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博士論文

**Effectiveness of the Step-by-Step Interpersonal Adaptation
Program for Patients with Severe and Chronic Schizophrenia
Who Experience Extreme Difficulty in Social Participation
(SIAP-SCS): A Retrospective Study**

（社会参加が極めて困難な重度かつ慢性統合失調症患者に対する
段階的対人適応プログラム(SIAP-SCS)の有効性：レトロスペクティブスタディ）

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Effectiveness of the Step-by-Step Interpersonal Adaptation Program for Patients with Severe and Chronic Schizophrenia Who Experience Extreme Difficulty in Social Participation (SIAP-SCS): A Retrospective Study

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ABSTRACT

The Step-by-step Interpersonal Adaptation Program for patients with Severe and Chronic Schizophrenia who experience extreme difficulty in social participation (SIAP-SCS) was developed and implemented to achieve social participation for patients who were unable to receive existing psychosocial treatment. The study was conducted as a pilot and retrospective study involving 20 participants. Interviews and medical records were used to evaluate their social participation. After the program, their social participation increased, and the scale scores of social functioning and psychiatric symptoms improved significantly. The results suggest that the SIAP-SCS can help patients with severe and chronic schizophrenia participate in society.

KEYWORDS

Schizophrenia; outpatient; occupational therapy; social participation; social functioning

Introduction

Numerous patients with schizophrenia exhibit poor social participation (Belio et al., 2014; Bennett et al., 2023; Harley et al., 2012). Tee et al. (2022) reported that many patients with psychiatric disorders who experience poor social participation express a desire to enhance their social participation but possess low self-confidence in their ability to do so.

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Social isolation can also be considered a state in which intimate relationships, social connections, and contact with others in the community are extremely limited (Grenade & Boldy, 2008). Therefore, patients with schizophrenia and poor social participation can be characterized as socially isolated. Studies have demonstrated that social isolation in patients has detrimental effects, such as worsening psychiatric symptoms, elevating the risk of suicide, and diminishing their overall quality of life (Burns-Lynch et al., 2016; Calati et al., 2019; Golubović et al., 2020). In addition, the deterioration of patients' psychiatric symptoms exacerbates the challenges of social participation, thereby perpetuating a vicious cycle that impedes patients from integrating into society.

As pharmacotherapy alone is limited for social participation among patients with severe and chronic schizophrenia, a combination of psychosocial treatment, including occupational therapy, is important (Guo et al., 2010; Sadock & Sadock, 2003). It is often difficult for the patients to continue psychosocial treatment and even more difficult for them to access welfare facility services for social participation due to low self-confidence and severe and chronic symptoms. Therefore, it is necessary to develop a new occupational therapy program that allows patients with schizophrenia who cannot participate in existing psychosocial treatments and welfare facility services to achieve social participation.

Patients with severe and chronic schizophrenia are characterized by high interpersonal tension and anxiety, which makes them very easily stimulated, and their psychiatric symptoms easily worsen. The aspects are extremely similar to those of acute schizophrenia and they require the same therapeutic environment and care for their sensitivities (Guerrero-Jiménez et al., 2022; McGlashan & Carpenter Jr, 1976; Nakai, 1976; Sugibayashi, 2023). Tanaka et al. (2014) reported that early occupational therapy for patients with acute schizophrenia (E-OTAS), a new rehabilitation program they developed for patients with schizophrenia in the acute phase, improved functional independence, social cognition, and psychiatric symptoms. Reportedly, social functioning and psychiatric symptoms were associated with social participation (Cacciotti et al., 2018; Harvey et al., 2007). Therefore, we hypothesized that an occupational therapy program based on E-OTAS would promote social participation among patients with severe and chronic schizophrenia.

In this study, we developed a new occupational therapy program, the Step-by-step Interpersonal Adaptation Program for patients with Severe and Chronic Schizophrenia who experience extreme difficulty in social participation (SIAP-SCS), which is developed from the specific aspects of E-OTAS and aims to promote social participation. A specific medical unit

was newly established in the outpatient department of the University Hospital in 2016 to implement the SIAP-SCS.

