CREATING MENTAL TOUGHNESS IN MULTIPLE SCLEROSIS PATIENTS WITH TREATMENT INTERVENTIONS BASED ON STIGMA EXPERIENCES AND POSITIVE PSYCHOTHERAPY: A RANDOMIZED CLINICAL TRIAL

Yaghoob Harooni Jamalooei[1], Maryam Esmaeili[2*], Ahmad Abedi[3], Mohammad Reza Najafi[4]

[1] Ph.D. Student of Psychology, Department of Psychology, Faculty of Education and Psychology, University of Isfahan, Isfahan, Iran.

[2] Assistant Professor, Department of Psychology, Faculty of Education and Psychology, University of Isfahan, Isfahan, Iran.(Email: m.esmaili@edu.ui.ac.ir); corresponding author, Isfahan, Azadi Square, Isfahan University, Faculty of Educational Sciences and Psychology, postal code 8174673441. ORCID: 0000-0001-5331-137X

[3] Associate Professor, Department of Psychology and Education of Children with Special Needs, Faculty of Education and Psychology, University of Isfahan, Isfahan, Iran.

[4] Professor, Department of Neurology, Neuroscience Research Center, Faculty of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract

Goal: This study aimed to create mental toughness in patients with Multiple Sclerosis using therapeutic interventions based on stigma experiences and positive psychotherapy in a randomized clinical trial.

Method: This study fell under pre-and post-test with a one-month follow-up design involving a control group. All Multiple Sclerosis patients presenting to a neurologist clinic and the patients who had been informed via online notifications on social networks comprised the statistical population. Out of these patients, 45 people were selected via the convenience method and randomly placed in two experimental (positive psychotherapy and experiences based on lived experiences of social stigma) and control groups of 15 people each. After randomization, all subjects filled in the Mental Toughness Questionnaire before and after the therapy in a one-month follow-up. Because the covariance analysis assumptions were not met, repeated measurement ANOVA and SPSS software (version 21) were used to analyze the data.

Findings: Covariance analysis results indicated that both positive psychotherapy (F=309.68 and Sig.=0.001) and lived experiences (F=657.01 and Sig. 0.001) had significant effects on mental toughness.

Conclusion: The findings revealed that positive psychotherapy and lived experiences helped increase the mental toughness of subjects.

Keywords: *positive psychotherapy, therapy based on lived experiences, mental toughness, multiple sclerosis*

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Introduction

Multiple Sclerosis (MS) is a common auto-immune demyelinating disease in the central nervous system, characterized by inflammation that causes episodic attacks and nervous degeneration that is responsible for progressive deterioration (Hauser & Cree, 2020). MS is usually diagnosed at the age of 20-49, though rare cases could appear in childhood and adolescence before 18 or 50 onwards (Reich et al. 2018). A total of 2.8 million people across the world are living with MS (35.9 people in 100000). The prevalence of MS has risen since 2013 in each region worldwide. An integrated incidence rate in 75 countries has estimated a rate of 2.1 people in every 100000, with the average age of diagnosis being 32 years. Women are two times more likely to develop MS than men (Walton et al. 2020). The unpredictability of disease symptoms results in many challenges for the affected people and caregivers. Also, the development of the disease, severity, and relapse in the affected population may differ (Ford, 2020). Evidence suggests that MS patients experience a higher rate of anxiety (Fahy and Maguire, 2022). One of the most important reasons for the stress and anxiety of MS patients is their failure to have control under difficult conditions (Bijoux, Leist, & Leist, 2022). People with MS may enjoy better life quality if they have a greater source of control (Lex et al. 2022), which results in increasing mental toughness (Bédard Thom et al. 2021).

Mental toughness has been studied as a major individual difference that allows people to effectively deal with problems (Clough et al. 2012; Ritaugo et al. 2022). In essence, mental toughness is a general term that requires a positive psychological source that contributes to a broad spectrum of success areas (Lin et al. 2017). This source provides a suitable context for MS patients to well adapt to MS complications. The psychological structure of this construct allows the individual to encounter difficult situations well and face social competition without losing self-trust. In the meantime, recent studies have indicated that mental toughness is an educational construct (Shaw et al. 2022).

