

Research article**The effect of mirror therapy on mental ill clients– Signs and symptoms****Vishal Pawar**

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Abstract

Mirror therapy is a pioneering, non-invasive treatment for the treatment of mentally ill patients. The tool of this therapy is a mirror from which the patient receives visual feedback in order to train the brain to configure a new “body map.” This so-called map is simply the hard-wired mental representation that allows a person to be aware of where each component of the body is at all times, even in complete darkness. **Aim:** To assess the sign & symptoms of mentally ill clients before and after mirror therapy. **Methods :** Non-probability sampling and random method were used to select the samples from 60 mentally ill patients under treatment for mental illness from four Jagruti rehabilitation center, Yawada mental hospital center, Nityanand rehabilitation center and Chaitanya rehabilitation center in Pune city Mirror therapy training was given to the patients in the rehabilitation centers. A pre-test was given to both groups. The self esteem scale (Rosenberg self esteem scale) used for the post-test was the same which was used for the pre-test. Pilot study was conducted on 16 selected clients. Two groups were made, eight in experimental and eight in control group. Pre-testing was given to both the groups and mirror therapy was administered to experimental group. Post-test was given after 15 days. **Results :** In pre-test all 30 clients had low self esteem and in the post- test it became 0 samples showed low self esteem level whereas in the control group in the post test 30 samples showed low self esteem level and the same again show low self esteem because of no interventions in the control group. Thus it is concluded that the mirror therapy was effective in mentally ill clients. This also shows that mirror therapy has a significant effect on improvement of self-esteem level in the experimental group.

Keywords: Mirror therapy, body map, mental ill clients

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1. Introduction

Mirror therapy and the use of parasagittal mirrors are effective therapeutic tools in retraining the mind and body to respond to visual impulses in paralysis and reduce phantom pain in amputees [1-5]. It is believed that the reflection of the intact or good limb normalizes the perception of the affected limb, replacing or driving proprioception movement [6]. However, the use of mirrors in

the study of treatment for eating disorders is controversial. Conflicting study results suggest more research is necessary in order to validate and replicate various studies.

Studies to investigate the neuronal basis for the effects of mirror therapy in patients with stroke data on 18 participants were suitable for analysis. Results showed a significant interaction effect of movement mirror during the bimanual experiment. Activated regions

were the presumes and the post eriorcingulate cortex ($p < 0.05$ false discovery rate). Conclusion of the study was in this first study on the neuronal correlates of the mirror illusion in patients with stroke, the authors showed that during bimanual movement, the mirror illusion increases activity in the resumes and the posterior cingulated cortex, areas associated with awareness of the self and spatial attention. By increasing awareness of the affected limb, the mirror illusion might reduce learnt non-use. The fact that the authors did not observe mirror-related activity in areas of the motor or mirror neuron system questions popular theories that attribute the clinical effects of mirror therapy to these systems [7].

The archives of physical medicine & rehabilitation a study was published in which analyzed the effects of using a mirror box with mental practice of reaching and hand/wrist motions on two stroke recoveries. They found that "performance of the paretic limb improved after the imagery intervention, indicated by increases in assessment scores and functionality and decreases in movement times. The improvements over baseline performance remained stable over a 3-month period [8].

A research conducted to study the usefulness of Mirror Therapy in different diagnoses in hand rehabilitation as a basis for developing the St Gallen protocol for mirror therapy, which has been used with 52 patients since the end of 2005. The secondary aim is to describe the St Gallen protocol and present the results from the cases of 52 patients treated with Mirror Therapy. Two selected case studies provide a more detailed illustration of the method of application. The mirror visual feedback has been reported as a new treatment modality for chronic pain by several authors using different methods. Some neurophysiologic aspects are illuminated to get an impression of what mirror therapy causes in the brain [9].

A study conducted to do research on the clinical aspects of mirror therapy in rehabilitation The Department of Health and Technique, Zuyd University of Applied

Sciences, Heerlen, The Netherlands) the objective of this study was to evaluate the clinical aspects of mirror therapy interventions after stroke, phantom limb pain and complex regional pain syndrome. A systematic literature search of the Cochrane Database of controlled trials, No restrictions were made regarding study design and type or localization of stroke, complex regional pain syndrome and amputation. Only studies that had Mirror therapy given as a long-term treatment were included. Two authors (A.S.R. and S.M.B.) Independently assessed studies for eligibility and risk of bias by using the Amsterdam-Maastricht Consensus List. Ten randomized trials, seven patient series and four single-case studies were included. The studies were heterogeneous regarding design, size, conditions studied and outcome measures. Methodological quality varied; only a few studies were of high quality. Important clinical aspects, such as assessment of possible side effects, were only insufficiently addressed. For stroke there is a moderate quality of evidence that Mirror Therapy as an additional intervention improves recovery of arm function, and a low quality of evidence regarding lower limb function and pain after stroke [10].

