Effect of Problem Solving Skills Program on Self -Control Behaviors and Negative Symptoms among Patients with Schizophrenia

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Abstract

Background: Problem solving skills program can be considered as a core strategy that helps patients with schizophrenia to increase their self- control to address problems in a systematic manner and to cope with the burden of their negative symptoms. **Aim**: The objective of the current research was to evaluate the effect of problem solving skills program on self -control behaviors and negative symptoms among patients with schizophrenia. **Subjects and Method: Research design**: The study's aim was achieved through utilizing a quasi-experimental (One group; Pre, posttest) research design. **Subjects:** A purposive sample of established diagnosed sixty hospitalized clients with schizophrenia at Minia Hospital for Mental Health and addiction treatment were selected. **Tools:** Personal and clinical data sheet, Self-Control Scale, and the Brief Negative Symptom Scale were utilized. **Results:** Findings proved high statistically significant differences in the global scores of self -control and negative symptoms scales before and after program implementation. **Conclusion:** Problem solving skills program is an effective strategy in improving self -control behaviors of patients with schizophrenia and their negative symptoms. **Recommendations:** More effort should be undertaken to involve problem-solving skills program as a component of a holistic psychosocial interventions to schizophrenic patients.

Keywords: Negative symptoms, Problem solving skills program, Self-control, Schizophrenia

Introduction:

Schizophrenia is a severe mental illness characterized by significant, fundamental alterations in perception, thinking, and emotion **(Wang, 2020)**. Schizophrenia, affects 1% of the global population. The disorder usually starts in late stage of teen years or beginning of adulthood and may be more prevalent in men. Genetics and the environment can both contribute to the development of the condition. Those who have a family member with schizophrenia are more likely to get the disorder themselves. Additional risk factors include stressful life events, prenatal exposure to viruses or toxins, and

traumatic early childhood experiences. Schizophrenia instances can also result from alterations in the brain's chemistry and structure **(Hany et al., 2024)**. According to **Ali et al., (2022),** schizophrenia, which is largely influenced by genetic factors, typically has a long-lasting course even with current therapies, leading to significant and enduring functional impairment for most patients.

Three categories of symptoms are included in the clinical presentation of schizophrenia: cognitive, positive, as well as negative symptoms. Positive symptoms contain hallucinations, delusions, and disordered behavior; cognitive symptoms include problems with memory, attention, and executive functioning. In addition, negative symptoms encompass blunting, flat affect, lack of speech, anhedonia and avolition **(Kirschner et al., 2020)**.

The negative symptoms of schizophrenia are a result of a decrease or loss of normal healthy functions; they typically persist as post-treatment residual symptoms **(Abdelgelil et al., 2022)**. According to **Kahn (2020),** the negative symptoms of the condition can significantly hinder social and vocational functioning and frequently exhibit a limited response to antipsychotic drugs. Based on several studies, positive symptoms are not as strongly correlated with prognosis as negative symptoms. Thus, there is currently more interest than ever in the negative symptoms experienced by patients with schizophrenia, coinciding with a growing focus on the functional impact of negative symptoms **(Vrbova et al., 2018)**.

Amaya, (2021) defined self-control as the capacity to guide one's actions towards individually held standards and objectives. It also, refers to the capacity to control one's emotions, ideas, as well as actions when faced with impulses and temptations. Several studies establish that having self-control is linked to the attainment of a better life situation, including achieving academic success, sound health, interpersonal relations, and self-adaptation **(Liu et al., 2023)**.

On this point, the ability to control one-self is a crucial skill for individuals with schizophrenia which allows them to change from being passive recipients of their social surroundings to subjects in charge of their own affairs, giving them the confidence to confront stigmatization head-on. Being able to exercise self-control is crucial for controlling schizophrenia and turning it from a condition that harms the person with it into something that benefits both them and society as a whole **(Prasetyo & Gunawijaya, 2018)**.

Problem-solving program is a successful approach for addressing psychological issues or discomfort. According to studies, chronic schizophrenia patients get psychiatric rehabilitation therapies, but they are still unable to successfully solve or overcome challenges in their daily lives. Patients' negative and cognitive symptoms may be lessened, but their capacity to resume their regular lives, handle challenges, and contribute to society, will not significantly improve. Furthermore, individuals suffering from persistent

schizophrenia find it difficult to focus on, identify, and evaluate their own issues. Patients with schizophrenia also frequently make poor decisions when faced with challenges since their problem-solving tactics and abilities are restricted **(Lee et al., 2018)**.

Psychiatric patients who receive problem-solving instructions are able to control negative symptoms and promote functioning by learning how to handle challenges and stressful situations. In addition, teaching the patients self-control boosts their abilities and confidence. Moreover, people with schizophrenia build views about their own competence in managing interpersonal difficulties when they consistently learn problem-solving techniques from a methodical approach and effectively use them in their everyday lives **(Rangrazian et al., 2021)**.

Accordingly, mental health nurses must engage in more rigorous coursework and get the skills required to improve the problem-solving skills for patients with schizophrenia. This means that one of the important roles of psychiatric nurses is to teach patients with schizophrenia this intervention to use it in their everyday interactions, and cope with daily problems. Acquiring this intervention functions as a protective barrier in averting such terrible outcomes and, eventually enables patients effectively reintegrate into society. It is noteworthy that, there is a significant demand for enabling patients with schizophrenia to increase self-control behaviors and mitigate negative symptoms **(Eweida et al., 2017)**.

Significance of the study:

Schizophrenia is one of the main psychotic illnesses and ranked among the leading causes of illness and disability worldwide. Around 24 million individuals worldwide, which is equivalent to 1 in every 300 people (0.32%), are experiencing schizophrenia. Among adults, this percentage is 1 in 222 (0.45%). The typical age for onset is usually in the late teens or twenties, with men typically experience the onset sooner than women **(World Health Organization, 2022)**. Moreover schizophrenia is the most prevalent psychiatric disorder in Egypt which affects 15 patients for every 10000 population **(Saied, 2020)**.