Positive psychology is a scientific approach that affects the individual's mental health, well-being, and functions, and thus helps them create a valuable life (Seligman, 2019). The founders of positive psychology maintained that traditional psychology spent much energy on identifying damages and less time nurturing positive feelings. With the emergence of the science of happiness or positive psychology, significant changes were concentrated on the function of mental health (Ryff, 2022). Positive psychology has revealed a broader volume of scientific knowledge, such as utilizing strong points (Van Zyl et al. 2021). Because various studies have demonstrated that well-being and mental pathology are two constructs with medium correlation, though independent of mental health (Huppert and Whittington, 2003; Weijers et al. 2021), positive psychology plays a key role in improving well-being among people with chronic diseases. Ignoring well-being in traditional psychology led to low levels of well-being, which was in turn a major risk factor causing stress, anxiety, and distress (Krais et al. 2022). In addition to increasing the quality of life and concentrating on well-being and positive feelings, which stand against the relapse and aggravation of disease symptoms, positive psychology helps patients to remain immune to mood disorders. Positive psychology has been mostly investigated in chronic diseases like thalassemia (Makarem-Nia et al. 2021), cancers (Sheikh-Wu et al. 2022), and acute heart diseases (Boehm, 2021).

Understanding the broad spectrum of the phenomenon of stigma in the lives of MS patients is very critical. Although studies and clinical trials have examined the effects of wide-ranging therapies such as Acceptance and Commitment Therapy (ACT), Dialectical Behavior Therapy (DBT), and Mindfulness-Based Stress Reduction (MBSR) (Zarotti et al. 2022) and evaluated the mental health of MS patients, they have failed to study their mental needs and cultural dimensions of their lived experiences, as they cannot cope with the mental complications of the disease or adapt to society's negative reactions. Hence, creating therapeutic frameworks based on MS patients' views and experiences is critical. It is now the time to provide qualitative studies to introduce therapies that best match the mental ills facing these patients, and it is also important to provide basic therapeutic research in the field of mental health. This perspective is especially important to understand and resolve mood disorders, which are one of the major problems

for MS patients and may produce devastating impacts on their recovery. On the other hand, conventional therapies include dysfunctions (Rosenthal et al. 2016). The results of these conventional therapies have indicated that modern therapies can help reduce harm from chronic diseases such as MS.

As stated, the Multiple Sclerosis disease is a chronic disease that affects the quality of life of the affected patients. A review of the literature indicates that no study has ever examined the comparison of a therapy based on the lived experiences of social stigma and positive psychotherapy concerning mental toughness. Thus, the present study aimed to answer the question: “Do these two therapeutic approaches produce significant differences in creating mental toughness in MS patients or not?”

Method

This study was a pre-and post-test and a control group with a one-month follow-up design in a randomized trial. The subjects that constituted the statistical population of this study consisted of MS patients (relapsing-remitting, primary progressive, secondary progressive) presenting to a neurologist clinic in Isfahan, Iran. Out of the patients who had presented to the clinic from January to February 2020, some who had met inclusion and exclusion criteria were selected. Inclusion criteria were diagnosed with MS by a specialist, an age range of 18-55, willingness and signature, producing a written consent form to take part in the study, the non-development of one of the severe somatic diseases, grave neurological disorders, or psychotic symptoms; meanwhile, exclusion criteria were disease relapse and inability to continue the sessions, and absence of more than 2 sessions.

The sample volume was estimated by using G*Power 3.1 (Faul et al. 2007). Considering the values of the first-type errors (α err prob = 0.05), the second-type errors (Power (1- β err prob) =0.95), and the effect size (Effect size f=0.5), the sample volume of each of the three pre-post- and follow-up groups was found to be 15 people, and the statistical power (actual power=0.9807332) indicates the significance of this value. Considering attrition, 18 people were selected for each group using the convenience sampling method. However, some of the subjects withdrew from the study due to some physical and personal reasons, and the final sample amounted to 45 people.

Study Tool

Mental Toughness Questionnaire: Developed by Clough, the MTQ48 scale is a self-report 48-item tool to measure mental toughness (Kawabat et al. 2021). This scale has 48 items and 6 subscales. The dimensions of this scale include challenge, control, commitment, and trust. Many studies have investigated the psychometric characteristics of this scale. Perry et al. (2013) did a study on 8207 people and reported the validity and reliability of the scale to be acceptable. In another study, Cronbach’s alpha of the entire scale was 87%, while the retest reliability was 90% (Sheard et al. 2009). In yet another study in 2012, Levy et al. found that five subscales of this questionnaire had acceptable Cronbach’s alpha of 60-80%, but the component of emotional control had unacceptable Cronbach’s alpha of 0.51, (Levy et al. 2012). The validity and reliability of this scale were also confirmed in Iran, and the total Cronbach’s alpha of 93% was obtained (Afsaneh-Poorak & Vaez Moosavi, 2014). The scale was scored based on the following: completely disagree (1), disagree (2), no idea (3), agree (4), and completely agree (5). Meanwhile, Items 6-14-11-22-29-35-42-47-21-26-27-37-9-15-33-41-10-18-32-36-28, and 46 were reversely scored. It was found the more an individual received a higher score, the more he enjoyed greater mental toughness.