Mirror Therapy Improves Motor Function after stroke using a random-effects model and post-intervention or changes between pre- and post-intervention measurements, the researchers found statistically significant improvements in motor function and in activities of daily living when mirror therapy was used. Patients with complex regional pain syndrome after stroke [11].

A study conducted to test the feasibility and preliminary efficacy of self-delivered home-based mirror therapy for phantom pain. Participants received an explanation of mirror therapy and were asked to self-treat for 25 min daily. Participants completed and posted back sets of outcomes questionnaires at months 1 and 2 post-treatment. Main outcome was mean phantom pain intensity at post-treatment. A significant reduction in mean phantom pain intensity was found at month 1 ($n = 31, p = 0.0002$) and at month 2 ($n = 26, p = 0.002$). The overall median

percentage reduction at month 2 was 15.4%. Subjects with high education (>16 years) compared with low education (<16 years) (37.5% vs 4.1%) had greater reduction in pain intensity ($p = 0.01$). These findings support the feasibility and efficacy of home-based self-delivered mirror therapy; this low-cost treatment may defray medical costs, therapy visits, and the patient travel burden for people with motivation and a high level of education. More research is needed to determine methods of cost-effective support for people with lower levels of education [12]. Home-based patient-delivered mirror therapy is a promising approach in the treatment of phantom limb pain. Previous studies and case reports of mirror therapy have used a therapist-guided, structured protocol of exercises. No case report has described treatment for either upper or lower limb phantom pain by using home-based patient-delivered mirror therapy. The success of this case demonstrates that home-based patient-delivered mirror therapy may be an efficacious, low-cost treatment option that would eliminate many traditional barriers to care [13].

A study investigated the effects of mirror therapy on the upper extremity functions of stroke patients. The subjects of this study were 14 hemiplegic patients (8 males, 6 females; 9 infarction, 5 hemorrhage; 8 right hemiplegic, 6 left hemiplegic) who voluntarily consented to participate in the study. The Korean version of the manual function test (MFT) was used in this study. The test was performed in the following order: arm movement (4 items), grasp and pinch (2 items), and manipulation (2 items). The experiment was conducted with the subjects sitting in a chair. The mirror was vertically placed in the sagittal plane on the desk. The paretic hand was placed behind the mirror, and the non-paretic hand was placed in front of the mirror so that it was reflected in the mirror. In this position, the subjects completed activities repetitively according to the mirror therapy program over the course of four weeks. There were significant increases in the grasp-and-pinch score and manipulation score. The grasp-and-pinch and

manipulation functions were improved through mirror therapy [14].

2. Subjects and methods

Non-probability sampling and random method were used to select the samples from 60 mentally ill patients under treatment for mental illness from four Jagruti rehabilitation center, Yarawada mental hospital center, Nityanand rehabilitation center and Chaitanya rehabilitation center in Pune city [15]. Formal administrative permission was obtained from various psychiatric rehabilitation centers in Pune city and the study was conducted from 26-08-2011 to 12-09-2011. Mirror therapy training [16] was given to the patients in the rehabilitation centers. They are advised to practice the mirror therapy once a day.

A pre-test was given to both groups. Intervention was given only to experimental group. After fifteen days a post-test was given to both the groups [17]. The self esteem scale (Rosenberg self esteem scale) used for the post-test was the same which was used for the pre-test.

Mirror therapy technique:

1. Pleasant way to say good morning & wish them to good morning.
2. I will enjoy all the day.
3. I will use each & every minute for the betterment of self & others.
4. I will help myself & others to come out from the problem. I love myself & I will take very good care of myself.
6. I will happy & happier.
7. I have trust that I can get well.
8. I want be happy & want other to be happier.
9. I will try my best & not to be disturbed by external or internal environment.
10. I will keep my words and do accordingly [18].

