



Digital Rehabilitation in People with Schizophrenia: A Pre-Post Study on Coping Skills and Caregivers' Expressed Emotion

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Abstract

Objective: This study explored the effectiveness of a digital rehabilitation program in enhancing coping mechanisms in individuals with schizophrenia and reducing expressed emotion among their family members over six months. **Methods:** 70 participants were selected using purposive sampling method and divided into a treatment group (n=35) and a control group (n=35). The treatment group engaged in a digital rehabilitation program including tele-monitoring, tele-

psychiatrist consultations, tele-psychotherapy, family sessions, psychoeducation webinars, cognitive remediation therapy, and social skills training. The control group continued medication without rehabilitation. Coping strategies and family-expressed emotions were assessed using the Coping Inventory for Stressful Situations (CISS) and the Family Emotional Involvement and Criticism Scale (FEICS). Paired t-tests and independent sample t-tests compared within-group changes and between-group differences. **Results:** Significant improvements were observed in the treatment group compared to the control group: task-oriented coping increased ($p < 0.05$), emotional-oriented coping decreased ($p < 0.001$), and avoidance-oriented coping decreased ($p < 0.05$). Emotional involvement ($p < 0.05$) and perceived criticism ($p < 0.01$) decreased in the treatment group. **Conclusion:** The digital rehabilitation program significantly enhanced coping strategies and reduced maladaptive coping in individuals with schizophrenia, offering valuable support for patients and families. Future research should include diverse populations and compare digital and traditional programs to further explore digital mental health interventions.

Keywords: *Digital Rehabilitation, Schizophrenia, Coping Skills, Caregivers, Expressed Emotions.*

1. Introduction

Psychosocial interventions play a crucial role in treating schizophrenia and related disorders (Lynch 2020; Puspitasari 2021). Traditionally, these interventions have been provided through in-person sessions. However, the global COVID-19 pandemic and the subsequent shelter-in-place mandates significantly hindered the delivery of in-person clinical services, including psychosocial treatments. As a result, healthcare systems and practitioners shifted to telemedicine to continue providing care (Kimhy et al., 2024). Tele-mental health care extends conventional services with effective interventions and innovative technologies, proving particularly cost-effective and adaptable, especially for remote communities (Langarizadeh et al., 2017). Digital services improve accessibility by overcoming geographical barriers and offering flexible scheduling, making it easier for patients to receive care from any location. Rotondi et al. (2010) investigated telehealth interventions for schizophrenia, finding high engagement and notable improvements in positive symptoms and knowledge about the condition. The study concluded that telehealth effectively delivers psychoeducation and support. Telemedicine has the potential to enhance medication adherence among patients with depression, bipolar disorder, or schizophrenia.

(Basit, Mathews & Kunik, 2020). Agarwal et al. (2024) found that digital rehabilitation effectively reduced the severity of schizophrenia symptoms, enhancing patients' quality of life and overall functioning after 6 months of intervention.

Kavanagh (1992) found that patients from families with high levels of expressed emotion experienced increased relapses. Wasserman et al. (2011) found that patients with schizophrenia living in homes with high levels of expressed emotion tend to have poorer prognosis for their illness than those from homes with low levels of expressed emotion. Inadequate or inaccurate understanding of the illness, its treatment, and family attitudes impact their interactions with the patient and the manifestation of the disease's symptoms (Bodén et al., 2009). Cohen et al. (2008) discovered that providing psychosocial education to caregivers of schizophrenic patients led to a decrease in the expressed emotions among them. Similar findings have been observed in other studies, corroborating the results of this study (Cole & Kazarian, 1988; Craig & Patterson, 2005). Psychoeducation combined with tele psychiatric follow-up via telephone led to a reduction in family burden, expressed emotions, and depressive symptoms among caregivers, providing valuable support for families involved in patient care (Özkan et al., 2013).