Table 1: Therapy based on lived experiences

Session	Objective	Content of meetings
First	Familiarity with treatment	Familiarization of the participants and the therapist with each other, a brief definition of multiple sclerosis, explanation of the effect of stigma on the disease process, creating a therapeutic relationship, listening to the narratives of the group members and empathizing with each

		other, empathy training, (understanding the processes and factors that cause it perceived stigma)
Second	Internal empowerment training against social isolation, discrimination, and rejection	Increasing internal control toward discrimination and rejection (less susceptible than others, tendency to work hard for goals, high self-confidence in facing challenges, more tendency to maintain physical health) against external control
Third	Internal value-building training against social isolation and worthlessness	Concentrating on strengths, and cultivating self-worth, beliefs and perceived strengths can turn threats into success, stressing that overcoming adversity can also make people resilient and more capable of facing future challenges.
Fourth	Cognitive restructuring training against the consequences of depression	Cognitive restructuring training to be more aware of thoughts related to perceived stigma leading to depression and hopelessness about the future, replacing positive behaviors
Fifth	Teaching positive re-examination against future uncertainty and fear	Positive reappraisal includes reframing stressful events and negative emotions as an opportunity for growth, development of personality dimensions in learning, and development of resilience in the face of adversity
Sixth	Teaching constructive strategies in handling destructive strategies and concealment	Teaching experiential strategies through dialogue and communication with people with MS and positive mental imagery against the false image of the disease and anger against external stigma and internal stigma.
Seventh	Teaching constructive behaviors in considering destructive strategies and concealment	Teaching techniques of constructive behavior against stigma and avoiding extreme reactions, self-disclosure to important people and self-supporters, and raising awareness of the disease for those around you to counter wrong stereotypes about MS.
Eighth	Summary and feedback	Purpose: summarizing the meeting and the techniques used from the first meeting until today, feedback, discussion, and exchange of opinions, summarizing the contents of the meetings held and an overview of them, answering the questions of the group members and examining the weak and strong points of the meetings.

Table 2: Therapy based on positive psychotherapy

Session	**Objective**	**Content of meetings**

-		Pre-test implementation
First	Familiarity with treatment	Registration of a positive self-introduction on a page by referents Orienting clients in the framework of positive psychotherapy, the assumptions of this perspective, and the role of the psychotherapist
Secon d	Record the capability of each person by himself/herself	Identifying personal capabilities, getting familiar with the classification of capabilities and moral virtues, and using personal capabilities in a new way.
Third	Counting blessings	Remembering blessings by remembering three good (positive) things in daily life Planting positive emotions and mentioning blessings and good things in life
Fourth	Having meaning in life, using the technique of personal heritage	Repeating the task done in the session Reviewing whether writing three good things or three blessings and emphasizing positive reminders and memory during the past week had a positive effect.
Fifth	Gratitude technique to promote positive thoughts, feelings, and behavior	Use the gratitude worksheet Focused on gratitude. Also, the role of bad and good memories was re-examined.
Sixth	Forgiveness and the practice of forgiveness letter	Mid-treatment review Clients reviewed their progress in writing notebooks and letters of forgiveness and gratitude and using their capabilities in practice based on their activity plans that started in the second session.
Sevent h	Hope and optimism	Noting three incidents or three things that they wanted to do but failed, then check whether there is another door or another solution in their way. Focusing on themes of hope, faith, and optimism, as well as practicing “one door closes, another door opens”.
Eighth	Constructive and active response technique Satisfaction with life	Using the technique of improving relationships and creating positive social relationships and happiness in life Response style training and training to improve relationships, completion of questionnaires by participants