The study examined the occupational therapy program to achieve social participation among patients with severe and chronic schizophrenia who have extreme difficulty participating in society. Therefore, we evaluated the possible effectiveness of the SIAP-SCS, retrospectively.

Methods

Design

We examined the effectiveness of the SIAP-SCS through a retrospective pilot study, because there were no previous studies on this type of occupational therapy intervention.

Environment of the SIAP-SCS administration

This SIAP-SCS was conducted in a newly established medical unit in the psychiatry outpatients' ward at Kobe University Hospital. The medical unit is situated adjacent to the consultation room, enabling prompt medical care by physicians or nurses in case of sudden deterioration in a participant's condition. All patients in the study were under the care of attending physicians from Kobe University Hospital.

The SIAP-SCS was primarily administered by an occupational therapist (first author), in collaboration with physicians, nurses, and psychiatric social workers. The average number of participants in each SIAP-SCS occupational therapy session was approximately six. The sessions were designed for a short duration of two hours once a day, allowing flexibility in session length based on participants' symptoms and preferences. This was because the study participants had difficulties in continuing to receive psychosocial treatment because of their characteristics; we considered that long hours of participation would be a significant burden.

Participants

As this was a pilot study, the sample size was not predetermined. All patients participating in the SIAP-SCS as of March 1, 2021, were included in the study. Among them, participants in the study were those who met the following inclusion criteria and agreed to participate in the study:

1. Individuals who had participated in the SIAP-SCS for at least six months.

2. Individuals diagnosed with schizophrenia (F2) according to the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) diagnostic criteria.
3. Individuals aged at least 18 years and under 65 years at the commencement of the research.
4. Individuals who had not been regularly engaged in work, attended school, or utilized social resources (at least once a week) for a minimum of three months prior to the date of their enrollment in SIAP-SCS.

However, individuals meeting the subsequent criteria were excluded from the study:

1. Individuals with complications such as intellectual disability or drug addiction.
2. Individuals assessed by the attending physician as incapable of responding to the interview or questionnaire due to their symptoms.

Intervention

SIAP-SCS

The SIAP-SCS is a new occupational therapy program designed to achieve social participation for patients with schizophrenia who are vulnerable to stimuli and whose psychiatric symptoms easily deteriorate and cannot be effectively treated by existing occupational therapy. It is characterized by the individualized occupational therapy program for patients with schizophrenia in the acute phase (Tanaka et al., 2014) being arranged for patients in the chronic phase, in the environment where they feel safe and secure. The SIAP-SCS emphasizes the following:

1. Initially, participants engage in activities individually with staff members. Over time, they transition to participating in group activities with several other participants in the same room.
2. Participants gradually become accustomed to spending time with others and engaging in interpersonal interactions as they progress through the program.

The staging of the SIAP-SCS and the principles of the staff involvement with participants are outlined below.

Stages of the SIAP-SCS

The SIAP-SCS is divided into the following five steps. Note that in each step, participants can choose individualized and simple structured activities

Table 1. The five steps in the Step-by-step Interpersonal Adaptation Program for patients with Severe and Chronic Schizophrenia who experience extreme difficulty in social participation (SIAP-SCS).

	Step 1	Step 2	Step 3	Step 4	Step 5
Distance from other participants	Far	Close			
Visibility of other participants	No	Yes			
Time spent doing the activity	Short time	Gradually increase	2 hours		
Number of people sharing space	Available one-on-one	Gradually increase	 (Max. 10 persons)		
Frequency of program participation	1/month~ 1/week	1~2/week	2~3/week		
Communication	Staff only			Greeting other participants	Interaction and cooperation with other participants 

(e.g., coloring books, handicrafts, puzzles, reading, basic use of computers). Table 1 illustrates the differences between the five steps. The participant's progression to a new step is decided by discussing with the participant and the occupational therapist after the occupational therapist determines that the goal of each step has been achieved and confirming the opinions of the attending physician and other professionals. Therefore, the duration for each step across all five steps is different for every participant.