An Egyptian study achieved by **Abdelgelil et al., (2022)** documented that (60%) of patients with schizophrenia had severe negative symptoms. Besides, **Sagayadevan et al., (2023)** discovered that patients with schizophrenia have decreased levels of self-control, which puts them at significant danger to engage in activities that could exacerbate their symptoms. Additionally, **Eweida et al., (2017)** demonstrated that problem solving program is beneficial for those suffering from schizophrenia by means of facilitating better self-control from a debilitating and persistent illness as well as reducing the negative effects of the disease.

Studies have been demonstrated that problem solving program is an evidenced-based intervention that improve patients' abilities to implement sequential problem

solving in their heir practical life situations. Therefore, psychiatric nurses should take into account this intervention to improve self-control and mitigate the burden of negative symptoms through a variety of skill training.

Aim of the Study

The aim of the current research was to evaluate the effect of problem solving skills program on self-control behaviors and negative symptoms among patients with schizophrenia.

Research hypotheses:

H1/: Patients with schizophrenia who will attend problem solving skills program will exhibit high scores in self-control behaviors after the program's implementation than before.

H2/: Patients with schizophrenia who will receive problem solving skills program will exhibit lower scores in negative symptoms after the program's implementation than before.

Subjects and Method

Research design:

Quasi-experimental research design (One group; Pre, posttest) was employed to accomplish the aim of the current research.

Setting:

The research was carried out at inpatient units of Minia Hospital for Mental Health and Addiction Treatment which located in New Minia City, Upper Egypt and affiliated to ministry of health. This hospital contains two floors; the first one includes the inpatient unit for females, outpatient clinics and pharmacy. The next floor comprises administration, nursing office, department dedicated to addiction treatment and male inpatient ward. The hospital has 53 beds available for patients of both genders. The nine districts of Minia Governorate are served by this hospital.

Study subjects:

A purposive sample of established diagnosed sixty hospitalized clients with schizophrenia brought in the previously indicated setting participated in the current research. The number of patients is determined according to **Isaac and Michael (1995)** formula as (N= n x 30 / 100), in which (N = Sample size) and (n = total number of patients with schizophrenia admitted to Minia Hospital for Mental Health and Addiction Treatment at previous year which equals 200 patients).

Inclusion criteria:

- Age (18 – 65) years old.
- Sufficient cognitive capacity for completing the program.

Exclusion criteria:

- Presence of evidence of mental retardation.
- Patients with organic brain disorders.
- Patients with comorbid diagnosis of substance dependence.

Tools of data collection:

Tool I: Personal and clinical data questionnaire

This questionnaire was constructed by the researchers for assessing the personal and clinical data of patients with schizophrenia that include: age, gender, residence, marital status, educational levels, working status, mode of admission to psychiatric hospital, number of hospitalizations, and duration of illness.

Tool II: Self-Control Scale (SCS) Self-Control Scale (SCS) was constructed by **Tangney et al., (2004)** in an English language and translated into Arabic by researchers**.** It was designed to assess the subject's capacity to suppress or modify internal reactions, halt undesirable behavioral patterns, and stop acting on them. The scale consists of 36 items, assessed on a 5-point scale (1 being not at all and 5 being very much), and they are divided into five categories: self-discipline (11 items), deliberate/non-impulsive action (10 items), healthy habits (5 items), work ethics (5 items), and reliability (5 items).

The Self-Control Scale (SCS) was scored by summing number ranking of the response for each of the 36 questions. Out of 36 items 24 items have reverse scoring as (2, 3, 4, 6, 8, 9, 10, 11, 12, 14, 16, 17, 19, 20, 21, 23, 25, 28, 29, 31, 32, 33, 34, and 35). The minimum score for the SCS is 36 with a maximum score of 180. A higher SCS score indicates better self-control. The scale yields a total score from 36–89 indicating poor self-control. The self-control levels range from 90 to135 refers to moderate self-control. On the other hand, good self-control level has been displayed when patients achieve a total score of 136 and more.

Tool III: The Brief Negative Symptom Scale (BNSS)

This questionnaire was developed by **Kirkpatrick et al., (2011)** in an English language and translated from English into Arabic by researchers. The (BNSS) has 13 items organized into 6 subscales. A 7-point Likert scale was employed to score each item: 0 = none, 1 = dubious or suspicious, 2 = mild, 3 = moderate, 4 = marked (moderate to severe), 5 = severe, and 6 = extremely severe. The total score of the scale was equivalent to the sum of the points on each subscale, and the score of every subscale was equivalent to the sum of the items. The scale's overall score fell between 0 and 78. The more severe the negative symptoms, the greater the score. The level of negative symptom shown on the BNSS is as follows: 0 to 38: mild negative symptoms; 39 to 58: moderate negative symptom; while severe negative symptoms were detected when the score was 59 to 78.

Method:

Validity and Reliability

A panel of five specialists from Psychiatric and Mental Health Nursing domain assessed the study tools' content validity. The statements were reviewed for comprehensiveness, item sequencing, clarity, relevance, format, and applicability. The content of tools was valid and pertinent to the research aim based on the opinion of all jury members. The researchers employed the test-retest approach to measure internal consistency so as to detect the research tools' reliability. The Cronbach's alpha-coefficient test had been employed to contrast repeated test responses. Internal consistency of SCS and BNSS was estimated through the application of Cronbach’s alpha coefficients test and resulted in values of 0.90 and 0.89, respectively that means excellent reliability.

Pilot study:

A pilot study was conducted on ten percent (6 patients) of the global number of patients for assessing the study data collection tools' clarity, applicability, and time necessary to complete it. The sample chosen for the pilot study was involved in the main research since the assessment tools were left unchanged.