To ensure content validity of the tool it was submitted to three psychiatrists, two psychologists, one statistician, one sociologist, one lawyer, four PhD. nurses and six nurses with specialty in psychiatry along with scoring sheet.

The reliability of the tool was established using rational equivalence formula. The total scoring was entered on the data sheet. Total mean and variance was calculated using the

rational equivalence formula following formula gives coefficients of reliability. Also data is collected by one person so, $\sum pq$ gives the exact error in the reliability scores [19].

$$r_{11} = \frac{n}{(n-1)} \frac{\sigma_t^2 - \sum pq}{\sigma_t^2}$$

Where,

r_{11} = reliability coefficient of the whole test.

n = number of items in the test.

σ_t = the S.D. of the test scores.

P = the proportion of group answering a question to each choice.

q = $(1-p)$ = the proportion of group not answering a question to each choice.

$n = 09$

If value of r_{11} is greater than 0.80 test is reliable. As value of $r_{11} = 0.8731$ (87.31%), hence test for coping is reliable. hence the questionnaire was found to be reliable.

The reliability of the tool was calculated to 0.87371 which shows that it is significantly reliable tool for testing the self esteem of mentally ill clients. Pilot study was conducted between 07-08-2011 to 23-08-2011 on 16 selected clients. Two groups were made, eight in experimental and eight in control group. Pre-testing was given to both the groups and mirror therapy was administered to experimental group. Post –test was given after 15 days. Using the same anxiety rating scale for both the groups the results were compared. Data analysis for pilot study was done using students' test. The data was arranged in two columns as before score and after score separately for each item, for both the groups. The difference is calculated. The Rosenberg self esteem scale was easy to understand. There is significance difference in self esteem level of mentally ill patients in experimental group where as in control group the difference in anxiety level is little. After pilot study no specific changes were made in the tool. The same tool was used for the final study.

3. Results

Table 1 (A). Comparison of pre-test and post-test in experimental group

N=30						
	Pre-test	Post test	Improvement of self esteem	T cal	T table	P value
Mean	23.1	28.76667	5.6667	19.49179	2.04523	1.64718e-18
S.d.	1.075484	1.174261				

Table 1 (A) represents the distribution of sample in experimental group according to the level of self-esteem. This table represent in experimental group the low self esteem of the clients were 30 while in the post test no low self esteem is found in mentally ill client.

Table 1(b)

N=30

From the table we can conclude P value is less than 0.01, we reject null hypothesis .i.e. there is significant increase in the self-esteem level indicating the effectiveness of mirror therapy in experimental group. N=30

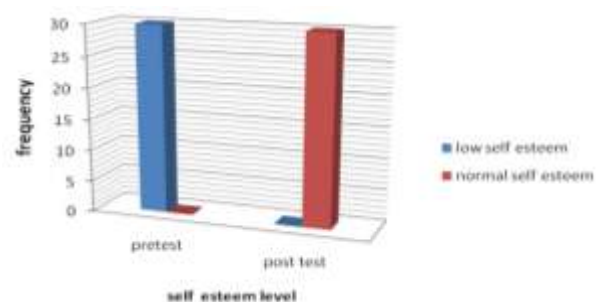


Figure-1: Comparison of pre-test and post-test in experimental group.

Shows that the number of patients with Low self-esteem is 30 in pre test and number of clients with normal self-esteem is 0.while in the post test number of clients with low self

esteem is 0 and with normal self-esteem is 30. after giving active mirror therapy.

Table-2(A) Comparison of pre-test and post-test in control group N=30

Self-esteem	Pre-test		Post-test	
	Frequency	%	Frequency	%
Low self esteem	30	100	30	100
Normal self esteem	0	0	0	0
Total	30	100	30	100

Table 2(A) represents the distribution of sample in control group according to the level of self-esteem. This table represent in control group the low self esteem of the clients were 30 while in the post test it was the same because of no active interventions are given to the group.