Manner of Administration

After obtaining a code of ethics from the University of Isfahan, a call to visit a neurologist clinic and online notifications were made on social media to select 54 out of 65 patients who had met the inclusion criteria. After being randomized, the subjects were placed in three groups (two experimental and one control group), as each group produced separate oral and written consent forms, while the therapy logic, the rules of administering the scale, and the timing of

the sessions were explained. In subsequent stages, experimental groups (therapy based on the lived experiences of social stigma and positive psychology) participated. It is noteworthy that out of the 54 subjects, some were removed, and finally 45 people made up the sample. The first experimental group of the lived experiences-based therapy attended the 90-minute group sessions for one session per week during eight weeks, consistent with Table 1, and the second group received a 90-minute session of positive psychotherapy per week during eight weeks, while the control group received no intervention. By the end of the sessions, the subjects were asked to again fill in the questionnaires, and finally data obtained from these groups were analyzed by SPSS software (version 21). To authenticate the protocol of the therapy based on the lived experiences of social stigma, this protocol was normalized for the MS patients with the help of supervisor and advisor professors and five other members at the Department of Psychology at the University of Isfahan.

Ethical Considerations: In this study, the study terms, such as timing, the number of sessions, the follow-up time, evaluations, randomization, the confidentiality of personal data, and the right to withdraw anytime were explained to the subjects. As well, the subjects were told they could withdraw anytime they wanted and sufficient explanations were made to them about the administration of the study, and necessary assurances were also provided.

Findings

The goal of the present study was to compare positive psychotherapy and therapy based on the lived experiences of social stigma on mental toughness. The study method was semi-experimental and included pre- and post-test design with a control group. The independent variables of the study included positive psychotherapy and lived experiences-based therapy, while the dependent variable was mental toughness. This study used descriptive (mean, standard deviation) and inferential statistics to analyze the data. Also, repeated measurement ANOVA was used to investigate the efficacy of the comparison of positive psychotherapy and therapy based on the lived experiences of social stigma on the dependent variable.

Demographic data of the subjects indicated that in the group of positive psychotherapy and therapy based on lived experiences, 7 people (46%) were men and 8 people (54%) were women; in the control group, 8 people (54%) were men and 7 people (46%) were women.

The average age of the group of positive psychotherapy and therapy based on lived experiences was 33 years with a standard deviation of 4.65, while the age range in the control group stood at 33.67 with a standard deviation of 5.27.

Out of the group of positive psychotherapy and therapy based on lived experiences, 60% were single, 20% were married, and 20% were divorced. In the control group, 26.66% were single, 40% were married, and 32.32% were divorced.

Out of the group of positive psychotherapy and therapy based on lived experiences, 33.33% held a primary and junior educational degree, 26.66% were diplomas and associate's degrees, 26.66% held B.A., and 13.33% had M.A. and higher. In the control group, 3.33% were primary graders, 40% were diploma and associate's holders, and 26.66% were B.A.s.

In addition, based on the type of MS in the group of positive psychotherapy and therapy based on lived experiences, 40% of the subjects fell under primary progressive, 40% under remitting-relapsing, and 20% under secondary progressive categories, while in the control group, 26.66% fell under primary progressive, 46% under secondary progressive, and 26.66% under remitting-relapsing categories.

Concerning the duration of developing MS, the mean and standard deviation of the group of positive psychotherapy and therapy based on lived experiences were 7.33 and 4.13, respectively, while the mean and standard deviation of the control group were 6.4 and 3.29, respectively, as listed in Table 1.

Table 3: Mean and standard deviation of the sub-variables of mental toughness (Challenge, commitment, control, and trust)

group control (witness)	Lived experiences group	Positive group psychotherapy	level	Statistical variables
average(standard deviation)	**average(standard deviation)**	**average (standard deviation)**		
9.20(2.65) 9.2(2.48) 117.73(43.50)	**7.13(2.1) 9.07(2.49) 145.67(27.22)**	**7.27(2.54) 10.07(3.71) (28.95) 122.80**	**pre-exam Post- test Follow up**	**Challenge**
6.70(2.31) 7.2(2.04) 51.33(17.15)	**6.8(3.02) 11.07(2.93) 38.47(16.70)**	**7.8(2.11) 9.93(2.01) 38.73(18.52)**	**pre-exam Post- test Follow up**	**obligation**
9.9(2.47) 9.2(3.01) 117.73(43.50)	**9.47(2.16) 15.87(6.77) 145.67(27.22)**	**10.53(2.23) 13.8(4.28) (28.95) 122.80**	**pre-exam Post- test Follow up**	**Control**
8.10(1.66) 8.3(2.83) 51.33(17.15)	**6.2(1.78) 10.13 (2.92) 38.47(16.70)**	**7.07(1.87) 9.8(2.56) 38.73(18.52)**	**pre-exam Post- test Follow up**	**trust**

The variable of mental toughness includes four sub-variables of challenge, commitment, control, and trust, whose mean and standard deviation by the groups under therapy are as follows:

The mean (SD) of the variable of challenge in the groups of positive psychotherapy, therapy based on the lived experiences and control was 7.27 (2.54), 7.47 (2.1), and 9.20 (2.65) in the pretest stage; 10.07 (3.71), 9.07(2.48), and 9.2 (2.48) in the posttest stage, which increased to 122.80 (28.95), 145.67 (27.22), and 117.73 (43.50) in the follow-up stage.