Procedure

Structured problem solving skills program was constructed by the researchers following reviewing present and previous relevant material on numerous study-related issues using recently published books, available journals, and internet resources to familiarize oneself with the problem of current research and provide a comprehensive understanding regarding the subject, for selecting the suitable tools and designing the research program. Data were collected and the program was applied within a duration of six months ranged between March to August 2024. The problem solving skills program was designed through the integration of four phases.

1- Assessment phase:

This stage was executed to assess baseline data for patients with schizophrenia through utilizing previously mentioned tools. The assessment phase was carried out for all participants. For collecting the required data, every patient was being interviewed, and about 40 to 60 minutes were needed for completing the tools according to the patients' ability to understand and talk.

2- Planning (Preparatory phase):

This stage involved the program approach, sufficient time required, total number of sessions, appropriate teaching methods and media that utilized. Problem solving skills program spanned a number of five phases that were covered in eight sessions for each subgroup of the study sample/ twice-weekly, each lasting approximately 60–90 min. The program comprised a variety of learning strategies such as group discussion, providing corrective feedback, positive reinforcement, lectures, brainstorming and learning materials such as: CDs, laptops, audiotapes, slides, colors, power point, notebook, paper, and pens.

3- Implementation phase:

During this phase, the patients who included in the study were divided into six subgroups; each one contains 10 participants. The program consisted of eight sessions. Each subgroup attended session two times/ week. The program was constructed by researchers after conducting a thorough literature review, the sessions of the program were as follows:

First session (introductory session):

The researchers met the participants in a quiet environment; its seats were arranged in a circular shape, and tried to establish an atmosphere of rapport, acceptance, and comfort. Then, the researchers gave a brief explanation about the program, its aims, importance, sessions, and the role of the researchers and patients.

Second session (recognition of the problem):

This session aimed to improve the abilities of the studied patients to

identify a real-life problem once it occurs. The patients are shown two videos of people experiencing difficulty in communication with others, as a problem or distressing event that interfere with interpersonal functioning. Through group discussion, the researcher explained that identifying the possible causes of the problem help in recognition of the problem and that those people could experience difficulty in communication with others due to lack of self-confidence and fear of being embarrassed or humiliated. In addition, this problem may arise from fear that others will criticize and react negatively to them. At the end of session, patients are given homework assignments as they were asked to explain why those people could experience this interpersonal problem and how to recognize problems.

Third session (describing the problem in clear statements):

This stage aimed to improve the ability of the studied patients to define the social problem clearly. This aim was reached through teaching them how to seek and collect enough information about the problem until it becomes clearer.

The researcher presented a problem of difficulty in communication with others to the patients and the patients began to ask many questions about the problem as a way to seek information. The group is not restricted to a limited number of questions as a one aspect that help patients describe the problem.

Fourth session (suggesting alternative solutions of the problem):

During this session the studied patients were trained to find out and create more ways to solve the problem. Also, the participants were practiced to divide the problem into smaller issues, then define reasonable objectives and come up with ways to reach them.

For example: The patients were shown a video of an individual experiencing difficulty in starting activities and through group discussion, the researcher explained that there are alternative solutions for this problem which may include; trying new things and learning a new skill which is related to the process of self-development and growth. Alternatively, talking to a close friend or family member is considered a great opportunity to get lots of comfort, support and guidance. In addition, patients experiencing difficulty starting activities can improve their daily routines; such as eating healthy food, getting enough sleep, which in turn help to solve the problem. After that, the patients were asked with placing the drawings for each solution in the right order.

Fifth session (selecting the best solution for the problem):

The main purpose of this step was to teach the patients how to evaluate the effective solution of the problem and make a suitable decision. This was achieved through teaching them the advantages and disadvantages of all alternative solutions. After that, each patient is asked to say which choice he/she would make as an aid in becoming a better problem-solver.

Sixth session (skill of positive self-talk):

This session aimed at teaching the patients positive thinking and positive self-talk through helping the patient to monitor thoughts, exclude negative ones, and to look at the positive aspects of things.

The researcher trained the patients on applying skill of positive self-talk as a significant part of self-control skills which help patients to solve problems. For example: If the individuals have negative feelings about their work on a particular project and the recurring thought in mind is "failure", the individual should ask himself: "What evidence is there to prove this failure? Are the individuals able to predict the future? Why do we only assume the bad?"

Seventh session (deep breathing exercises):

This session aimed at teaching the patients how to practice deep breathing exercises as a part of emotion regulation which help patients to solve problems. Patients were instructed to take deep breath, inhale deeply through the nose and to feel the abdomen rises as filling their body with air. Then gently exhale out through the mouth, the navel pushing in toward the spine as the patient expels air out.

Eighth session (role play about all steps of problem-solving):

The researcher presented a life problem on videotape and the participants' task was to discover the problem, acknowledge, and ask questions to get information about this problem, create numerous solutions based on these information, consider advantages and disadvantages for each one, and choose the best, and lastly implementing this solution through role play within the group.

4- Evaluation phase:

This is the final phase of the program which was terminated during the latest session using the same study tools to collect post program assessment data (posttest) and repeated the evaluation, six weeks later after program implementation (follow up) for the studied patients.

Ethical Considerations

Following official permission by the ethical committee of Minia University's Faculty of Nursing was obtained (**Code No.; REC202434**), the director of Minia Hospital for Mental Health and Addiction Treatment in New Minia City provided official approval for data collecting. Participants who matched the inclusion criteria for this research were interviewed by the researchers. In this step, the study's purpose and nature were clarified, and official permission was obtained. Patients were being told that their involvement in the research was entirely optional; the researcher also notified the patients regarding their possibility to leave the study whenever they want. The coding of the data ensured confidentiality and anonymity. The nature of the study inflicted no harm on the patients.