Table-2(b) N=30

	Pre	Post	Improvement of self esteem	t cal	t table	P value
Mean	22.86667	22.96667	0.1	0.275667	2.04523	0.392379464
S.D.	1.257864	1.538036				

Since P value is more than 0.05 we accept null hypothesis from the above values we conclude that there is no significant change in self-esteem was observed after the post test. N=30

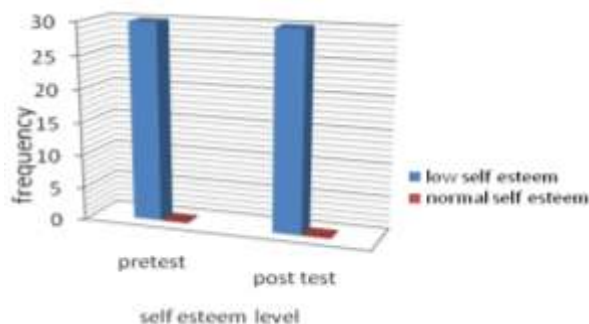
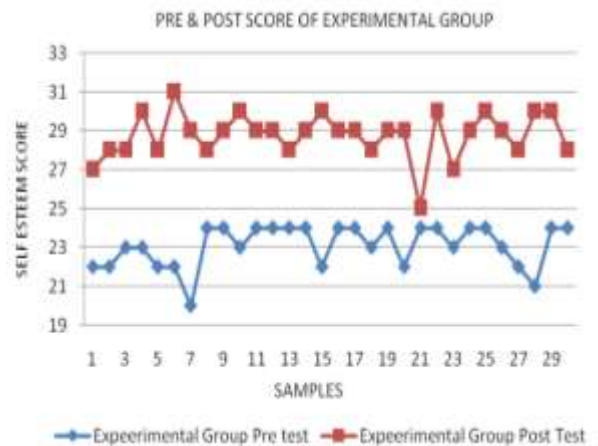


Figure-2: bar graph showing comparison of pre test and post test in control group

Figure 2 represent in control group all the 30 samples showed low self-esteem in the pre-test. In the post-test the same 30 clients shows low self-esteem.

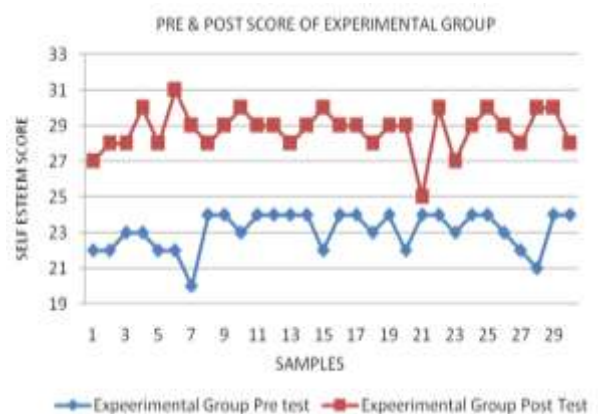
Table no-(3)

Fig 3 Pre and post test scores of experimental group N=30



From the above maintained figure we can represent that changes are found in the score of low self esteem after giving the active mirror therapy in the experimental group.

Fig 10 Pre-test and Post-test values of control group. N=30



From the above maintained figure we can represent that very little changes are found in the score of low self esteem

Table -3 descriptions in increased level of self esteem by clients in experimental group and control group.

Experimental group				Control group			
Sample no	Pre-test	Post-test	Increased self esteem	Sample no	Pre-test	Post-test	Increased self esteem
Fn-1	22	27	5	Fn-1	23	23	0
Fn-2	22	28	6	Fn-2	23	25	2
Fn-3	23	28	5	Fn-3	22	22	0
Fn-4	23	30	7	Fn-4	21	21	0
Fn-5	22	28	6	Fn-5	24	24	0
Fn-6	22	31	9	Fn-6	24	27	3
Fn-7	20	29	9	Fn-7	23	23	0
Fn-8	24	28	4	Fn-8	24	24	0
Fn-9	24	29	5	Fn-9	24	24	0
fn-10	23	30	7	Fn-10	22	22	0
Fn-11	24	29	5	Fn-11	22	22	0
Fn-12	24	29	5	Fn-12	20	20	0
Fn-13	24	28	4	Fn-13	20	20	0
Fn-14	24	29	5	Fn-14	24	24	0
Fn-15	22	30	8	Fn-15	24	24	0
Fn-16	24	29	5	Fn-16	24	24	0
Fn-17	24	29	5	Fn-17	24	24	0
Fn-18	23	28	5	Fn-18	24	24	0
Fn-19	24	29	5	Fn-19	23	23	0
Fn-20	22	29	7	Fn-20	23	23	0
Fn-21	24	25	1	Fn-21	22	22	0
Fn-22	24	30	6	Fn-22	20	20	0
Fn-23	23	27	4	Fn-23	23	23	0
Fn-24	24	29	5	Fn-24	23	23	0
Fn-25	24	30	6	Fn-25	24	21	-3
Fn-26	23	29	6	Fn-26	23	23	0
Fn-27	22	28	6	Fn-27	22	22	0
Fn-28	21	30	9	Fn-28	24	24	0
Fn-29	24	30	6	Fn-29	23	24	1
Fn-30	24	28	4	Fn-30	24	24	0