The mean (SD) of the variable of commitment in the groups of positive psychotherapy, therapy based on the lived experiences and control was 7.8 (2.11), 6.8 (3.02), and 6.70 (2.31) in the pretest stage; 9.93 (2.01), 11.07(2.93), and 7.2 (2.04) in the posttest stage, which increased to 38.73 (18.52), 38.47 (16.70), and 51.33 (17.15) in the follow-up stage.

The mean (SD) of the variable of control in the groups of positive psychotherapy, therapy based on the lived experiences and control was 10.53 (2.23), 9.47 (2.47), and 9.9 (2.47) in the pretest stage; 13.8 (4.28), 15.87 (6.77), and 9.2 (3.01) in the posttest stage, which increased to 122.80 (28.95), 145.67 (27.22), and 117.73 (43.50) in the follow-up stage.

And also, the mean (SD) of the variable of trust in the groups of positive psychotherapy, therapy based on the lived experiences and control was 7.07 (1.87), 6.2 (1.78), and 8.10 (1.66) in the pretest stage; 9.8 (2.56), 10.13 (2.92), and 10.13 (2.92) in the posttest stage, which increased to 38.73 (18.52), 38.47 (16.70), and 51.33 (17.15) in the follow-up stage.

Table 3 gives the overall results of the statistical variable of mental toughness.

Table 4: Mean and standard deviation of the statistical variables by the groups under therapy

group control (witness)	Lived experiences group	Positive group psychotherapy	level	Statistical variables
average(standard deviation)	average(standard deviation)	average(standard deviation)		
117.87(39.97) 121.40(43.77) 117.73(43.50)	118.13(35.05) 144(26.93) 145.67(27.22)	108.33(31.99) 124(28.97) 122.80(28.95)	pre-exam Post-test Follow up	Mental toughness

The mean (SD) of the statistical variable of mental toughness in the positive psychotherapy group was 108.33 (31.99) in the pretest stage; 124 (28.97) in the post-test stage, which increased to 122.80 (28.95) in the follow-up stage.

The mean (SD) of the statistical variable of mental toughness in the lived experiences group was 118.13 (35.05) in the pretest stage; 144 (26.93) in the posttest stage, which increased to 145.67 (27.22) in the follow-up stage.

Also, the mean (SD) of the statistical variable of mental toughness in the control group was 117.87 (39.97) in the pretest stage, which increased to 121.40 (43.77) in the post-test stage but decreased to 117.73 (43.50) in the follow-up stage, as the significance of this is investigated by the inferential statistics as below.

Table 5: Kolmogorov-Smirnov test of the normality of the data distribution by the groups under therapy

control (evidence))number = 15(	Positive psychotherapy and treatment based on lived experiences (number = 15)	Variable Groups
(5.27)23.67	(4.65)33	Age: (mean/standard deviation)
(54)8 (46)7	(46)7 (54)8	Female (number/percentage) Male (number/percentage)
(40)6 (26.66)4 (33.33)5	(20)3 (60)9 (20)3	Married (number/percentage) single (number/percentage) Divorced (number/percentage)
(33.33)5 (40)6 (26.66)4 (0)0	(33.33)5 (26.66)4 (26.66)4 (13.33)2	Elementary and cycle (number/percentage) Diploma and postgraduate diploma number/percentage)(Bachelor's degree (number/percentage) Master's degree and above (number/percentage)
(26.66)4	(40)6	Primary progressive

(46)7 **(26.66)4**	**(40)6** **(20)3**	**Recurring subsidence** **Secondary progressive**
(4.13)7.33	**(3.29)6.4**	**duration of infection (mean and standard deviation)**

The Kolmogorov-Smirnov test, as given in Table 5, was performed to investigate the equal distribution of data with the normally distributed data in the groups under therapy in three pretest, posttest, and follow-up stages. Because of the probability or the asymp sig. value of the statistical variable of mental toughness was larger than the probability of the first-type error ($\propto = 0.05$), the null hypothesis stating the validity of the normal data distribution could not be rejected; in other words, data distribution was found to be uniform. Thus, to analyze the effects of positive psychotherapy and lived experiences on the statistical variable of the study, the parametric test of mixed variance for repeated measurement was used, with the assumptions of the parametric tests measured before presenting the results.