Statistical Analysis

SPSS for windows version 20.0 (SPSS, Chicago, IL) was utilized to carry out all statistical analyses. The Continuous data were distributed normally as well as were displayed by mean ±standard deviation (SD). Numbers and percentages were employed to present the categorical

data. The one-way analysis of variance (ANOVA) test was utilized to compare more than two for variables with continuous data. The Chi-square test (or fisher's exact test when applicable) was utilized to compare variables with categorical data. For testing correlations between two variables having continuous data, Correlation co-efficient test was applied. Besides, the reliability (internal consistency) for the questionnaires utilized in this research was estimated. Statistical significance was determined with $p<0.05$.

Limitations of the Study

The study may be limited for several causes, including; lack of specific or noiseless area for conducting patient meetings and applying the program, so, the researchers faced many obstacles, which lead to frequent repetition. Also, failure to restore relevant articles that was needed to support the current research variables is another obstacle.

Results

Table (1) reveals that the mean age of participants is 33.1 ±10.2 and that (73.3%) of them belong to age group average of 50 to 65 years, (76.7%) of them are males and (80%) are from rural areas. In addition, (66.7%) of the participants are single. Regarding educational level, most of patients (80%) have primary and secondary education, and (85%) of them are not working.

Table (2) shows that (85%) of studied patients have involuntary admissions to psychiatric hospital and (80%) of them admit the hospital more than three times. Besides, (76.7%) of patients have had the disease for three years and above.

Figure (1) demonstrates that, there are 65% of the patients under study exhibits low level of 'self - control at pretest and only 15% of them exhibit a good self - control level. Regarding posttest and the follow up test, the percentage of studied patients who have good self - control level is increased to (60% and 55%, respectively). While poor self – control level is seen among (13.3% and 15%, respectively).

Table (3) reports a highly statistically significant differences between pre-test and post-test as well as between pre-test and follow up in relating to total self-control score and it's all subscales with P- value (0.001**). Regarding total self-control mean score, this was increased to 134.3 ±44.8 and 131.1 ±43.9 at post-test and follow up, respectively.

Figure (2) demonstrates that, there are 58.3% of the patients under study exhibits severe level of negative symptoms at pretest and only 13.3% of them exhibit a mild level of negative symptoms. Regarding posttest and the follow up test, the percentage of studied patients who have mild negative symptoms level is increased to (61.7% and 58.3%, respectively). While severe negative symptoms level is seen among (8.3% and 10%, respectively).

Table (4) summarizes the presence of high statistical significant differences between pre and post-tests as well as between the pre and follow up tests concerning global negative symptoms mean score and it's all subscales with P- value (0.001**).

Table (5) clarifies that at the post-test and follow up, high statistical significant differences between self – control and educational level were noticed where P- value is (0.002* and P<0.001**, respectively). Additionally , at pre-test, post-test, and follow up, patients have university degree or above have the highest self – control mean scores compared to patients in other levels of education (87.0 ±20.2& 176.5 ±11.9& 175.5 ±11.9, respectively). Besides, at the post-test and follow up, there are statistically significant differences between self – control and duration of illness where P- value is (0.003* & P<0.001**, respectively). In addition, at pre-test, post-test, and follow up, studied patients that have the disease for under one year have the greatest self – control mean scores (82.5 ±23.6& 172.6 ±17.2 & 173.1 ±16.1, respectively).

Table (6) illustrates that at the post-test and follow up, a statistically significant differences between brief negative symptom and educational level were detected where P- value is (0.034*and P<0.001**, respectively). Besides, at pre-test patients with primary and secondary education have the highest brief negative symptom mean scores (42.0 ±13.2), while at post-test and follow up, patients that can read and write have the highest mean scores (30.7 ±11.7& 30.3 ±11.6, respectively). Besides, at the post-test and follow up, a statistically significant differences between brief negative symptom and duration of illness were detected where P- value is (0.003* & P<0.001**, respectively). In addition, at pre-test, post-test, and follow up, studied patients that have the disease for 3 years or more have the highest brief negative symptom mean scores (42.8 ±12.9& 29.6 ±11.9& 30.3 ±11.4, respectively).

Table (7) reports a statistically significance negative correlations between self-control scores and brief negative symptom scores at post-test as well as follow up as P- value is <0.001**.

Table (1): Frequency distribution of the studied patients relating to their personal data (n= 60)

Personal data	No.	%
Age / years		
18 <40	44	**73.3**
40 < 50	12	20.0
50-65	4	6.7
Mean ±SD	**33.1 ±10.2**	
Gender		
Male	46	**76.7**
Female	14	23.3
Residence		
Urban	12	20.0
Rural	48	**80.0**
Marital status		
Single	40	**66.7**
Married	13	21.7
Divorced	7	11.7
Educational level		
Illiterate	4	6.7
Primary and secondary education	48	**80.0**
University and above	8	13.3
Working status		
Working	9	15.0
Not working	51	**85.0**

Table (2): Frequency distribution of the studied patients relating to their clinical data (n= 60)

Clinical data	No.	%
Mode of admission to psychiatric hospital		
Voluntary	9	15.0
Involuntary	51	**85.0**
Number of hospitalizations		
Once	5	8.3
2 times	7	11.7
3 times and more	48	**80.0**
Duration of illness (Years)		
Less than one	6	10.0
1 to less than 3	8	13.3
3 or more	46	**76.7**

