

Effect of Problem-Solving Skills Training on Positive Symptoms and Suicidal Thoughts among Patients with Schizophrenia

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Abstract: Schizophrenia is a severe, chronic mental disorder affecting millions globally, causing delusions, hallucinations, and a high suicide risk, particularly among younger individuals. Problem-solving skills training can reduce suicidal ideation, decrease positive symptoms and enhance quality of life. **Purpose:** Evaluate the effect of problem solving skills training on positive symptoms and suicidal thoughts among patients with schizophrenia. **Design:** A Quazi experimental research design (study and control group pre/ posttest) was used to achieve the purpose of the study. **Setting:** This study was carried out at psychiatric department at Menoufia University Hospital and Meet-khalf Hospital, Shebin Elkom City, Menoufia governorate which is affiliated to General Secretariat of Mental Health in Egypt. **Sample:** A purposive sample of 90 patients with schizophrenia was selected and divided randomly into (study and control group). **Instruments:** (1) Scale for Assessment of Positive Symptoms (SAPS) in addition to socio- demographic and clinical questionnaire (2) Beck Scale for Suicide Ideation (BSS). **Results:** The intervention significantly reduced positive symptoms and suicidal thoughts in the schizophrenic study group (93.3%) mild positive symptoms and (40%) no suicidal thoughts compared to the control group (73.3%) mild positive symptoms and (17.8%) no suicidal thoughts...). Also, there was a positive correlation between total positive symptoms mean score and total suicidal thoughts mean score after intervention. **Conclusion:** Training in problem solving skills has a positive effect in reducing positive symptoms and suicidal thoughts among patients with schizophrenia. **Recommendations:** Problem solving skills training should be incorporated as a treatment modality for schizophrenic patients.

Keywords: Problem solving skills, Positive symptoms, Suicidal thoughts, Schizophrenia.

Introduction

Schizophrenia spectrum disorders, a severe and chronic form of schizophrenia, exhibit both positive and negative symptoms, cognitive

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deficits, and other clinical and non-clinical characteristics, often leading to poor clinical and functional outcomes (Habtewold et al., 2023). Schizophrenia, a severe chronic illness affecting early adulthood and adolescents, is a common psychotic disorder in Egypt, characterized by changes in thought, perception, and social behavior (Abdelgelil et al., 2022).

Schizophrenia, characterized by hallucinations, delusions, and cognitive difficulties, can disrupt functioning, leading to educational disruptions and loss of livelihoods. Symptoms include positive, negative, and cognitive, often accompanied by psychotic behavior. People who exhibit positive signs of schizophrenia typically become detached from reality (Maglia et al., 2023).

Schizophrenia is a condition characterized by hallucinations, delusions, and disorganized thinking, as well as flat emotions, limited speech, and lack of motivation (Paschall, 2021). Schizophrenia involves hallucinations, delusions, and cognitive difficulties, leading to depression, reduced motivation, social withdrawal, and relationship issues, affecting daily life and emotional management (Lee et al., 2018).

Schizophrenia significantly shortens lifespan and reduces well-being, making suicide prevention a critical public health issue. Implementing measures to reduce suicidal behaviors is essential (Vázquez et al., 2023).

Schizophrenic patients are more likely to die by suicide, especially younger individuals. Factors such as age,

education, mental health issues, and substance abuse can increase the risk. Effective treatment, including early intervention and comprehensive care, is crucial in preventing suicide, addressing core symptoms and co-occurring depression and substance abuse (Mikhael et al., 2020).

Schizophrenic patients with executive function impairment struggle to adapt to changes in their environment due to issues with core mental abilities, including difficulty switching tasks, repeating mistakes, and slower thinking (Susana & Yunias, 2020).

Problem-Solving Therapy (PST) emerged in the 1970s as a therapeutic approach to address mental health difficulties by enhancing problem-solving (PS) abilities (D'Zurilla & Goldfried, 1970s). Based on Social Learning Theory, PST emphasizes fostering an optimistic and confident approach to problems (positive problem orientation) and equips clients with four key Problem Solving skills (PSS) defining the problem, brainstorming solutions, choosing the best one, and putting the chosen solution into action and evaluating its effectiveness (Krause et al., 2021).

