes such as language comprehension, reading, or reasoning, and on the other, it is considered one of the most affected functions in schizophrenia spectrum disorders, being closely related to functionality. This finding is congruent with previous studies in which improvements in working memory are reported after a specialized rehabilitation program[51,52]. These results could be explained by the effects that an intervention program in a dynamic, structured, hierarchical board game format with specific operational memory tasks and immediate feedback has had on the cognitive functioning of the participants. On the other hand, the improvement obtained by the control group in processing speed is in line with other studies in which improvements are found in this property of this cognitive domain, after the completion of cognitive stimulation sessions[51,52].

With regard to clinical variables, we can say that the assessment of psychopathological symptoms is considered useful for the evaluation of symptomatic changes produced by treatment or for the follow-up of various chronic cases. In this sense, the symptomatological perception of the "Trisquel" group is indicative of a reduction in symptoms after the intervention with "Trisquel". Different from what was found in the control group where an increase in the per-

Table 3 Intragroup comparison regarding cognitive performance

	Trisquel Group				Control Group			
	Pre	Post	p	cohen's d	Pre	Post	p	cohen's d
WAIS-III[a]								
Coding	51,3±12,3	52,6±12,1	0,571	0,161	52,8±9,2	56,5±9,4	0,089	0,567
Arithmetic	10,0±3,1	11,1±3,6	0,059	0,577	9,1±3,1	9,5±3,3	0,561	0,162
Digit Span	12,8±3,9	13,1±4,2	0,641	0,132	13,2±2,4	12,5±2,9	0,190	0,419
Symbol Search	25,1±6,0	26,4±5,6	0,218	0,359	26,4±4,5	28,1±4,4	0,085	0,578
Letter-Number Sequencing	7,4±2,3	8,6±2,4	0,029	0,623	4,2±1,3	4,4±0,9	0,659	0,141
Working Memory Index	24,9±6,5	27,1±6,5	0,020	0,743	24,7±10,1	24,8±9,1	0,943	0,013
Processing Speed Index	16,4±3,7	17,1±3,1	0,312	0,025	16,5±5,6	17,7±4,7	0,034	0,740
STROOP[a]								
Words	84.1±17.0	85,8±13,0	0,419	0,234	95,6±11,9	96,3±12,7	0,600	0,162
Colors	55,3±13,1	58,3±15,0	0,204	0,383	65,1±10,3	62,7±8,8	0,275	0,348
Word-color	33,7±7.2	36,9±6.7	0,214	0,363	37,9±10,1	40,1±9,3	0,126	0,503
TMT[a]								
Parte A[b]	53,2±14,2	54,1±18,9	0,861	0,051	43,8±6,3	49,9±18,5	0,236	0,380
Parte B[b]	139,5±67,5	126,6±79,3	0,362	0,171	151,4±67,9	121,5±48,5	0,131	1.060
Verbal Fluency Test[a]								
Phonemic	28,4±8,6	28,7±10,7	0,894	0,038	32,3±12,2	31,9±8,9	0,866	0,052
Semantic	17,2±3,3	17,1±3,3	0,909	0,038	17,0±3,3	17,9±5,7	0,543	0,190

[a]Values expressed as mean ± standard deviation; [b]Inverse scores, the higher the score the worse the performance

Table 4 Intragroup comparison regarding clinical and functional variables

	Trisquel Group				Control Group			
	Pre	Post	p	Cohen's d	Pre	Post	p	Cohen's d
SCL-90-R[a]								
Somatization[b]	1,1±0,8	0,9±0,5	0,207	0,289	1.0±0.8	1,0±0,8	0,990	0,004
Obsession/compulsion[b]	1,9±1,0	1,5±0,8	0,085	0,520	1.6±0.5	1,8±0,7	0,387	0,272
Interpersonal Sensibility[b]	1,4±0,8	0,9±0,7	0,015	0,789	1.0±0.8	1,2±0,9	0,312	0,322
Depression[b]	1,6±0,9	1,3±0,7	0,099	0,395	1,5±0,8	1.6±0.8	0,330	0,308
Anxiety[b]	1,3±0,8	1,2±0,7	0,758	0,087	1,3±0,6	1,3±0,8	0,884	0,046
Hostility[b]	0,5±0,6	0,3±0,4	0,181	0,295	0,4±0,4	0,8±0,6	0,102	0,524
Phobic anxiety[b]	1,0±0,8	0,8±0,8	0,135	0,300	0,8±0,8	1,0±0,9	0,414	0,257
Paranoid ideation[b]	1,4±1,0	0,9±1,0	0,049	0,419	0,9±0,6	1,4±0,9	0,071	0,611
Psychoticism[b]	1,2 ±0,8	0,9 ±0,8	0,181	0,395	1,1±0,7	1,1±0,7	0,893	0,041
Global Severity Index (GSI)[b]	1,3±0,7	1,1±0,6	0,055	0,436	1,1±0.5	1,2 ±0,68	0,383	0,275
Positive Symptom Distress Index (PSDI)[b]	2,1±0,6	2,0±0,6	0,493	0,197	2,1±0.4	2,1±0,5	0,578	0,172
Positive Symptom total (PST)[b]	52,8±20,1	45,7±15,7	0,131	0,450	47,0±17,6	53,1±23,4	0,182	0,432
SF-36[a]								
Total socore	54,6±15.4	58,7±16.6	0,584	0,171	56,7±16,6	64,4±19,3	0,017	1,070
GAF[a]								
Total score	63,1±7.5	68,4±9.8	0,020	0,678	64,1±10,2	65,0±11,1	0,676	0,130