Data presented in table-3 shows, Self esteem experienced by experimental and control group. The increased self esteem is calculated. It is noted that in experimental group that after mirror therapy 30(100%) out of 30 sample showed good increased self esteem level, no negative results come in the experimental group. In control group very little change was found this is may be due to no active intervention given to the group.

Table-4 comparison of the pre and post observation of self esteem level of mentally ill clients in control and experimental group.

Group	Frequency	Mean	Standard deviation	T-cal Value	T-value	P-value
Experimental	30	5.67	1.124873	5.57	2.04	6.4573e-17 = 0.00
Control	30	0.1	1.39795			

Two-sample T-test was used to find out the effect of Mirror therapy on self-esteem.

P-value < 0.01 shows high significance.

P-value between 0.05 to 0.01 shows significance.

P value > 0.05 shows no significance

The table values show that mirror therapy has a significant effect in improvement of self-esteem in experimental group at the level of significance 0.01. Mean of Improvement of self-esteem in experimental group was 5.67 where in control group it was 0.1 only. Since P value is less than 0.01 we reject the null hypothesis, from the above findings we can conclude that, there is significant increase in self esteem was observed in experimental group than in control group, which evidently proves that mirror therapy had a significant effect in the improvement of self esteem in experimental group over the control group.

1. Compare the signs and symptoms of self esteem in mentally ill Clients before and after the mirror therapy.

There are few signs & symptoms of the self esteem are present with the some clients

after giving a mirror therapy there are reduction of some signs & symptoms

Table 5 Signs and symptoms

SN	Signs and symptoms
1	Poor hygienic conditions & self care.
2	Complaints of fatigue.
3	Poor postures
4	Withdrawal from activities.
5	Expression of feeling of isolation
6	Expressions of self depression, self dislike, and unhappiness with self.
7	Decreased interest, motivation, concentration
8	Expression of sadness, anxiety or discouragement.
9	Loss of appetite/weight loss
10	Overeating

Analysis of sign and symptoms of low self esteem in experimental and control group

Table-6 N=60

	1		2		3		4		5	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Expt	33.33	0	33.33	3.333	33.33	0	36.67	0	36.67	0
Control	16.67	26.67	26.67	26.67	20	20	26.67	26.67	23.33	23.33
6		7		8		9		10		
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
36.67	0	30	0	30	0	43.33	0	30	0	
10	10	30	30	16.67	20	20	23.33	20	23.33	

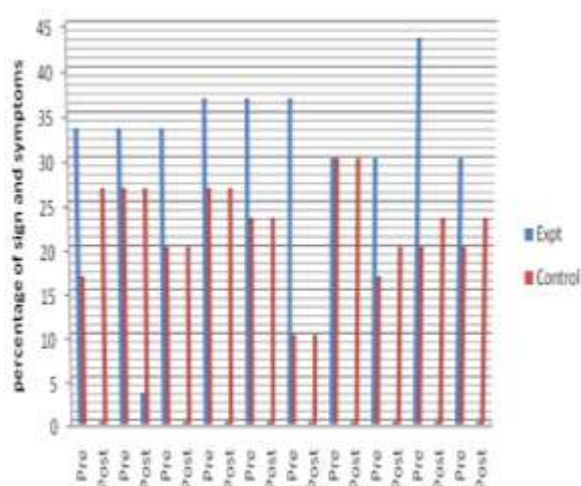


Figure 11: Percentages of the signs & symptoms of the low self-esteem

Figure 11 represents the assessment of signs and symptoms of the low self-esteem, we have observed 10 signs and symptoms of low self-esteem in the mentally ill clients in experimental and control group.