Individuals with psychotic disorders are often observed to predominantly employ maladaptive coping strategies (Kommacher et al., 2014). Berry et al. (2006) and Diez-Alegra et al. (2006) reported poor coping skills and low self-efficacy among patients with chronic schizophrenia. Strous et al. (2005) and Janssen et al. (2006) found that dysfunctional coping strategies and competence/control beliefs were associated with increased symptom severity. Martins et al. (2007) and Harrow et al. (2009) reported that poor coping skills result in poor clinical outcomes in schizophrenia (Schmidt et al. 2024)

Although telemedicine has shown promise in delivering psychosocial interventions for individuals with schizophrenia, there is limited research specifically examining its role in influencing coping styles in this population and addressing expressed emotion among their caregivers. This gap in the literature highlights the need for further investigation. Therefore, our research paper aims to explore the role of digital rehabilitation in shaping coping skills in people with schizophrenia and its impact on expressed emotion among their caregivers.

1.2 Research Objectives

- a) To study the effectiveness of Digital-Rehabilitation on coping mechanisms among the individuals with schizophrenia.

- b) To study the effectiveness of Digital- Rehabilitation on expressed emotion among the family members of individuals with schizophrenia.

2. Methodology

2.1 Study Design

Pre-post study design was used for the present study.

2.2 Sample

Purposive sampling was employed to select participants. The study comprises two groups: a treatment group and a control group. Participants who met the specified inclusion and exclusion criteria were chosen for this research. The sample size for the study was 70, with 35 participants in the treatment group and 35 in the control group.

2.3 Inclusion Criteria

1. Individuals diagnosed with schizophrenia.
2. Individuals aged between 20 and 60 years.
3. Treatment group: Participants actively engaged in our digital rehabilitation program for 6 months.
4. Control group: Participants who received our digital rehabilitation services for 1 month prior to dropout and are not enrolled in any rehabilitation program afterward, while still under medication.
5. Participants residing with their family members.

2.4 Exclusion Criteria

1. Individuals with coexisting chronic medical conditions.
2. Individuals with comorbid psychiatric disorders.
3. Individuals who dropped out of the digital rehabilitation program but are receiving psychotherapy from other organizations.
4. Illiterate individuals.

3. Intervention

The current digital rehabilitation programme is a psychosocial rehabilitation initiative that uses online platforms to deliver remote services and support. Mental health professionals such as psychiatrist, clinical psychologist and counselor utilize video conferencing tools (e.g. Zoom) to

provide services, which include daily tele-monitoring calls, bi-monthly tele-psychiatrist consultation, weekly tele-psychotherapy, monthly family sessions, weekly group family psychoeducation webinars, cognitive remediation therapy (CRT), and social skills training (SST). Participants in the treatment group of this study were involved in this rehabilitation programme for six months.

3.1 Daily Tele-Monitoring

Daily tele-monitoring aims to collect information on participants' moods, daily activities, biological functioning, medicine compliance, and side effects while offering brief psychological support for 5 to 10 minutes. This regular interaction helps address concerns and support participants in managing daily stressors. Each participant in the treatment group received daily tele-monitoring calls.

3.2 Tele-psychiatrist consultation and Tele-Psychotherapy

Participants in the treatment group received remote psychotherapy sessions from clinical psychologists. Additionally, bi-monthly tele-psychiatrist consultation sessions. Tele-psychotherapy sessions are tailored to meet the specific needs of each participant, focusing on empowering them. These sessions include various therapeutic approaches such as psychoeducation, supportive therapy, and cognitive-behavioral therapy (CBT). In our programme, psychoeducation plays a vital role in empowering participants with an understanding of the condition and its treatment. This contributes to actively engaging in the treatment. Supportive therapy aims to provide emotional support, reinforce coping mechanisms, and enhance participants' ability to manage stressors. CBT was used to help the participants identify and change negative thought patterns and behaviors, develop healthier coping strategies, and improve overall mental health.

3.3 Family sessions and family psychoeducation webinars

Monthly family sessions in our programme focus on managing expressed emotion, providing psychoeducation, and addressing family dynamics. These sessions aim to help families to understand the condition, adapt strategies to navigate the challenges associated with the condition, and foster a supportive environment for the individual with schizophrenia.