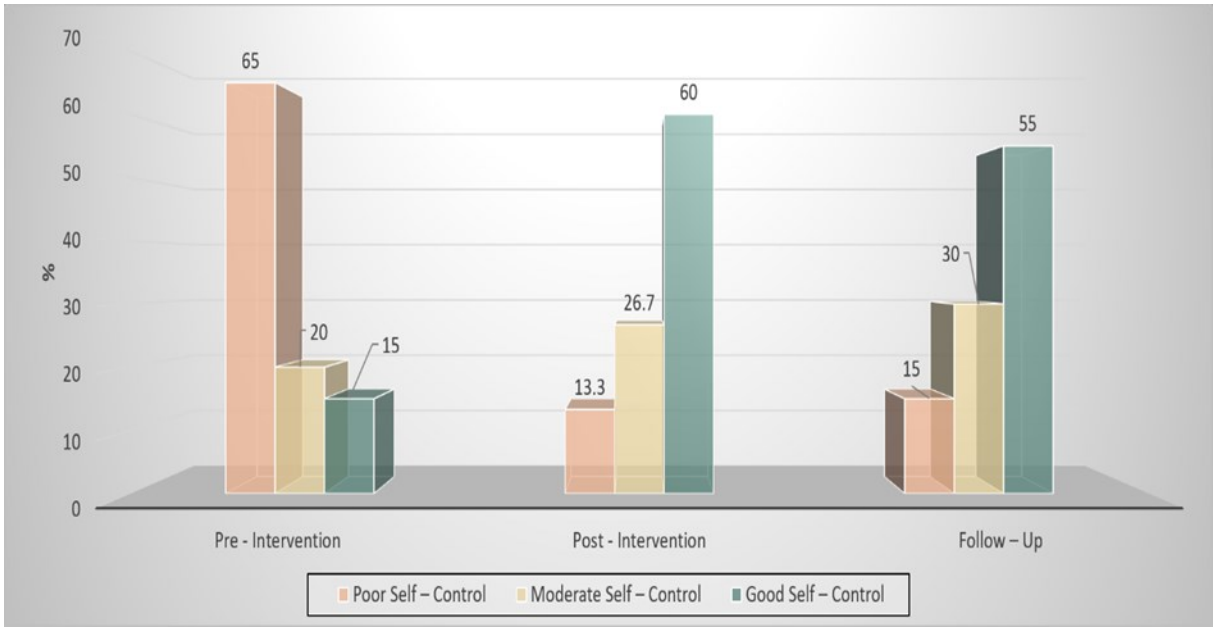

Figure (1): Frequency distribution of studied patients 'self - control levels at pre, post, and follow up (n = 60)

Table 3: Comparison of studied patients' Self-Control Scale scores and its subscales between pre, post and follow- up (n = 60)

Self-Control Scale domains	Pre Mean ±SD	Post Mean ±SD	Follow – up Mean ±SD	Significance test 1	Significance test 2
Self-discipline subscale	22.2 ±10.3	40.1 ±13.6	39.3 ±13.4	T=8.127, P<0.001**	T=7.837, P<0.001**
Deliberate/non-impulsive action	20.8 ±9.6	36.9 ±12.9	36.1 ±12.8	T=7.755, P<0.001**	T=7.407, P<0.001**
Healthy habits subscale	15.4 ±7.1	24.9 ±9.4	24.1 ±9.2	T=6.246, P<0.001**	T=5.798, P<0.001**
Work ethics subscale	10.8 ±4.9	17.5 ±6.2	17.0 ±6.1	T=6.567, P<0.001**	T=6.137, P<0.001**
Reliability subscale	10.2 ±3.7	14.9 ±5.8	14.6 ±5.7	T=5.291, P<0.001**	T=5.015, P<0.001**
Self-Control Scale total score	**79.3 ±30.2**	**134.3 ±44.8**	**131.1 ±43.9**	T= 7.885, P<0.001**	T=7.530, P<0.001**

Significance test 1: Pre – intervention / Post – intervention (Student's T – Test), Significance test 1: Pre – intervention / Follow – up (Student's T – Test)

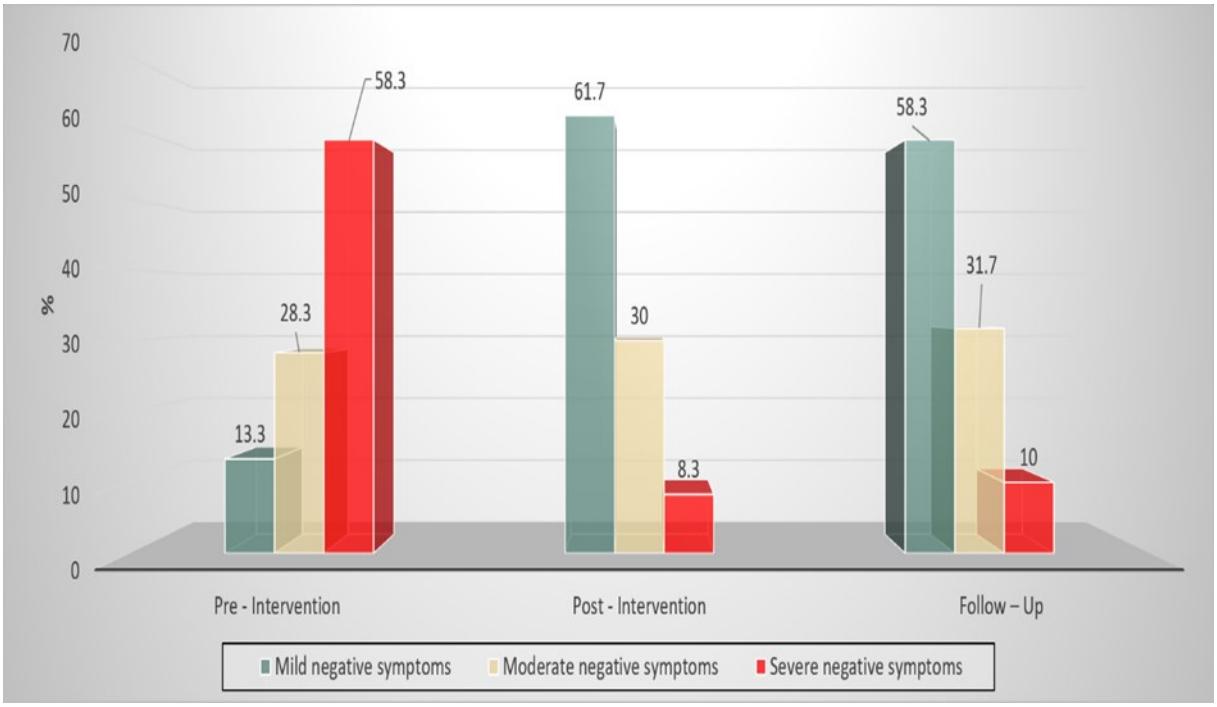

Figure (2): Frequency distribution of studied patients according to their negative symptoms at pre, post, and at follow up (n = 60)