Step 1: Participants spend time at a distance from others while sharing space.

The aim of this step is to acclimate participants to sharing space with others in a controlled environment. Participants can choose a location that is sufficiently distant from other participants. Their environment can be adjusted to ensure participants are not visible to each other. One-on-one interactions with the staff are also available. At this stage, participants may attend the program less frequently and are not required to engage in active communication with each other.

Step 2: Participants spend time engaging in activities near others. The goal of this step is for participants to comfortably participate in activities near others, without the need for environment adjustments as in Step 1. Gradually, participants work toward increasing the duration of time for these activities and the number of individuals sharing the same room.

Regarding the frequency of participation, the goal for participants is to be able to participate consistently once or twice a week. As in Step 1, active communication among participants is not required.

Step 3: Participants attend the program two to three times a week and have simple interactions with others. In a setting similar to that in Step 2, participants are expected to actively engage in an activity for two hours. Concurrently, they will gradually become accustomed to communicating with each other, beginning with basic greetings. The goal is for participants to attend the program regularly, two to three times a week.

Step 4: Participants engage in group activities. In addition to the contents of Step 3, participants engage in group activities designed to improve their interpersonal skills and increase opportunities for interpersonal interaction, based on their preferences and consultation with the staff. Examples of group activities include social skill training, social cognition and interaction training, tea party discussions, and cooperative cooking with others.

Step 5: Participants transition toward employment, schooling, and utilizing other social resources. Participants discuss the possibility of expanding their social participation through employment, attending school, and the use of other social resources in consultation with the staff. Afterward, they have the opportunity to proactively enhance their social participation by exploring various avenues, such as visiting community centers, enrolling in vocational training programs, or engaging with other relevant facilities, in accordance with their personal preferences.

Principles of staff involvement with participants in the SIAP-SCS

In the SIAP-SCS, the staff is engaged with participants based on the following principles.

1. At the beginning of the program, the staff should always carefully assess the condition of each participant individually and determine whether they have encountered any difficulties since their last participation. Advice is provided if necessary.
2. During and after the program, the staff should individually check in with each participant to enquire about their well-being and any problems they may be facing. As the program progresses through its steps, the staff creates opportunities for participants to engage in conversations with other participants and seek guidance from the staff on their own.

3. The staff ensures that participants are shielded from experiencing failures and are instead encouraged to achieve success.
4. In Step 5 of the program, the staff proactively provides participants with information about social resources. If desired, the staff offers support, including accompanying them on visits to these resources and providing guidance on their utilization.
5. The staff diligently follows up with participants after they start working, attending school, or engaging with social resources. This ongoing support includes the gradual reduction of assistance and determining an appropriate program termination point in consultation with the participants.

Evaluation

The following items were assessed using interview records of the participants, their medical records, and scores on the rating scale. Data were collected both before participants engaged in the SIAP-SCS (pre-SIAP-SCS) and during the evaluation in March 2021 (post-SIAP-SCS).

Demographic data

The data were collected from interview records with the participants and their medical records. Interviews were conducted by the first author at the medical unit, face-to-face with the participants. The authors reviewed medical information by accessing the hospital's electronic medical records. Information on age, sex, age of onset, marital status, presence or absence of cohabitants, educational background, work history, medication status, and history of use of medical and welfare facilities were collected at the pre-SIAP-SCS. The number and duration of the program participations were collected at the post-SIAP-SCS.

Social participation

We conducted the evaluation with participant social participation as the main outcome. To evaluate social participation, we assessed the following items using participant interview records and their medical records: (i) whether the participant was working, attending school, or using social resources such as welfare facilities or culture centers; (ii) time the participant spent outside their home per week; and (iii) the number of people with whom they were connected. Note that (i) excludes participation in the SIAP-SCS; (ii) excludes the time spent participating in the SIAP-SCS; and (iii) excludes the staff with whom participants interacted in the SIAP-

SCS. Information about social participation was obtained through interviews with each participant at the medical unit. In the interviews, the first author asked, “Can you tell me where and when you went out during the week?” and “Can you tell us who you feel connected to (i.e., people you see often or keep in touch with by phone, email, social networking sites, etc.)?” The contents of medical records were reviewed to obtain more information.