Significance of the study

Schizophrenia is a chronic disorder that affects approximately 1.1% of the population, (National Institute of Mental Health "NIMH", 2018). Furthermore, schizophrenia affects fifty percent of patients in psychiatric hospitals worldwide. Schizophrenia is the most common chronic psychosis in Egypt, accounting for the majority of inpatients in mental hospitals. The

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prevalence rate of schizophrenia in Egypt is expected to be around 22 percent of people or 56 thousand Egyptians. (Hasan et al .,2023). Research indicates age, unemployment, poverty, depression, anxiety, hopelessness, and discomfort increase suicidal thoughts in schizophrenic patients, with hallucinations and delusions being strong predictors of higher suicide deaths (Harris et al ., 2020).

Psychiatric nurses are essential in both preventing suicide and providing care for individuals who attempt suicide. By encouraging patients to recognize the problem and realize that there are various approaches to problem-solving, psychiatric nurses can assist hospitalized patients experiencing suicidal thoughts in developing their problem-solving abilities. Therefore, studying the effect of problem-solving skills training on schizophrenia has the potential to improve patient outcomes, reduce suicide risk, and contribute to a better understanding of how to manage this complex illness (Tel et al .,2024).

Methods

Purpose of the study:

Evaluate the effect of problem solving skills training on positive symptoms and suicidal thoughts among patients with schizophrenia.

Research hypotheses:

1) Patients who participate in problem solving skills training (study group) will have lower mean scores related to positive symptoms than patients who don't receive training (control group).

2) Patients who participate in problem solving skills training (study group) will have lower mean scores related to suicidal thought than patients who don't receive training (control group).

Research design:

A Quazi - experimental research design two group (study and control group pre/ posttest) was used to achieve the purpose of the study.

Research setting:

This study was conducted at psychiatric department at Menoufia University Hospital and Meet-khalf Hospital, Shebin Elkom City, Menoufia governorate which is affiliated to General Secretariat of Mental Health in Egypt. (1): The psychiatric unit at Menoufia University Hospital was founded in 2012 and is located on the General Hospital's eighth floor. It has fifteen beds and provides 24-hour rehabilitation treatments and psychiatric counseling to adult inpatients, both male and female. (2): The Meet Khalaf Psychiatric Hospital opened officially in 2005 after being established in 1999. The Meet Khalaf Hospital had 113 beds available for admission. The hospital contains five departments: one for addiction treatment, one for women, and three for men. It has an ECT department as well. The hospital offers critical and urgent care emergency services continuously, outpatient services for psychiatric disorders and addiction throughout patient clinics, community medicine services for psychological

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rehabilitation, and inpatient rehabilitation services.

Sampling: -

A purposive sample of 90 patients with schizophrenia was chosen and divided into two equal group (study and control), 45 for each group, who attend psychiatric department in Menoufia university hospital and Meet-khalf Hospital, Shebin Elkom, Menoufia, Egypt according to the following inclusion criteria and exclusion criteria:

Inclusion criteria:

Individual diagnosed with schizophrenia aged 25-65, free from other psychiatric disorders, able to communicate, willing to participate in study, and with less than 10 years of illness duration.

Exclusion criteria:

This includes neurological illnesses, acute medical conditions, mental retardation, or patients in a state of acute disturbance.

Instruments:

Three instruments were used for data collection:

Instrument one: A structured interviewing questionnaire.

It was developed by the researcher to assess social characteristics of the patients which divided into two parts:

- **Part one:** - socio-demographic data: age, sex, marital status, level of education, place of residence and occupation etc....
- **Part two:** - clinical data: age at onset of schizophrenia, duration of illness,

smoking condition and way of entering hospital etc....