Analysis of sign and symptoms of low self esteem in experimental Group. (In percentages)

- 1) Poor hygienic conditions & self care in the pre-test the score of this symptom was the 33.3 while in the post test it was 00.
- 2) Complaints of fatigue in the pre-test the score of this symptom was the 33.3 while in post test 3.33.
- 3) Poor postures in the pre-test the score of this symptom was the 33.3 while in post test 00.
- 4) Withdrawal from activities. In the pre-test the score of this symptom was the 36.67 while in post test 00.
- 5) Expression of feeling of isolation in the pre-test the score of this symptom was the 36.67 while in post test 00.
- 6) Expressions of self depression, self dislike, and unhappiness with self in the pre-test the score of this symptom was the 36.67 while in post test 00.
- 7) Decreased interest, motivation, concentration In the pre-test the score of this symptom was the 30 while in post test 00.

- 8) Expression of sadness, anxiety or discouragement in the pre-test the score of this symptom was the 30 while in post test 00.
- 9) Loss of appetite/weight loss in the pre-test the score of this symptom was the 43.33 while in post test 00.
- 10) Overeating In the pre-test the score of this symptom was the 30 while in post test 00.

Analysis of sign and symptoms of low self esteem in control group. (In percentages) The control group shows the same signs and symptoms, the results are as follows,

- 1) Poor hygienic conditions & self care in the pre-test the score of this symptom was the 16.67% while in the post test it was 26.67%.
- 2) Complaints of fatigue in the pre-test the score of this symptom was the 26.67 while in post test 26.67.
- 3) Poor postures in the pre-test the score of this symptom was the 20 while in post test 20.
- 4) Withdrawal from activities. In the pre-test the score of this symptom was the 26.67 while in post test 26.67.
- 5) Expression of feeling of isolation in the pre-test the score of this symptom was the 23.33 while in post test 23.33.
- 6) Expressions of self depression, self dislike, and unhappiness with self in the pre-test the score of this symptom was the 10 while in post test 100.
- 7) Decreased interest, motivation, and concentration in the pre-test the score of this symptom was the 30 while in post test 30.
- 8) Expression of sadness, anxiety or discouragement in the pre-test the score of this symptom was the 16.67 while in post test 20.
- 9) Loss of appetite/weight loss in the pre-test the score of this symptom was the 20 while in post test 23.33.
- 10) Overeating In the pre-test the score of this symptom was the 20 while in post test 23.33.

3. Assessment of signs and symptoms of self esteem:

After doing assessing the signs and symptoms of low self-esteem it was found that the number. Of signs and symptoms of low self-esteem are decreased in experimental group while in control group it was not decreased. We can say that mirror therapy was effective to decrease the signs and symptoms of self-esteem.

4. Discussion

Findings of this section show that in the experimental group after mirror therapy there is improvement of self-esteem level. In pre-test all 30 clients had low self esteem and in the post- test it became 0 samples showed low self esteem level whereas in the control group in the post test 30 samples showed low self esteem level and the same again show low self esteem because of no interventions in the control group.

Obtained pre test and post test score regarding self esteem of mentally ill clients has t- value of 5.57; table value 2.04 and p value 0.000 which is less than 0.01 and p value 0.000 which is less than 0.01 so null hypothesis is rejected and hence H1 is accepted. Thus it is concluded that the mirror therapy was effective in mentally ill clients. This also shows that mirror therapy has a significant effect on improvement of self-esteem level in the experimental group.

In present study the pre-observation mean score of the experimental group is 23.1 and the post-observation mean score is 28.76. Whereas the pre-test mean score of control group is 22.86 and the post-observation mean score is 22.96. From the data analyzed, it is evident that the subjects of the experimental group were comparatively more self-esteem than the control group. If mirror therapy is provided for a longer duration of time, the results would have been even more significant.

The comparison between the post observation scores of control group and experimental group does not show much difference, but the difference of mean of

experimental group, 5.67 and the difference of mean of control group 0.1, evidently shows that mirror therapy had a significant role in improvement of low self esteem.

Conclusion

The preliminary findings suggest that Mirror therapy can be a useful intervention supplement in treating mentally ill patients; it provides a simple and cost effective therapy for patients. Further studies in the form of randomized trials are needed to validate its effectiveness. Mirror therapy helps to improve the positive effect and if it is practiced for a longer period. There has been a phenomenal increase in the popularity of various alternative therapies and medicines in recent years and many of them can be excellent when it comes to improvement and treatment.

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