Additionally, weekly group family psychoeducation webinars cover topics such as understanding schizophrenia, the need for treatment, the role of family in supporting treatment, relapse prevention, and managing expressed emotion within the family dynamic. These webinars play a

crucial role in empowering families with knowledge and skills essential for effectively supporting their family members with schizophrenia.

3.4 Cognitive Remediation Therapy (CRT) and Social Skills Training (SST)

Participants exhibiting cognitive decline and social withdrawal received CRT and SST. Ten individuals with schizophrenia undergoing CRT and SST were included in the treatment group. Participants were remotely engaged in interactive tasks designed to target specific cognitive deficits such as memory, attention, problem-solving and decision making etc. Online SST aims to enhance social interactions by offering virtual role-playing, virtual demonstration of appropriate social behaviors for participants to observe and imitate, reinforcement is used to encourage desired behaviors, that helps participants learn social skills. This allows participants to interact with a group in a controlled environment and participate in various activities with peer support. Real-time feedback is provided to the participants on their performance by the clinicians.

4. Tools

4.1 Coping Inventory for Stressful Situation (CISS)

The Coping Inventory for Stressful Situations (CISS) was developed by Dr. Endler and Dr. Susan Parker in the late 1980s. This scale comprises 48 items divided into three domains: Task-Oriented (TO), Emotional-Oriented (EO), and Avoidance-Oriented (AO). The CISS demonstrates good reliability, with a correlation coefficient of 0.93.

4.2 Family Emotional Involvement and Criticism Scale (FEICS)

The Family Emotional Involvement and Criticism Scale (FEICS) was developed by C.G. Shields and P. Franks in 1992. This scale contains 14 items, with 7 items each measuring the subscales of Emotional Involvement (Cronbach's $\alpha = 0.76$) and Perceived Criticism (Cronbach's $\alpha = 0.82$). Items on each subscale are scored on a 5-point Likert scale ranging from 1 (Almost Never) to 5 (Almost Always), resulting in total subscale scores ranging from 7 to 49. After reverse scoring items 2 and 8, the mean Emotional Involvement score is derived by averaging the odd-numbered items, while the mean Perceived Criticism score is derived by averaging the even-n

umbered items.

4.3 Procedure

Before proceeding with data collection participants were screened using The Brief Psychiatric Rating Scale (BPRS), with the treatment group having a mean score of (98.46) and the control group having a mean score of (96.77). A Google Form was used as the primary tool for data collection. The form contained an overview of the study, an informed consent form, a personal information schedule, CISS, FEICS. Initial data were collected from both the treatment and control groups at the time of enrollment in the study. In the second phase, follow-up data were collected six months later. For the treatment group, data were collected after they had completed six months of participation in the digital-rehabilitation program. In contrast, for the control group, data were collected after six months of being dropout from the digital rehabilitation program.

5. Results

In this study, paired t-test were conducted to see whether significant differences existed between pre-intervention assessment and post-intervention assessment within each group. An independent sample t-test was used to investigate the difference between the treatment and control groups.

Table 1: Showing the p-values representing the significance of the difference between pre and post- intervention assessment data of the treatment group on all the variables

Variables	Treatment group pre- Intervention assessment		Treatment group post- Intervention assessment		T Value	P Value
	Mean	Std. Deviation	Mean	Std. Deviation		
Task-Oriented	46.69	11.450	54.71	9.724	-3.726	.001**
Emotional Oriented	54.14	9.484	38.37	10.330	7.906	.000**
Avoidance oriented	43.31	9.673	34.94	15.921	2.607	.013*
Emotional Involvement	23.43	2.240	20.09	7.473	2.660	.012*
Perceived criticism	21.00	6.598	17.06	4.759	2.730	.010**

** Significant at .01 level (Two-Tailed Test)

* Significant at .05 level (Two-Tailed Test)

The above table demonstrates an increase in the mean score of the post-intervention assessment for "Task-oriented" coping compared to the pre-test mean score. This is found to be significant at the 1% level of significance, indicating an improvement in task-focused coping strategies. The mean scores in the domains of "Emotional-oriented" and "Avoidance-oriented" coping have significantly decreased in the post-intervention assessment compared to the pre-intervention assessment, and the p values of these two domains are significant at the 1% and 5% levels of significance, respectively. These findings suggest a reduction in emotional and avoidant coping mechanisms following the intervention.