Social functioning, psychiatric symptoms, and anxiety

We assessed social functioning, psychiatric symptoms, and anxiety as secondary outcomes because these factors are reported to be associated with social participation (Aikawa et al., 2018; Cacciotti et al., 2018; Harvey et al., 2007).

We assessed social functioning using the Global Assessment of Functioning (GAF), with evaluations conducted by the attending physician. The GAF is a rating scale used to assess social, occupational, and psychological functioning among adults. This scale is rated between 0 and 100, with higher scores indicating better functioning (Jones et al., 1995; Ministry of Health, Labour and Welfare, 2003). The GAF scale has been confirmed as reliable and valid (Jones et al., 1995; Startup et al., 2002).

We evaluated psychiatric symptoms using the Positive and Negative Syndrome Scale (PANSS), with assessments conducted by the attending physician. The PANSS is assessed through a structured interview and comprises 30 items, including seven positive scale items, seven negative scale items, and 16 items on the general psychopathology scale. Each item is rated on a scale from 1 (absent) to 7 (extreme), with higher scores indicating more severe symptoms (Kay et al., 1987). PANSS has been confirmed as reliable and valid (Kay et al., 1987; Yamada et al., 1993).

We measured anxiety using the State-Trait Anxiety Inventory-Form JYZ (STAI-J), a translated version of the STAI (Form Y) (Spielberger et al., 1983) items adapted to Japanese culture. The STAI-J is a self-reported questionnaire that assesses two types of anxiety: state anxiety and trait anxiety. Each category included 20 questions, rated on a 4-point Likert scale, with higher scores indicating greater anxiety. The scores can be converted to standard scores (T-scores). The T-score was used in this study. The STAI-J has been confirmed to be reliable and valid (Hidano et al., 2000).

Ethics

This study was approved by the Ethics Committee at Kobe University Graduate School of Medicine (B200113). All participants received an oral and written explanation of the study from the first author and provided

their written consent. For participants under 20 years of age, consent was obtained from the individual and their parent.

Statistical analysis

Only data from participants who completed assessments at both the pre-SIAP-SCS and post-SIAP-SCS stages were included in the statistical analysis.

We utilized scores from each rating scale at both the pre-SIAP-SCS and post-SIAP-SCS stages to evaluate social participation (time spent outside and number of people connected), social functioning (GAF), psychiatric symptoms (PANSS), and anxiety (STAI-J). If the scores on each rating scale were normally distributed both at the pre-SIAP-SCS and post-SIAP-SCS stages, a paired t-test was used. Otherwise, a Wilcoxon signed-rank test was used.

For social participation (employment, attending school, and use of social resources), McNemar's test was utilized to compare pre-SIAP-SCS and post-SIAP-SCS stages. If a significant increase in social participation was observed, further analysis was conducted on the number and duration of the SIAP-SCS participation based on whether participants were working, attending school, or utilizing social resources post-SIAP-SCS.

Statistical significance was set at $P < 0.05$. Statistical analysis was conducted using Statcel-the Useful Addin Forms on Excel-4th ed. (OMS Publishing, Tokyo, Japan).

Results

As of March 1, 2021, 46 patients were enrolled in the SIAP-SCS at Kobe University Hospital. Twenty-two participants met the inclusion criteria for this retrospective study. All participants consented to participate in the study; however, one withdrew consent immediately after providing it, and another was excluded because the attending physician determined that conducting the interview or questionnaire would not be suitable considering their symptoms. As a result, data from 20 participants were collected and used for statistical analyses. None of the participants participated in a new treatment program within the duration of their SIAP-SCS participation. In addition, two participants had a change in their primary medication (from risperidone to brexpiprazole), and no other major changes were made to their medications. In other words, we could not find any change in the factors that might have affected their results either before or during their participation in the SIAP-SCS.

Table 2. Participant characteristics (N = 20).