Instrument two: Positive Symptoms

Assessment Scale

It was developed by Andreson in 1991 to assess positive symptoms of schizophrenia. It was translated into Arabic by researcher. SAPS is split into 4 domains: (1) hallucinations consisted of 6 items; (2) delusions consisted of 12 items; (3) bizarre behaviors consisted of 4 items; and (4) positive formal thought disorders consisted of 8 items. Within each item in the domain, separate symptoms were rated from 0 (none) to 4 (severe). The scoring system consists of No = 0, sometimes =1, usually = 2, always = 3. The minimal score is 0, and the maximum score is 90.

Total scoring system of positive symptoms scale is categorized as follows:

- None :(0)
- Mild (1 – 30)
- Moderate : (31 – 67)
- Severe : (68 – 90)

Instrument three: Beck Scale for Suicide Ideation (BSS).

This scale was developed in 1979 by Beck et al., translated into Arabic by researcher, then back again, and modified as necessary. This instrument was used to assess attitudes and behaviors that clinicians routinely consider when assessing a patient's risk of suicide. The Beck Scale for Suicide Ideation (BSS) includes 19 statement groups, each assessing various aspects of suicidal ideation.

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Each statement group consisted of three sentences that describe different intensities of suicidal ideation, representing a three-point scale from 0 to 2. The participants were given instructions to select the specific statement from each group that most suited their needs. The total Beck Scale for Suicide Ideation (BSS) score ranged from zero to 38, with higher values indicating a greater risk of suicide.

Scoring system for suicidal thoughts is:

- Less than 8 = No suicidal thought
- From 8 - 16 = Mild suicidal thought
- From 17 - 26 = Moderate suicidal thought
- From 27- 38 = sever suicidal thought

Validity:

A panel of five professors from Menoufia University's psychiatric nursing department evaluated the tools' content validity by examining the relevancy, comprehensiveness, clarity, and applicability of the questions. According to their opinions, modifications were made, and the final form was developed. Beck Scale for Suicide Ideation (BSS) :which was used in the research study, some words in the Arabic version of the tool were modified in order to convey the intended meaning, and a final version was developed. The scale for the assessment of positive symptoms (SAPS), which was used in the research study, had modifications. The scoring system was modified to consist of four items: No = (0), sometimes = (1), usually = (2), and always = (3),

instead of 5 responses, which were :0 = None/Not at All 1 = questionable; 2 = mild; 3 = moderate; 4 = marked. 5 = severe.

Reliability:

The internal consistency of the questionnaire was calculated using Cronbach's alpha coefficients. The reliability of the instruments was done using test - retest reliability and proved to be strongly reliable at 0.87for instrument two, at 0.77 for instrument three

Pilot study:

After the instruments were designed, they were tested through a pilot study, which was done before conducting the study to check clarity and feasibility of the tools to be sure that it was understood and to estimate the time needed to complete its items. It was carried on a sample of 10% (9 patients with schizophrenia) who were excluded later from the main study sample to assure stability of the results.

Ethical consideration:

Ethical approval was attained from an ethical research committee of the Faculty of Nursing, Menoufia University. Informed consent for participation was taken from the participants after explaining the purpose of the study and assures maintaining anonymity and confidentiality of the subjects data, the patients were informed that participation in this study was voluntary; they have the right to participate in the study and they have

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the right to withdraw from the study at any time.

An official approval was obtained from the Human Rights Protection Committee and Research Committee of General Secretariat of Mental Health in Egypt after revision of the study protocol and instruments, then an official approval was obtained from the directors of Menoufia University Hospital and Meet-khalf Hospital, Shebin Elkom City, Menoufia governorate.