In the post-intervention assessment of the "Family Emotional Involvement and Criticism Scale (FEICS)", the mean values for the domains of "Emotional Involvement" and "Perceived Criticism" decreased compared to the mean values of the pre-intervention assessment. The p-value for the "Emotional Involvement" domain shows significance at the 5% level of significance and the "Perceived Criticism" domain shows significance at the 1% level of significance.

Table 2: Showing the p-values representing the significance of the difference between pre- and post- intervention assessment data of the control group on all the variables

Variables	Control group pre- Intervention assessment		Control group post- Intervention assessment		T Value	P Value
	Mean	Std. Deviation	Mean	Std. Deviation		
Task-Oriented	47.23	10.591	48.34	11.679	-2.000	0.054
Emotional Oriented	48.49	7.740	45.97	7.438	2.385	0.023*
Avoidance oriented	43.86	12.572	44.11	13.237	-0.617	0.541
Emotional Involvement	24.06	4.235	23.80	4.241	0.770	0.447
Perceived criticism	20.14	3.507	20.80	4.549	-1.839	0.075

** Significant at .01 level (Two-Tailed Test)

* Significant at .05 level (Two-Tailed Test)

The above table shows the comparison of data from the control group over a six-month period, before and after the intervention. The results show little difference in the mean scores

between the pre- and post-intervention assessments for the three coping strategies: "Task-Oriented," "Emotional-Oriented," and "Avoidance-Oriented," as well as for expressed emotions like "Emotional Involvement" and "Perceived Criticism." Although participants were on medication, the lack of significant differences suggests that medication alone may not be enough to affect these psychosocial factors. This emphasizes the need of incorporating psychosocial interventions alongside pharmacological treatments, as factors like understanding about the condition, coping strategies, family responses play crucial role in treatment process and overall wellbeing.

Table 3: Showing the p-values representing significance of difference between post intervention assessment of treatment group and control group on all the variables

Variables	Treatment group post-assessment		Control group post-assessment		T Value	P Value
	Mean	Std. Deviation	Mean	Std. Deviation		
Task-Oriented	54.71	9.724	48.34	11.679	2.480	.016*
Emotional Oriented	38.37	10.330	45.97	7.438	-3.532	.001**
Avoident oriented	34.94	15.921	44.11	13.237	-2.621	.011*
Emotional Involvement	20.09	7.473	23.80	4.241	-2.557	.013*
Perceived criticism	17.06	4.759	20.80	4.549	-3.364	.001**

** Significant at .01 level (Two Tailed Test)

* Significant at .05 level (Two Tailed Test)

The post-intervention assessment revealed that the mean score on the "task-oriented" domain was higher in the treatment group compared to the control group, suggesting that the intervention successfully enhanced task-oriented behaviors ($p < 0.05$). The treatment group scored lower in the "emotion-oriented" and "avoidant-oriented" domains compared to the control group, with p-values indicating significance at the 1% and 5% levels, respectively. This means that the

intervention successfully decreased emotion-oriented and avoidant-oriented behaviors in the treatment group.

Additionally, the mean values for emotional involvement and perceived criticism were both lower among treatment group participants compared to control group participants in the post-intervention assessment. The p-value for emotional involvement was significant at the 5% level, while the p-value for perceived criticism was significant at the 1% level. This means that the intervention effectively reduced both emotional involvement by caregivers and perceived criticism among participants in the treatment group compared to those in the control group.