Table (4): Comparison of studied patients' Brief Negative Symptom scores and its subscales between pre, post and follow- up (n = 60)

Brief Negative Symptom Scale	Pre Mean ±SD	Post Mean ±SD	Follow – up Mean ±SD	Significance test 1	Significance test 2
Anhedonia	13.0 ±5.4	6.5 ±2.9	6.9 ±2.9	T=8.214, P<0.001**	T=7.708, P<0.001**
Distress	4.6 ±1.7	2.3 ±1.1	2.4 ±1.3	T=8.798, P<0.001**	T=7.962, P<0.001**
Asociality	8.0 ±2.9	4.3 ±1.9	4.6 ±2.0	T=8.266, P<0.001**	T=7.476, P<0.001**
Avolition	8.3 ±2.9	4.2 ±1.9	4.5 ±2.0	T=9.160, P<0.001**	T=8.355, P<0.001**
Blunted affect	12.9 ±5.1	6.5 ±2.7	6.9 ±2.8	T=8.590, P<0.001**	T=7.988, P<0.001**
Alogia	7.7 ±2.6	4.1 ±2.0	4.2 ±1.9	T=8.501, P<0.001**	T=8.418, P<0.001**
Brief Negative Symptom total score	**54.4 ±20.1**	**28.0 ±13.3**	**29.4 ±13.4**	T=8.484, P<0.001**	T=8.016, P<0.001**

Significance test 1: Pre – intervention / Post – intervention (Student's T – Test), Significance test 1: Pre – intervention / Follow – up (Student's T – Test)

Table (5): Relation between Self – Control mean scores with personal and clinical data among studied patients at pre, post and follow up (n=60)

Personal and clinical data	Pre		Post		Follow – Up	
	Mean ±SD	Significance test	Mean ±SD	Significance test	Mean ±SD	Significance test
Age (Years)						
18 < 40	79.9 ±26.8	F=0.423, P=0.657	136.1 ±42.3	F=0.559, P=0.575	132.9 ±41.9	F=0.379, P=0.686
40 < 50	74.4 ±16.0		135.3 ±53.1		130.8 ±51.0	
50 – 65	87.0 ±28.7		111.3 ±51.5		112.8 ±51.4	
Gender						
Male	79.4 ±26.7	T=0.067, P=0.947	133.0 ±42.7	T=0.408, P=0.685	131.0 ±42.8	T=0.030, P=0.976
Female	78.9 ±19.0		138.6 ±52.4		131.4 ±48.9	
Residence						
Urban	74.4 ±19.6	T=0.748, P=0.458	141.2 ±53.7	T=0.594, P=0.555	137.2 ±52.1	T=0.531, P=0.597
Rural	80.5 ±26.1		132.5 ±42.7		129.6 ±42.0	
Marital status						
Single	76.9 ±24.4	F=1.509, P=0.230	135.0 ±40.5	F=0.354, P=0.704	133.2 ±38.5	F=1.529, P=0.226
Married	78.3 ±24.3		138.8 ±46.0		138.8 ±46.0	
Divorced	94.4 ±27.6		121.4 ±67.8		104.9 ±63.8	
Educational level						
Not read and write	66.8 ±22.0	F=0.888, P=0.417	124.8 ±44.7	F=7.333, P=0.002*	120.9 ±42.6	F=8.530, P<0.001**
Primary and secondary education	79.0 ±25.8		163.3 ±21.3		162.3 ±21.1	
University and above	87.0 ±20.2		176.5 ±11.9		175.5 ±11.9	
Working status						
Working	80.6 ±24.2	T=0.169, P=0.866	117.0 ±48.9	T=1.261, P=0.212	118.4 ±48.8	T=0.939, P=0.351
Not working	79.0 ±25.3		137.3 ±43.8		133.4 ±43.1	
Mode of admission to psychiatric hospital						
Voluntary	73.8 ±30.8	T=0.711, P=0.480	120.3 ±52.6	T=1.013, P=0.315	121.7 ±52.3	T=0.698, P=0.488
Involuntary	80.2 ±24.0		136.7 ±43.4		132.8 ±42.6	

Number of hospitalizations						
Once	82.2 ±28.0	F=0.588, P=0.559	112.8 ±66.3	F=0.916, P=0.406	112.8 ±66.3	F=0.563, P=0.572
2 times	88.3 ±27.8		148.3 ±24.0		139.6 ±21.0	
3 times and more	77.6 ±24.5		134.5 ±44.6		131.8 ±44.0	
Duration of illness (Years)						
Less than one	82.5 ±23.6	F=0.059, P=0.943	172.6 ±17.2	F=6.261, P=0.003*	173.1 ±16.1	F=8.148, P<0.001**
1 to less than 3	78.1 ±23.4		164.2 ±16.4		163.2 ±17.8	
3 or more	79.0 ±25.8		123.7 ±45.4		119.6 ±43.1	

Table (6): Relation between Brief Negative Symptom mean scores with personal and clinical data among studied patients at pre, post and follow up (n=60)