Age (Mean ± SD)	40.90 ± 8.70
Sex (Men: Women)	11:9
Mean age of onset (years)	24.25 ± 6.17
Marital status	Single Married Divorced Widower
	16 2 2 0
Household members	Parents Spouse Living alone
	17 1 2
Education level	Junior high school High school University or vocational school Graduate school
	0 10 9 1

Table 3. Number and duration of the SIAP-SCS participation.

	Mean ± SD
Number of participation (times)	157.45 ± 142.76
Duration of participation (months)	31.65 ± 17.12

SIAP-SCS: Step-by-step Interpersonal Adaptation Program for patients with Severe and Chronic Schizophrenia who experience extreme difficulty in social participation.

Demographic information

Table 2 presents the participants’ demographic information at the pre-SIAP-SCS stage. The mean age of the participants at the pre-SIAP-SCS stage was approximately 40 years, and the ratio of men to women was nearly equal. The majority of participants were unmarried and resided with their parents. All participants had attained at least a high school education and had prior work experience, including part-time jobs. Furthermore, over half of the participants (n = 14, 70%) had either never utilized social resources or had discontinued their use shortly after initiation.

Participation in the SIAP-SCS

Table 3 provides details about the number and duration of SIAP-SCS participation during the post-SIAP-SCS stage. On average, participants had been using the program for approximately 2.5 years and had attended approximately 150 sessions.

Social participation

In this study, social participation was assessed by examining (i) whether participants were working, attending school, or utilizing social resources (ii) the amount of time spent outside their homes per week, and (iii) the number of people they were connected with (Table 4). Initially, none of the participants were employed, attending school, or using social resources.

Table 4. Social participation, social function, psychiatric symptoms, and anxiety.

	Pre-SIAP-SCS	Post-SIAP-SCS (>6 months)	P-value
Social participation Whether they are working, attending school, or utilizing social resources (Yes: No) ⁺	0:20	13:7	<0.01
The amount of time spent outside their homes per week (min) ^{##}	342.13 ± 291.19	847.75 ± 711.10	<0.01
Reported number of people they are connected with ^{##}	5.15 ± 3.88	8.60 ± 6.21	<0.01
GAF ^{##}	47.20 ± 13.07	55.70 ± 15.52	<0.01
PANSS ^{##}			
Positive scale [*]	17.65 ± 6.78	16.20 ± 7.05	0.02
Negative scale [†]	20.85 ± 5.19	18.35 ± 5.38	0.02
General psychopathology scale [†]	41.35 ± 9.99	35.65 ± 10.19	0.02
Total [*]	79.85 ± 18.51	70.20 ± 20.54	<0.01
STAI-J(T-score) ^{##}			
State anxiety [†]	47.10 ± 11.71	45.85 ± 10.56	0.56
Trait anxiety [†]	55.25 ± 8.64	52.25 ± 7.73	0.09

SIAP-SCS: Step-by-step Interpersonal Adaptation Program for patients with Severe and Chronic Schizophrenia who experience extreme difficulty in social participation; GAF: the Global Assessment of Functioning; PANSS: the Positive and Negative Syndrome Scale; STAI-J: the State-Trait Anxiety Inventory-Form JYZ.

^{##}: mean ± SD;

⁺: McNemar's test;

^{*}: Wilcoxon signed-rank test;

[†]: a paired t-test.

Additionally, participants spent less than one hour per day outside their homes. More than half (n = 13, 65%) of the participants indicated that their only connections were with family members and their primary care physician. Following the SIAP-SCS intervention, there was a significant increase in all (i) – (iii) indicators (P < 0.01).

Social functioning, psychiatric symptoms, and anxiety

This study assessed social functioning using GAF scores, which were evaluated by the attending physician (Table 4). A significant improvement in the scores was observed post-SIAP-SCS compared to pre-SIAP-SCS (P < 0.01). Psychiatric symptoms were assessed using PANSS scores, as rated by the attending physician (Table 4). Post-SIAP-SCS, a significant decrease was noted in total scores and all subscales compared to the pre-SIAP-SCS (total score: P < 0.01; subscales: P < 0.05).