Procedure:

- A written letter was issued from the Dean of Faculty of Nursing, Menoufia University to obtain the approval for data collection from the directors of Menoufia University Hospital and Meet-khalf Hospital, Shebin Elkom City, Menoufia governorate and from General Secretariat of Mental Health in Egypt to conduct the proposed study. The purpose and the nature of the study were explained to the administrative personnel.
- Once the permission was obtained to continue this proposed study. A comfortable, private place was chosen for the interviewers. Orientation was done about the purpose of the study and content of the study. Assessment was done using the scale for the assessment of positive symptoms and Beck scale for suicide ideation for 90 patients. Then they were randomly assigned to two equal groups: one study group and the other was control group using coin tossing.
- The researcher met the study group and informed them that they will attend

12 sessions which distributed as the following (11 sessions) within three months/ one session every week), and one session (posttest) after completing sessions

- The problem solving skills training was applied through three months in the period from the beginning of October 2023 to the end of December 2023. Patients were divided into two groups: a study group (45 patients) and a control group (45 patients). The study group was divided into five groups, each with nine participants. Each group attended twelve sessions, one-third theoretical and the other two-thirds practical. The researcher met each group once every week from 10 AM to 11.30 AM. After completing problem solving skills training sessions.

Assessment phase: -

Patients are orientated to attend 12 sessions over three months, one weekly session, and one posttest after completing session's .Session 1: Introduction and orientation. Session 2: overview of schizophrenia. Session 3: Relaxation training & how to deal with delusion and hallucination Session 4: Application of thought-stopping technique. Session 5: Application of problem-solving technique. Session 6: Application of problem solving skills (effective listening skill).Session 7: Application of imaginative skills .Session 8: application of team work and emotional intelligence skills. Session 9: Implementation of risk reduction measures. Session 10: Application of

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decision making skill .Session 11: Using planning when starting something new. Session 12: session for the post- test

Statistical Analysis:

The study used IBM's SPSS version 22 for data collection, analysis, and statistical analysis. Descriptive statistics were used to present quantitative data in mean, standard deviation, range, and qualitative data in numbers and percentages. Analytical statistics were used to determine possible associations between factors and the targeted disease. Tests of significance included Chi-square, Mann-Whitney, and pearson correlation, with a significance level of $p < 0.05$. Significance level was set at p value < 0.05 .

Results

Table 1 reveals that there is no statistical significant difference between study and control group regarding all items of socio demographic data.

Table 2 clarifies that there is no statistical significant difference between study and control group regarding all items of clinical data.

Figure 1 shows that there is no significant difference in the levels of positive symptoms before intervention between the study and control groups, where 66.7% and 64.4% of the study and control groups having mild positive symptoms and 33.3% and

35.6% of the study and control groups having moderate positive symptoms, respectively.

Figure 2 shows that there is significant difference in the levels of positive symptoms after intervention between the study and control groups, where 93.30% and 73.30% of the study and control groups having mild positive symptoms and 6.70% and 26.70% of the study and control groups having moderate positive symptoms, respectively.

Figure 3 clarifies that there is no significant difference between study and control group regarding levels of suicidal thoughts before intervention where 17.8% and 17.8% of the study and control groups having no suicidal thoughts and 8.9% and 6.6% of the study and control groups having sever suicidal thoughts ,respectively.

Figure 4 clarifies that there is significant difference between study and control group regarding levels of suicidal thoughts after intervention where 40% and 17.8% of the study and control groups having no suicidal thoughts and 0 % and 6.7%of the study and control groups having sever suicidal thoughts ,respectively

Table 3 shows that: Before the intervention, there was no significant association between the study group's positive symptoms and suicidal thoughts; however, after the intervention, there was a highly significant positive correlation.

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Table (1): Distribution of patients according to socio-demographic data (N=90):