Table 6: Levene's test to investigate the equality of the data by the groups under therapy

group control (witness)		**Lived experiences group**		**Positive group psychotherapy**		**level**	**Statistical variable**
SIG	**F**	**SIG**	**F**	**SIG**	**F**		
0.068 **0.087** **0.52**	**4.77** **3.41** **6.44**	**0.408** **0.154** **0.510**	**0.731** **2.29** **0.460**	**0.89** **0.151** **0.171**	**0.061** **2.32** **2.09**	**pre-exam** **Post-test** **Follow up**	**Mental toughness**

In Table 6, Levene's test results of the variance equality of the groups under therapy, as regards the variable of mental toughness in the three stages of pretest, posttest, and follow-up, indicated that the assumption of the variance equality was met, and the error variance of dependent variables in all groups was the same; thus, the assumption of using variance analysis was met. Since the significance level of all groups in dependent variables was larger than 0.05, one would say with a 95% confidence level that the study variable in the three groups of positive psychotherapy, lived experiences, and control was the same in terms of the distributed scores of dependent variables.

Table 7: Inter- and intra-subject variance analysis in three pretest, posttest, and follow-up stages as regards mental toughness

Statistical power	**Eta**	**Sig**	**F**	**mean square**	**Df**	**Sum of Square**	**Source**	**Scale**	**Variables**
1	**0.113**	**0.098**	**3.13**	**1569.63**	**1**	**1569.63**	**Factor**	**Intergroup**	**Positive psychother**
1	**0.142**	**0.057**	**4.31**	**711.21**	**1**	**711.21**	**interactive effect**		

				500.41	**14**	**500.41**	**error**		**apy**
1	**0.854**	**0.001**	**309.68**	**630598.42**	**1**	**630598.42**	**group**	**between groups**	
				2036.27	**14**	**28507.91**	**error**		
1	**0.004**	**0.820**	**0.053**	**20.83**	**1**	**20.83**	**Factor**	**Intergroup**	**lived experiences**
1	**0.328**	**.020**	**6.84**	**7128.900**	**1**	**7128.900**	**interactive effect**		
				389.54	**14**	**5453.66**	**error**		
1	**0.979**	**0.001**	**657.01**	**831504.2**	**1**	**831504.2**	**group**	**between groups**	
				1265.58	**14**	**1265.58**	**error**		

To compare the efficacy of positive psychotherapy and therapy based on the lived experiences of social stigma on mental toughness, the parametric test of mixed variance for repeated measures with an intra-group factor in three pretests, posttest, and follow-up stages, and an inter-group factor separately was used. These test results indicated that positive psychotherapy and lived experience measurements produced significant differences in the three stages.

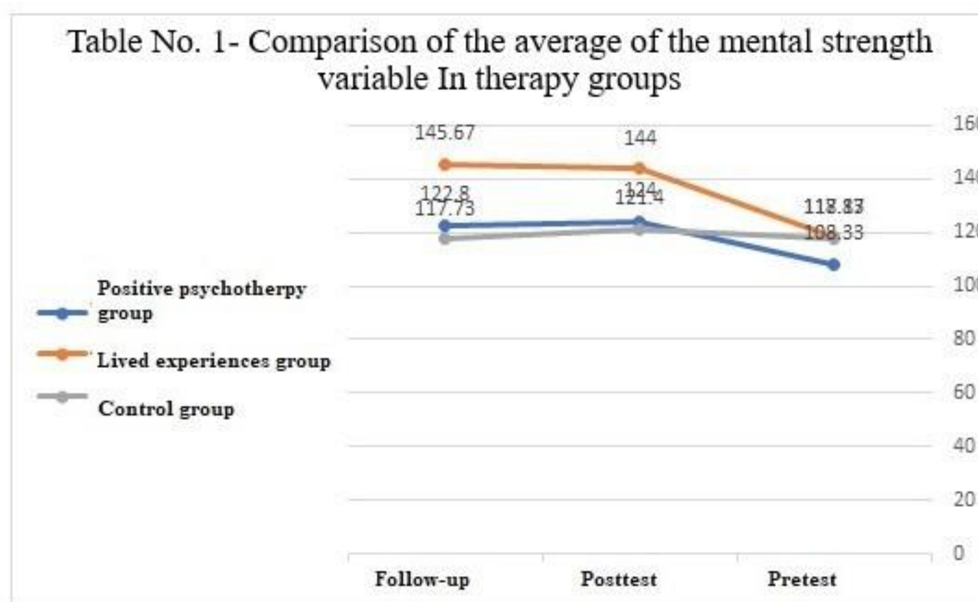

Diagram 1: Comparison of the mean of the variable of mental toughness in groups under therapy