Anxiety was assessed using STAI -J T-scores, evaluated by participants (Table 4). At pre-SIAP-SCS, 10 participants (50%) exhibited state anxiety,

Table 5. Differences in the number and duration of the SIAP-SCS participation based on social participation (N = 20).

	Social participation (+) (Employed, in school, or utilizing social resources) (n = 13) (Mean ± SD)	Social participation (-) (Unemployed, in school, or utilizing social resources) (n = 7) (Mean ± SD)	P-value
Number of participation in the SIAP-SCS (times)	205.38 ± 152.84	68.43 ± 59.92	0.03
Duration of participation in the SIAP-SCS (months)	36.62 ± 15.39	22.43 ± 17.37	0.08

SIAP-SCS: Step-by-step Interpersonal Adaptation Program for patients with Severe and Chronic Schizophrenia who experience extreme difficulty in social participation.

and 15 participants (75%) showed trait anxiety, with T-scores of 50 or higher, indicating above-average anxiety levels. However, there were no significant differences between pre-SIAP-SCS and post-SIAP-SCS scores for both state and trait anxiety.

Differences in the number and duration of the SIAP-SCS participation based on social participation

All three indicators of social participation exhibited significant increases (Table 4). Consequently, we conducted a comparative analysis between the groups engaged in work, attending school, or utilizing social resources post-SIAP-SCS (n = 13) and those that were not (n = 7). Subsequently, a comparison was made regarding both the number and duration of SIAP-SCS participation among these two groups. The results showed significant differences in the number of SIAP-SCS participations, although no notable variation was observed in the duration of participation (Table 5).

Discussion

This study evaluated the occupational therapy program to achieve social participation among patients with severe and chronic schizophrenia who have extreme difficulty participating in society. As the characteristics of these patients with severe and chronic schizophrenia are similar to those of patients in the acute phase (Guerrero-Jiménez et al., 2022; McGlashan & Carpenter Jr, 1976; Nakai, 1976; Sugibayashi, 2023), we conducted SIAP-SCS, a new occupational therapy program which is developed from the early individualized occupational therapy for patients with schizophrenia in the acute phase (Tanaka et al., 2014). Therefore, we evaluated the possible effectiveness of the SIAP-SCS, retrospectively.

The results showed significant increases in the indicators of social participation, such as “whether the participant was working, attending school,

or using social resources,” “time the participant spent outside their home per week,” and “the number of people with whom they were connected,” suggesting the effectiveness of the SIAP-SCS in increasing social participation, which was the main outcome. Furthermore, the GAF and PANSS scores improved significantly, suggesting that the SIAP-SCS may also improve social functioning and psychiatric symptoms.

Among the patients with acute schizophrenia, the early occupational therapy E-OTAS by Tanaka et al. (2014) showed significant improvement in the FIM total score and cognitive domain score compared to the control group, as well as improvement in BPRS in a before/after comparison of the intervention group. In this study, we found an improvement in social function and psychiatric symptoms, suggesting that the SIAP-SCS from early individualized occupational therapy is effective when applied to patients with severe and chronic schizophrenia. Furthermore, Cacciotti et al. (2018) and Harvey et al. (2007) found that social functioning and psychiatric symptoms are associated with social participation in the case of mental illness. These reports may support the results of our study, that is, improvements in social functioning and psychiatric symptoms as well as increase in social participation after the SIAP-SCS.

In the SIAP-SCS, the patients were initially engaged only in a short individual intervention, and they gradually came to share space and interact with others. It is a well-known fact that patients with severe schizophrenia are sensitive to changes in their environment (Sadock & Sadock, 2003). Such patients might not adapt to an environment with many other people. Therefore, our results in this study suggest that starting with a short, individualized program and gradually increasing the number of other people and interactions with them can make it easier for the patients to participate and can result in positive changes. Another factor contributing to the positive change may be that this step-by-step approach allowed participants to participate while increasing their confidence through successful experiences.