Personal and clinical data	Pre		Post		Follow – Up	
	Mean ±SD	Significance test	Mean ±SD	Significance test	Mean ±SD	Significance test
Age (Years)						
18 < 40	55.5 ±19.1	F=1.582, P=0.214	28.0 ±11.6	F=0.214, P=0.808	28.6 ±11.2	F=0.474, P=0.625
40 < 50	46.8 ±23.5		27.1 ±13.3		32.2 ±12.9	
50 – 65	65.5 ±14.4		31.8 ±19.1		28.5 ±8.4	
Gender						
Male	55.8 ±20.1	T=0.956, P=0.343	27.4 ±12.5	T=0.731, P=0.468	29.3 ±11.6	T=0.005, P=0.996
Female	49.9 ±20.1		30.1 ±11.7		29.3 ±10.6	
Residence						
Urban	49.2 ±20.5	T=1.014, P=0.315	26.7 ±11.9	T=0.428, P=0.670	34.8 ±9.8	T=1.910, P=0.061
Rural	55.7 ±20.0		28.4 ±12.5		27.9 ±11.3	
Marital status						
Single	55.8 ±19.3	F=0.290, P=0.750	28.2 ±12.2	F=0.298, P=0.743	28.9 ±10.7	F=0.091, P=0.913
Married	52.4 ±21.7		26.2 ±8.4		30.5 ±14.0	
Divorced	50.4 ±23.2		30.6 ±19.0		29.4 ±10.9	
Educational level						
Not read and write	37.5 ±14.5	F=1.888, P=0.167	30.7 ±11.7	F=3.591, P=0.034*	30.3 ±11.6	F=9.994, P<0.001**

Primary and secondary education	42.0 ±13.2		26.0 ±12.1		27.5 ±8.1	
University and above	32.5 ±12.4		15.1 ±6.9		14.0 ±6.7	
Working status						
Working	63.8 ±19.2	T=1.536, P=0.130	29.8 ±10.3	T=0.459, P=0.648	34.2 ±15.7	T=1.430, P=0.158
Not working	52.8 ±19.9		27.7 ±12.7		28.4 ±10.3	
Mode of admission to psychiatric hospital						
Voluntary	54.3 ±24.1	T=0.013, P=0.989	28.6 ±9.6	T=0.137, P=0.891	28.8 ±14.4	T=0.149, P=0.882
Involuntary	54.4 ±19.5		27.9 ±12.8		29.4 ±10.8	
Number of hospitalizations						
Once	53.8 ±17.1	F=0.672, P=0.515	31.6 ±10.6	F=0.237, P=0.790	34.0 ±14.0	F=1.423, P=0.249
2 times	62.7 ±12.9		27.0 ±9.1		23.4 ±12.1	
3 times and more	53.3 ±21.1		27.8 ±12.9		29.7 ±10.8	
Duration of illness (Years)						
Less than one	35.5 ±14.3	F=0.994, P=0.376	15.3 ±6.5	F=4.259, P=0.018*	17.3 ±7.3	F=3.557, P=0.035*
1 to less than 3	39.1 ±13.2		25.8 ±11.3		28.5 ±12.4	
3 or more	42.8 ±12.9		29.6 ±11.9		30.3 ±11.4	

Table (7): Correlation between Self-Control scores and Brief Negative Symptom scores among studied patients at pre, post, and follow up (n=60)

	Self-Control Scale		
	Pre – intervention	**Post – intervention**	**Follow – Up**
Brief Negative Symptom Scale			
Pre – intervention	- 0.021 (0.875)		
Post – intervention		- 0.769 (<0.001**)	
Follow – up			- 0.736 (<0.001**)

Discussion

The current study's objective was to evaluate the effect of problem solving skills program on self-control behaviors and negative symptoms among patients with schizophrenia.

The findings of the current investigation demonstrated that, at pre-test, nearly two thirds of the schizophrenic patient's exhibit low level of self-control with a lower mean score. This outcome might be contributed to cognitive deficits, psychotic symptoms, emotional dis-regulation, and negative symptoms. Schizophrenia can disrupt thought processes, attention, and decision-making abilities, leading to difficulty in regulating behavior and impulses . In addition, when a person is experiencing psychotic symptoms as hallucinations or delusions, they may act in ways that seem impulsive or irrational to others and their behavior might be driven by these experiences rather than by conscious self-control . Moreover, schizophrenia can involve difficulty managing emotions, leading to erratic behaviors, emotional outbursts, or impulsivity. This finding is congruent with the research conducted by **Lee et al., (2018),** who found that schizophrenic patients had low self-control score of (93.26+19.68).

Regarding negative symptoms, the outcomes of the current investigation cleared that, over half of the patients with schizophrenia under study exhibits severe level of negative symptoms at pretest with a higher mean score. Several factors may contribute to the high negative symptoms score observed among patients with schizophrenia including, chronicity of illness, inadequate treatment adherence, and socio-economic factors. Additionally, the psychosocial stressors and comorbid conditions are significant contributors to the severity of negative symptoms in our patient population. These results are corroborated by a previous research carried out by **Morsy et al., (2024)** who proved that before intervention greater than of schizophrenics in the study group have severe level of negative symptoms. Also, **Mohammed et al., (2022)** greater than half of participants possessed severe level of negative symptoms. in addition, above one third of them were inflicted with moderate level. This finding is also congruent with the research of **Rangrazian et al., (2021),** who found that patients with schizophrenia experience severe negative symptoms with a high mean score (56.94±8.43).

Regarding the impact of the problem-solving skills programs on self-control among patients with schizophrenia, the current research results revealed a notable increase in schizophrenic patients' self-control scores at the posttest and follow-up's test than at pretest. The beneficial impact of problem-solving skills programs on self-control may be attributed to several mechanisms. Problem solving skills programs is more self-guided and motivates patients with schizophrenia to take an active role in making decisions about their lives which strengthens their ability to regulate impulsive behaviors and choose more

constructive actions. In addition, it helps schizophrenic patients to organize disorganized thinking patterns, allowing them to approach situations more systematically by learning to break down complex problems into smaller and manageable parts, so, patients can avoid becoming overwhelmed, which in turn increase self-control.