Studied variable					χ^2	P value
	Study group (N=45)		Control group (N=45)			
	No.	%	No.	%		
Age / years						
25 - <35 years	16	35.6	12	26.7	1.57	0.666
35 —< 45 years	21	46.7	21	46.7		
45 - <55 years	6	13.3	10	22.2		
55 - < 65 years	2	4.40	2	4.40		
Gender						
Male	27	60.0	35	77.8	3.31	0.069
Female	18	40.0	10	22.2		
Residence						
Rural	37	82.2	38	84.4	0.080	0.777
Urban	8	17.8	7	15.6		
Marital state						
Single	20	44.4	19	42.3	0.555	0.758
Married	17	37.8	20	44.4		
widower	8	17.8	6	13.3		
Educational level						
Read& write	15	33.4	8	17.7	6.47	0.263
Basic	6	13.3	5	11.1		
Secondary	18	40.0	25	55.6		
University	5	11.1	7	15.6		
Postgraduate	1	2.20	0	0.00		
Occupation						
Don't work	18	40.0	21	46.7	2.26	0.518
Housewife	7	15.6	3	6.70		
Work	18	40.0	20	44.4		
Student	2	4.40	1	2.20		
Type of work	N=18		N=20			
Manual work	5	27.8	6	30.0	1.91	0.590
Employee	1	5.60	3	15.0		
Special work	12	66.6	11	55.0		
Income						
Insufficient	34	75.6	37	82.2	0.600	0.438
Sufficient	11	24.4	8	17.8		

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Table (2): Distribution of patients in the study and control groups according clinical data (N=90):

Studied variable					χ^2	P value
	Study group (N=45)		Control group (N=45)			
	No.	%	No.	%		
Age at onset of the disease						
16 - <25 years	6	13.3	5	11.1	1.74	0.628
25 —< 34 years	26	57.8	24	53.3		
34 - <45 years	12	26.7	16	35.6		
> 45 years	1	2.20	0	0.00		
Duration of illness						
Less than 1 year	15	33.3	12	26.7	0.476	0.490
1 – 10 years	30	66.7	33	73.3		
Entry method						
Mandatory	45	100.0	45	100.0	-	-
If entry method mandatory						
By whom						
Family	45	100.0	45	100.0	-	-
Neighbour	-	0.00	0	0.00	-	-
Police	-	0.00	0	0.00	-	-
Hospital	-	0.00	0	0.00	-	-
Other	-	0.00	0	0.00	-	-
Have relatives with mental illness						
Yes	12	26.7	13	28.9	0.055	0.814
No	33	73.3	32	71.1		
If the answer is yes, what is the relationship	N=12		N=19			
Parents	4	33.3	4	30.8	FE 0.019	0.891
Sibling	8	66.7	9	69.2		
other	0	0.00	0	0.00		
Alcohol misuse						
Yes	3	6.70	2	4.40	FE 0.212	0.654
No	42	93.3	43	95.6		
Drug misuse						
Yes (Tramadol)	6	13.3	4	8.90	0.450	0.502
No	39	86.7	41	91.1		
Narcotic Substance misuse						
Yes	8	17.8	4	8.90	0.809	0.368
No	37	82.2	41	91.1		
Type of narcotic substance	N=8		N=4			
Hashesh	5	62.5	1	25.0	FE 1.50	0.221
Tramadol	3	37.5	3	75.0		
Smoking						
Yes (cigarette)	26	57.8	28	62.2	1.85	0.475
No	19	42.2	17	37.8		

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Figure (1) Before intervention