In contrast, the T-scores of the STAI-J, a measure of anxiety, showed no significant change. The result showed that the SIAP-SCS might not alleviate the participants' anxiety, although it enabled them to engage in the program. Patients with schizophrenia often experience discomfort in new environments (Sadock & Sadock, 2003). The SIAP-SCS participants extended the duration of time for their activities outside their homes and embraced new challenges, including employment, school attendance, and the use of social resources. Prior to the SIAP-SCS, 15 of the 20 participants had T-scores of 50 or higher for trait anxiety, and the mean score exceeded 55, which can be considered a high anxiety range (Hidano et al., 2000). This implies that, this group of participants exhibited a heightened susceptibility to anxiety. An important finding is that SIAP-SCS participants, who are

inherently sensitive to anxiety, successfully engaged in new social activities, increased their time spent outside, and established new relationships without exacerbating their anxiety. In addition, we believe that the SIAP-SCS was able to be implemented without worsening the participants' anxiety and psychiatric symptoms, because it was conducted in a specifically established medical unit in the psychiatric outpatients' ward in a university hospital where the attending physicians, nurses, and other specialists could respond immediately in case of deterioration of the participants' conditions. This may have contributed to the participants' sense of security.

During their participation in the SIAP-SCS, none of the participants engaged in other treatment programs, and only a small number of them made changes to their medication regimen. The group of participants that was able to engage in work, attend school, or utilize social resources participated in SIAP-SCS significantly more than the group that was not able to do so. These results suggest that the SIAP-SCS may be effective in increasing participants' social participation. However, we cannot deny the possibility of external and confounding factors that have not yet been identified affecting outcomes. In addition, the small sample size and retrospective design of this study make it difficult to examine the effect of the SIAP-SCS using multiple regression analysis rigorously, which is an important problem to be addressed in future studies.

Furthermore, this study has several limitations. First, because it was a pilot study, it was conducted at a single facility with a limited number of participants. Future studies should encompass multiple sites and a larger number of participants. Second, as previously mentioned, the small sample size and retrospective design of this study made it difficult to examine the effects on SIAP-SCS rigorously. In order to examine the effects of SIAP-SCS more rigorously, standardizing the duration and number of program participation would be necessary, in addition to conducting a detailed factor analysis using multiple regression as described above, after sufficiently identifying external and confounding factors. Third, this study was a single-arm, before-and-after comparative study. A two-group comparison with a control group or a randomized controlled trial would provide a clearer evaluation of the effectiveness of the SIAP-SCS. Finally, follow-up studies should also be conducted to confirm the persistence of the effects and outcomes after the intervention is completed.

Conclusion

This study examined the effectiveness of the SIAP-SCS as a new occupational therapy program for achieving social participation among patients with schizophrenia who have extreme difficulties with social participation

that cannot be treated using existing psychosocial treatments. The results showed significant improvements in social participation among the participants, which was the main outcome. Furthermore, significant improvements in social functioning and psychiatric symptoms were demonstrated. These findings suggest that the SIAP-SCS is effective in increasing social participation among patients with severe and chronic schizophrenia who have extreme difficulty participating in society. The results of this study suggest the possibility of expanding on previous occupational therapy techniques and establishing techniques that can promote social participation among patients with severe and chronic schizophrenia, thereby contributing to improving their quality of life and recovery. The findings have real-world relevance and suggest promising avenues for further research and clinical implementation.

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Authors' contributions

Conception and design of study: T Kojina, K Yotsumoto, Y Nishimura, T Ebisu, T Hashimoto; Acquisition of data: T Kojina, Y Nishimura, T Horai, S Aoyama, I Sora; Analysis and/or interpretation of data: T Kojina, T Ebisu, T Hashimoto; Drafting the manuscript: T Kojina, T Hashimoto; Revising the manuscript critically for important intellectual content: T Kojina, K Yotsumoto, Y Nishimura, T Ebisu, T Horai, S Aoyama, I Sora, T Hashimoto; All authors approved the final version of the paper.

Disclosure statement

The authors declare no conflicts of interest.

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Data availability

The data used to support the findings of this study are available from the corresponding author upon request.

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