Moreover, the effect of problem-solving skills programs on negative symptoms among patients with schizophrenia, conversely, the studied patients' negative symptoms score was notably decreased at the posttest and follow-up's test compared to the pretest. The significant effect of problem-solving skills programs on negative symptom severity among patients with schizophrenia may be rationalized by; activation of brain information and cognitive processing resulting in reduction of severity of negative symptoms. This cognitive improvement can lead to enhanced verbal expression and a more dynamic emotional response among patients with schizophrenia, thereby reducing the severity of alogia and affective flattening. Through structured problem-solving exercises, schizophrenic patients are taught how to initiate activities, follow through with plans, building up small successes over time, and stay motivated, reducing their avolition scores. Furthermore, problem-solving exercises provide patients with strategies to manage interpersonal conflicts that help them to become more confident in social situations, increase patients' engagement and reduce their social withdrawal. All of these effects contribute to the reduction in the seriousness of negative symptoms. These results are corroborated by a previous research conducted by **Lee et al., (2018)** who found that self-control behavior and negative symptoms score were significantly improved among patients with schizophrenia following the problem-solving exercises program, compared with baseline.

Regarding the relation between schizophrenic patients' self – control scores and their personal and clinical data, the current study's findings revealed that, at the post-test and follow up, there were statistically significant relation between self – control as well as educational level. In addition, at pre-test, post-test, and follow up, patients have university degree or above have the highest self – control mean scores compared to patients in other levels of education. This could be attributed to that education often promotes the development of cognitive and executive functions, such as problem-solving, planning, and critical thinking, which are integral to self-control.

Additionally, education could influence self-control indirectly through its impact on self-efficacy and coping strategies. Individuals with higher education may feel more confident in their ability to manage their condition, potentially employing more effective strategies to deal with stressors and symptoms. In contrast, those with lower educational attainment may

experience reduced access to information about managing schizophrenia or may lack the skills needed to implement effective self-regulation techniques. This outcome is in accordance with a research by **Lau et al., (2022)**, who documented that education was significantly related to self-control among patients with schizophrenia. The same authors clarified that individuals with elementary education or lower exhibited decreased levels of self-control scores compared to those who had completed a college degree or higher.

Concerning duration of illness, the current research also showed that at the post-test and follow up, there are statistically significant relation between self – control and duration of illness. In addition, at pre-test, post-test, and follow up, studied patients that have the disease for under one year have the greatest self – control mean scores. One possible explanation is that during the early stages of the illness, cognitive and behavioral functions, including self-regulation, may still be relatively intact. Schizophrenia often involves a gradual decline in cognitive abilities, including executive function, emotional regulation, and impulse control, which can worsen as the disease progresses. Individuals who have had the illness for a shorter period may still be actively engaged in finding ways to cope with the initial symptoms, leading to higher motivation and a stronger effort to maintain control over their behavior and emotions. This outcome is matched with **Billen et al., (2019)** who showed that there are statistically notable relation between self – control and duration of illness and treatment and those with diminished levels of self – control possessed longer duration of illness and treatment.

Concerning the relation between schizophrenic patients' negative symptom mean scores and their personal and clinical data, the current study's findings revealed that, at the post-test and follow up, there are statistically significant relation between negative symptoms and educational level. Besides, at pre-test patients with primary and secondary education have the greatest negative symptoms mean scores, while at post-test and follow up, patients that can read and write have the highest mean scores. One justification for this relation could be that higher levels of education are often associated with better cognitive functioning. These cognitive abilities can help individuals with schizophrenia cope more effectively with their symptoms and maintain better functioning in daily life.

In addition, those with higher education may have a greater chance of being employed or participating in social engagements as well, which could help mitigate the impact of negative symptoms .Moreover, individuals with higher educational attainment often have better access to healthcare resources, support systems, and information about coping strategies, all of which can contribute to reducing the impact of negative symptoms. Conversely, those with lower education levels

may experience more barriers to accessing these resources, leading to poorer symptom management and a higher burden of negative symptoms. In contrast, a recent study of **Mohamed et al., (2024)** found no statistically significant relationship between severity of negative symptoms and educational level of study's participants.

Regarding the duration of illness, the current study results indicated that, at the post-test and follow up, there are statistically significant relation between brief negative symptoms score and duration of illness. In addition, at pre-test, post-test, and follow up, studied patients that have the disease for 3 years or more have the highest brief negative symptom mean scores. This progression may be attributed to the neurodegenerative aspects of schizophrenia, where prolonged illness duration leads to greater brain changes and functional impairments that manifest in negative symptoms. In alignment with this perspective, a recent study of **Slováková et al., (2024)** exhibited a statistically significant relationship between severity of negative symptoms as well as duration of illness.

Finally, the results of the current investigation revealed a negative correlation between self-control scores and brief negative symptoms scores at pre, post-tests and follow up. This negative correlation highlights the potential protective role of self-control in managing negative symptoms. Persons with greater self-control may have better ability to regulate their feelings, manage stress, and resist impulsive or maladaptive behaviors, all of which can help reduce the influence of negative symptoms. This outcome is in agreement with the research of **Sagayadevan et al., (2023)**, who proposed that self-control is negatively associated with negative symptom severity. Similarly, **Amr et al., (2016)**, found that there was a significant negative correlation between self-control as well as negative symptoms scores among persons with schizophrenia.

Conclusion

On the basis of the results of the present research, it is possible to draw the conclusion that, individuals with schizophrenia who perceived the problem solving skills program had a statistical significant greater enhancement in their self-control behaviors, and negative symptoms which continued for six weeks post the program implementation. So, this study established significant evidence that problem-solving skills program is effective in improving self-control behaviors and negative symptoms among individuals with schizophrenia.

Recommendations

1. Involving problem-solving skills program as a component of holistic psychosocial interventions to schizophrenic patients.
2. Providing all nurses and health providers who manage schizophrenia patients with in-service training program concerning problem-solving skills to improve patients' outcomes.

3. Outstanding follow up and monitoring for individuals with schizophrenia involved in problem-solving skills program to support their skills acquiring and persistence of the change.
4. Planning future research in various local and international contexts with a large sample size concerning problem-solving skills program is needful to reflect further results which could be replicated on a wider basis.

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