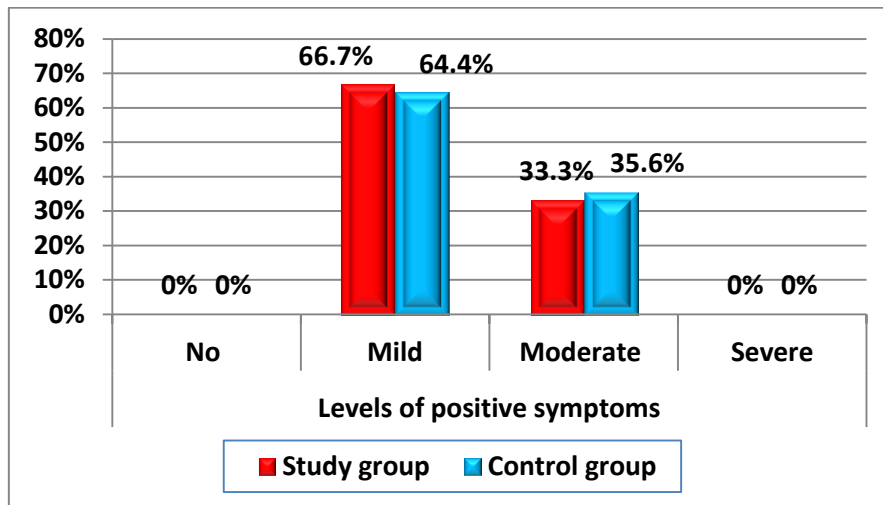


Figure (2) After intervention

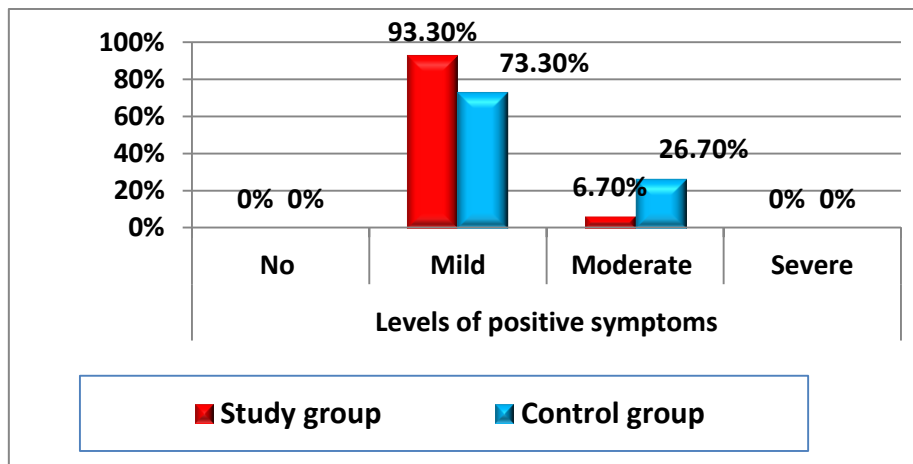
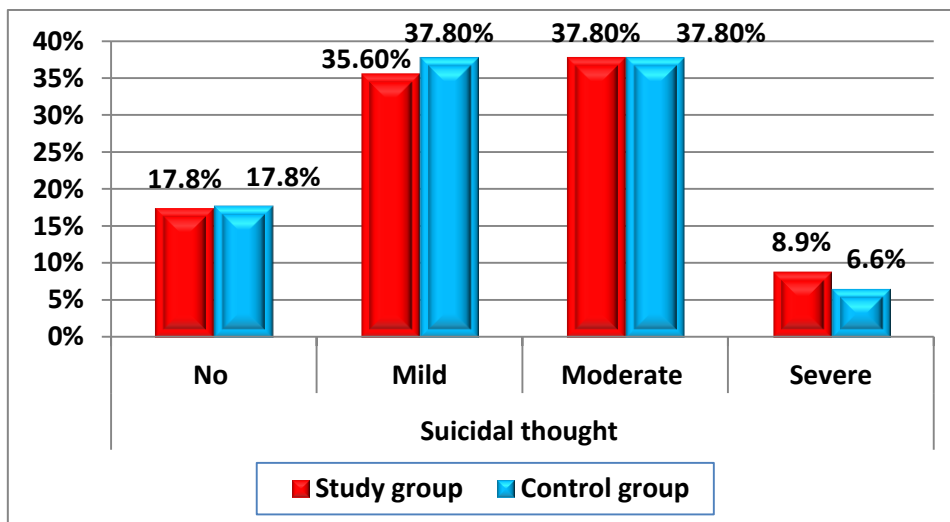


Figure (1),(2) Levels of Positive Symptoms among the patients(study and control group) before and after intervention

Figure (3) Before intervention



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Figure (4) After intervention