6. Discussion

The results of this study reveal the effectiveness of digital rehabilitation on coping skills among individuals with schizophrenia. Tele-psychotherapy, online-based cognitive remediation therapy (CRT), social skills training (SST), and daily tele monitoring calls, collectively contribute to significant improvements in task-oriented coping strategies among the treatment group participants. The results suggest that participants became more adept at employing proactive and problem-solving approaches to manage stress. Furthermore, among the treatment group participants, the study observed a evidential decrease in emotional-oriented and avoidance-oriented coping mechanisms in post-intervention indicating that digital rehabilitation effectively helps participants move away from less adaptive coping strategies- which are often linked to poorer outcomes. The explanation for this could be that tele-psychotherapy offered through our program helps participants integrate coping strategies into their everyday lives. Along with tele-psychotherapy, online-based CRT and SST may have contributed to enhancing cognitive functions, patients' understanding of social relationships and communication. Along with this, it also may have fostered a sense of responsibility and improved interpersonal interactions. Daily telemonitoring calls have played a crucial role in tracking patient progress by discussing daily stressors, and hence reinforcing the application of skills learned from therapy and SST. This constant feedback and support from counselors have significantly contributed to the effectiveness of the program. By fostering more adaptive coping methods, the present digital rehabilitation program supports individuals in managing their condition more effectively. For individuals with mental illness, telehealth technology provides valuable insights and coping skills for daily life along with strengthening the therapist-client relationship. Additionally, using an app to track and

manage mental health progress gave patients a sense of empowerment, leading to increased participation in their treatment. (Jørgensen et al., 2023).

There was a significant reduction in caregivers expressed emotion following the intervention. High levels of expressed emotion among caregivers are frequently associated with higher relapse rates in schizophrenia patients (Amaresha & Venkatasubramanian, 2012). In the post-intervention assessment, there was an evidential reduction in perceived criticism and in emotional involvement among the participants of the treatment group compared to the control group, suggesting that digital rehabilitation can play a vital role in creating a more supportive and less stressful environment for both patients and their families. A study evaluated the "Schizophrenia Online Access to Resources" (SOAR) intervention, designed to deliver family psychoeducation. SOAR provided empathy, education on schizophrenia, a supportive environment, and coping strategies, focusing on problem-solving to reduce stress and achieve personal goals. The intervention effectively reduced positive symptoms and enhanced family members' understanding of the condition (Rotondi et al., 2010). The success of the present digital rehabilitation program in reducing expressed emotion can be attributed to the monthly family sessions that have provided a safe space for both patients and family members to express their thoughts and understand each other's perspectives, thereby creating a supportive environment and helping both patients and families manage their emotions and interactions. Weekly webinars have further contributed by increasing awareness, reducing stigma, and helping both patients and families understand the condition and its treatment.

6.1 Conclusion

This study provides valuable insights into the potential use of digital rehabilitation services to enhance the management of schizophrenia. The present study demonstrated the effectiveness of digital rehabilitation program in improving patients' coping strategies and reducing expressed emotions among their caregivers. The outcomes were suggestive of digital rehabilitation playing a significant role in the treatment of schizophrenia and may contribute to preventing relapse by fostering adaptive coping mechanisms and reducing expressed emotion.

Furthermore, this study helps us to understand the importance of integrating digital tools into mental health care to complement traditional approaches, offering a flexible and accessible option for individuals with schizophrenia, along with providing a more holistic approach to treatment.

6.2 Limitation

The study does not compare digital programs with traditional programs. Additionally, the online-based nature of the intervention resulted in an undefined socio-demographic background of participants, with varying representation across different regions of India. Some regions, like the northern and western parts, may have had higher representation, while others, such as the southern and northeastern regions, were underrepresented.

6.3 Suggestions

Future research should aim to include a more diverse participant pool from various demographic and socio-economic backgrounds to provide a broader perspective on the efficacy of digital mental health interventions. Additionally, comparative studies between digital and traditional programs could offer a clearer understanding of their relative benefits and limitations.

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