As given by Table 7, and considering the significance of the intra-group factor, there is a significant difference between the three pre-test, post-test, and follow-up stages in positive psychotherapy as for the variable of mental toughness, as the significance level of Sig < 0.01 is not met and the significance levels of the intra-group factor in the groups of positive psychotherapy and lived experiences were 0.098 and 0.820, respectively, which indicates the insignificance of this variable. Also, the intra-group interactive effect in the variable of mental toughness in the groups of positive psychotherapy and lived experiences had significance levels of 0.057 and 0.02, which are not larger than the studied significance level. Since the goal of the present study was to investigate the efficacy of positive [psychotherapy and therapy based on the lived experiences of social stigma on increasing mental toughness. The variance analysis test of the inter-group effects was examined, with the

significance level (<0.01), indicating a significant difference in the study variable, and the statistical power of 1 indicating the accuracy of the significance of these effects.

Table 8: Bonferroni post hoc test to compare the mean mental toughness of the groups under therapy in pairs and in time series

95% confidence interval lower limit upper limit	Sig	standard error	mean difference (A-B)	Level B	Level A	Group	Scale
43.71 96.66 3.79 55.81	0.001 0.017	9.67 9.67	-70.18 *29.80	Post-test Follow up	pre-exam	Positive psychotherapy	Mental toughness
49.92 101.92	0.001	9.67	*75.93	Follow up	Post-test		
1.031 54.03 -17.92 21.25	0.041 1.000	9.75 7.20	*27.53 1.66	Post-test Follow up	pre-exam	lived experiences	
-57.91 6.18	0.137	11.79	-25.86	Follow up	Post-test		

- **The mean difference is significant at the 0.05 level**

Considering the significant differences of three scores in the pretest, posttest, and follow-up stages in the groups of positive psychotherapy, lived experiences, and control as regards the variable of mental toughness, the Bonferroni post hoc test was used to investigate the mean differences of the studied variable both in pairs and also examine the effects of time on them. Diagram 1 illustrates the mean of the studied variable in the three stages of pretest, posttest, and follow-up. This diagram indicates that the mean of the variable of mental toughness in the group of positive psychotherapy had seen a significant rise in two stages of the posttest and follow-up stages compared to the pretest stage. Also, the mean of this statistical variable in the group of lived experiences had seen a significant rise in two stages of posttest and follow-up compared to the pretest stage. The Bonferroni post hoc test in Table 8 indicates that in the group of positive psychotherapy, the mean difference in mental toughness in the pretest-posttest, pretest-follow-up stages, and posttest-follow-up stages had significance levels of 0.001, 0.017, and 0.001. Also, the Bonferroni post hoc test of lived experiences suggested that the mean difference in mental toughness in the pretest and post-test stages had a significance level of 0.041.

Discussion and Conclusion

The present study aimed to compare the efficacy of positive psychotherapy and the therapeutic protocol of the lived experiences of MS patients in the mental toughness of two groups. This is the first study that has investigated the efficacy of positive psychotherapy in comparison to the effects of the therapy on the lived experiences among MS patients. Findings showed that positive psychotherapy can create positive sources such as positive feelings, strong character points, and positive relations to effectively increase mental toughness.

Since mental toughness in chronic diseases has not been directly investigated, especially in MS, one of its secondary components (i.e., self-confidence in the area of positive psychotherapy) has been examined. In this connection, Waters et al. (2021) confirmed in a study the integration of the components of positive psychotherapy as an applied approach, and presented solutions such as developing strong points and inter-individual abilities through which knowledge, skills, approaches, and positive psychotherapy methods can help reduce mental diseases, strengthen mental health, and remove relevant challenges. Commitment is another secondary component examined by Berg et al. (2020), who reported that a hope-based intervention could help increase the quality of life among cancer patients. This study indicated that positive psychotherapy increased commitment in these patients. Another component of mental toughness is the challenge which refers to managing stress caused by crises. Fernandez et al. (202) systematically investigated the promising results of positive psychotherapy interventions and used them as a therapy to tackle stress and related problems.