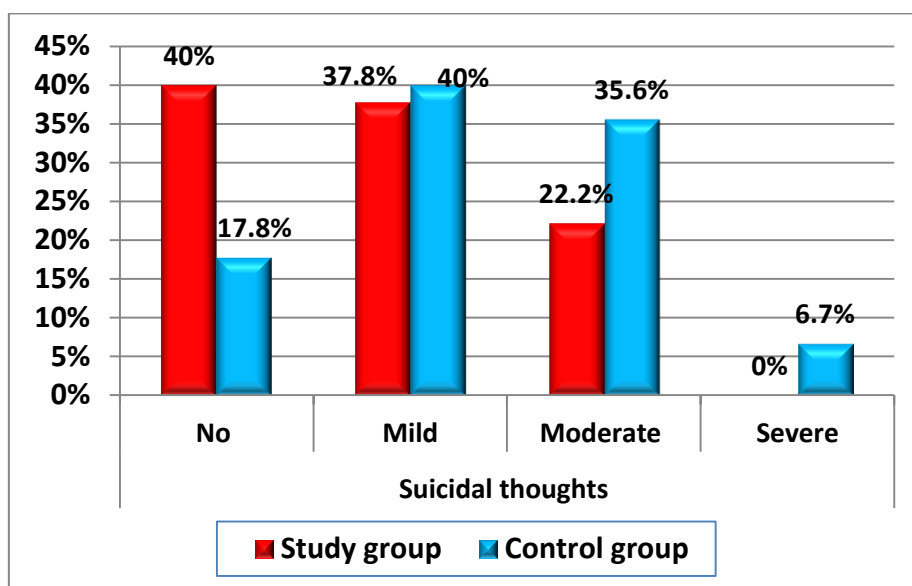


Figure (3),(4) Levels of Suicidal thought among the patients(study and control group) before and after intervention

Table (3): Correlation between suicidal thoughts and positive Symptoms among the study group before and after intervention (N=45):

Studied variable	Positive Symptoms of study group			
	Before intervention		After intervention	
	r	P value	r	P value
Suicidal Thoughts	0.111	0.466	0.542	0.001**

Discussion

Schizophrenia, a chronic and debilitating mental disorder, significantly impacts an individual's ability to navigate daily life. Schizophrenic patients often experience positive symptoms like hallucinations and delusions, which can be disruptive and lead to suicidal thoughts. Studies show that a higher frequency of positive symptoms may be associated with a decrease in problem-solving abilities (Lewandowski et al., 2018). Frustration and difficulty distinguishing reality from distorted perceptions, such as hallucinations and delusions, can hinder problem-solving

abilities and potentially lead to suicidal ideation (Rabinowitz et al., 2018). Impaired problem-solving skills in mental patients, particularly those with schizophrenia, can increase suicidal thoughts due to feelings of hopelessness and lack of control over daily challenges (Darvishi et al., 2023).

Reducing positive symptoms and enhancing general functioning have been demonstrated benefits of cognitive remediation therapy, which focuses on enhancing problem-solving and other cognitive skills (Brébion et al., 2016). By equipping individuals with better problem-solving abilities,

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they might gain a greater sense of control over their experiences, potentially leading to a decrease in both positive symptoms and suicidal ideation. Therefore, the present study was aimed to evaluate the effect of problem solving skills on positive symptoms and suicidal thoughts among patient with schizophrenia.

The current study revealed that there was no statistically significant difference between study and control group regarding all items of socio demographic data. This indicated that the sample were homogenous sample. The current study found no statistically significant difference between the study and control groups in positive symptoms before problem-solving skills training; indicating that randomization was effective because both the study and control group fulfilled the same criteria and composed a homogeneous sample, these may result from the fact that both the controlled and studied patients were selected to participate at the same hospitalization stage, shared the majority of environmental circumstances, and received the same type of treatment before intervention. While, after problem-solving skills training, there was a statistically significant difference in positive symptoms between the study and control groups. This indicated the effectiveness of the problem-solving training sessions that may enhance the patients' ability to differentiate between reality and their distorted perceptions, which may also reduce the frequency or intensity of hallucinations. Additionally, patients

may feel less anxious overall as a result of developing their problem-solving abilities, which may indirectly decrease the severity of positive symptoms.