[a]Values expressed as mean ± standard deviation; [b]Inverse scores, the higher the score the worse the performance

ceived psychopathological symptoms is obtained after the treatment. These disparate results may have to do with the dynamics and characteristics of the intervention program with "Trisquel". That is, its board game format, motivating therapeutic context, oriented to social skills, use of different rehabilitation techniques and with an integral approach. In this sense, the concept of therapeutic context has been a central element in the development of holistic models of neuropsychological rehabilitation because it allows for increased awareness of illness, optimizes learning capacity and facilitates the process of emotional adjustment[53]. On the other hand, it is possible to think that the traditional cognitive stimulation work based on the realization of pencil and paper activities in which the systematized repetition of exercises prevails does not obtain more improvements because it is not a specially motivating activity and lacks the social interaction or the specific work of social stimulation, inherent to the group activities oriented to social abilities.

In relation to psychosocial functioning in schizophrenia, the literature refers to difficulties in social, work or school activity[2]. In our work, in line with other studies referenced in the literature[27,51], only the "Trisquel" group obtained a statistically significant improvement in psychosocial functioning. The improvements found in psychosocial functioning obtained in the "Trisquel" group are in line with the results obtained in publications in which a significant impact on the patient's daily life activities has been obtained after a specific intervention program[27,28,51,54]. The results found in the control group are in line with other works in which improvements in cognitive performance after rehabilitation have been described without producing improvements in symptomatic and functional performance[52].

One of the most typical alterations of mental disorders is the lack of awareness of illness, which is also often an indicator of a worse prognosis. In clinical practice, the term "lack of insight" is applied when there is disagreement between the professional and the patient regarding the mental problem that is present and the need for treatment. In this sense, although the "Trisquel" group experiences an improvement in cognitive performance, symptomatological perception and psychosocial function after treatment, it only obtains a slight improvement in health perception (SF-36) and this could be interpreted as an adjustment of insight. On the other hand, the control group that experiences an improvement in cognitive performance and a worsening in symptomatological perception considers that their perception of health (SF-36) is much better than before starting the program. That is, although they report having a greater presence of psychopathological symptoms in their daily functioning, they consider that these symptoms do not have implications for their health, and this could be interpreted as a mismatch of insight.

Important implications for research and clinical practice emerge from this study. It provides explicit information for planning future studies (sample selection, evaluation protocol, procedure, analysis of results) and evidence of its feasibility. It represents an example of how an intervention program in a board game format can generate a motivating therapeutic context that induces improvements in cognitive performance, symptomatologic perception and psychosocial functioning. It can be considered a versatile and dynamic tool that each professional can adapt to his/her daily intervention needs.

The findings of this paper should be considered preliminary and interpreted with caution. Future studies should take into account various limitations such as not having included measures of social skills, social cognition and insight and not conducting follow-up assessments. Future studies should schedule follow-up periods, include social cognition assessment instruments[13], social skills and insight and employ variables that would improve the representativeness of the sample, with a higher percentage of women and larger samples.

Conclusions

The results of this study allow us to conclude that the intervention program in board game format "Trisquel" can be considered an effective rehabilitation tool to induce improvements in the functioning of working memory, in the symptomatologic dimensions of interpersonal sensitivity and paranoid ideation and in the psychosocial functioning in patients diagnosed with schizophrenia spectrum disorder.

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