This finding was consistent with studies by Mohamed et al. (2024) and Shinozaki et al. (2020), which shown that psych education can help alleviate both positive and negative symptoms among patients with schizophrenia. Psych education can empower patients to understand the importance of medication and encourage them to take their medications as prescribed. This consistency in treatment can have a positive impact on both positive and negative symptoms. Additionally, a study by Shehu et al. (2022) concluded that psycho-educational therapies are a common component of a treatment plan for patients with schizophrenia. Therapy teaches patients problem solving to manage positive symptoms. Techniques like relaxation training, distraction strategies, and reality testing can help patients challenge or disengage from delusions or hallucinations

The existing study found that there was no statistically significant difference in suicidal thoughts between the study and control group before problem solving skills training, indicating that randomization was effective because both groups met the same criteria and formed a homogeneous sample. This could be because the patients in the control and study groups were chosen to participate at the same hospitalization stage, had similar environmental circumstances, and had received the

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same kind of treatment prior to intervention. However, after training in problem-solving skills, there was a statistically significant difference in suicide thoughts between the study and control groups. This indicated the effectiveness of the program training session where improved problem-solving abilities could be responsible for this difference. Patients may feel less anxious overall, which could decrease the severity of positive symptoms which improve patient self-esteem and reduce hopelessness, which may decrease suicide thoughts. This result was consistent with the study done by Tel. et al. (2024) and Darvishi et al. (2023), who studied "Effect of Psycho educational Program on Positive and Negative Symptoms among Schizophrenic Patients ". Their finding revealed a statistically significant difference between the experimental and control groups after education. They also showed that high problem-solving skills were associated with a lower probability of suicidal ideation, suicide attempts, and suicide death and that the total score of problem-solving skills was higher in individuals who did not attempt suicide than those who did

Additionally, the current study found that there was no statistically significant correlation between positive symptoms and suicidal thoughts of study group before intervention; where p value ($p = 0.466$). while after intervention there were positive significant correlation between positive symptoms and suicidal where p value ($p = 0.001$) ; From the researcher point of view this

may be due to the effect of the program solving training session where Improved problem-solving abilities could be responsible for this difference. Where Patients learn how to deal with delusion and hallucinations, increased patients' awareness of their own thought patterns and may feel less anxious decrease levels of stress and anxiety, which could decrease the severity of positive symptoms which reduce hopelessness, improve patient self-esteem, which may minimize suicide thoughts. ; this result was supported with Elsayed et al(2022) who studied "Relationship between Suicidal Thoughts and Positive Symptoms among Schizophrenic Patients" found highly positive significant correlation between total scale for the assessment of positive symptoms and total suicidal thought.

These results were consistent with studies by lee. et al (2018) who studied "The Effects of Problem-Solving Skills Training on Self-control Behaviors and Psychotic Symptoms Among Community-Dwelling Patients With Schizophrenia" found statistical significant relation between positive symptoms and suicidal thoughts after problem solving skills training.

Conclusion:

Based on the results of the current study, it was concluded that:

Training in problem solving techniques has positive effects in reducing positive symptoms and suicidal thoughts among patients with schizophrenia. There was a significant reduction in positive symptoms and

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total mean score of suicidal thoughts among the study group after intervention compared to the control group. Finally, there was a positive correlation between total positive symptoms mean score and total suicidal thoughts mean score after intervention.

Recommendation:

- Problem solving skills training (PSST) should be incorporated as a treatment modality for schizophrenic patients Educational program should be developed for psychiatric nurses to equip them with the skills to deliver problem solving skills training (PSST) to patients with schizophrenia.
- Screening is needed for high-risk patients to be referred for appropriate treatment when needed.
- Educational programs are required for families of patients with schizophrenia. Problem solving skills training should be tried in combination with other treatment modalities.
- Public should be educated about schizophrenia, the benefits of Problem solving skills training, and the importance of seeking help. Problem-solving skills training programs should be modified to accommodate diverse patient populations' cultural backgrounds and beliefs, improving program effectiveness and fostering better engagement with diverse patient populations.

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