Positive psychotherapy is said to emphasize developing people's positive traits and their integration with the world and others so that they can discover areas of growth and begin to move toward their real potential. Consistent with Subjective Well-Being (SWB) theories, developing the positive feelings of MS patients, along with the experience of positive feelings due to learning and applying new skills could overcome challenges, strengthen social links, and facilitate the recovery process (Diener et al. 2018).

Therapy based on lived experiences is another area where the therapists should take into account mental aspects of the MS disease and mental outcomes of developing diseases with no definitive cure, s most traditional therapies are based on mood disorders (DSM categories). This is while chronic patients who produce mood disorders (Bijoux Leist & Leist, 2022; Fahy Maguire, 2022) have never been examined, and no special treatments have been produced for them.

However, MS patients are more exposed to mental disorders due to physical problems in motor dysfunctions and negative attitudes by others. Therefore, it is increasingly required to provide treatment packages based on the experiences of these patients. As an emerging field, anti-stigma interventions (Grandónet al., 2021) create a turning point for reducing social stigma. In this regard, Grandón et al. (2021) maintained that providing well-designed intervention protocols can effectively reduce stigma, which is one of the main challenges facing health systems. Gayha et al. (2021) also demonstrated in a systematic study that art therapy interventions were effective in reducing the stigma associated with mental health. Interventions that integrate several forms of art tend to reduce stigma associated with mental health than studies that use films, theater, or role-play, alone.

According to the findings of this study, it is recommended to implement executive suggestions such as the targeted expansion of the positive psychotherapy program and the utilization of the lived experiences of MS patients to improve their quality of life and conditions in society, especially in treatment centers. Also, it is recommended to integrate training programs, workshops, and social support, and to increase community awareness of the disease; meanwhile, health specialists and doctors are suggested to pay more attention to improving the condition of patients during treatment processes.

Providing social support laws for these patients, introducing modern therapeutic interventions based on the lived experiences of patients, creating appropriate hardware and software to develop strong points, positive attitudes, and feelings of valuableness, developing educational sources and positive psychotherapy in writing, making the media aware, using experts of specialized areas such as psychologists to implement future interventions, participating MS patients in positive activities, using educational means and social networks and their wide-ranging capacities to provide positive psychotherapy training, sharing diseases experts, and emphasizing patients' abilities are also some other suggestions to improve patients' conditions.

The study, however, suffered from some limitations; for example, the study did not take into account cultural differences in various cities across Iran, and the study was just performed in Isfahan. Care should be taken to generalize the findings of this study. The low number of participants and the lack of a follow-up over a

longer period, as well as the failure to control intervening social, economic, and cultural factors, were other limitations of the study.

Ethical rules included subjects' full awareness of the study implementation trend, confidentiality, and meeting inclusion and exclusion criteria. This article had an ethics code of IR.UI.REC.1399.082 from the Department of Psychology at the University of Isfahan. This study has also been registered at the Iranian clinical trial site with the code IRCT20210808052113N.

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Mental Toughness Questionnaire

	Items	Completely disagree	Disagree	No idea	Agree	Completely agree
1	I usually find					

	something that gives me motive					
2	Overall, I feel I have control over myself					
3	Overall, I feel I am a valuable person					
4	Challenges usually help me to have the best performance					
5	I am a totally effective person when working with others					
6	Unexpected changes in my work schedule confuse me					
7	I usually do not withdraw from my activities when I am under pressure					
8	Overall, I have confidence in my abilities					
9	I automatically do what I want without enthusiasm and thinking of it					
10	Sometimes, I expect failure and hopelessness					
11	I really feel I don't know where to start when faced with several situations simultaneously					
12	Overall, I feel I have control over what happens in my life					
13	Although there are bad situations, I feel they end favorably					
14	Most of the time, I wish my life could be more predictable					
15	Every time I try to plan for something, unexpected things appear to dent it					

16	I am usually an optimistic individual					
17	I usually articulate what I have to say					
18	I sometimes feel I am a useless individual					
19	I am a reliable individual in performing duties I am entrusted with					
20	When a situation unfolds, I actively accept its responsibility					
21	Overall, I conclude I cannot keep calm					
22	When doing my duties, various factors easily divert my attention					
23	I cope with problems that may arise well					
24	I do not blame myself even when everything is mistaken					
25	I always seek to fulfil my effort fully					
26	When unhappy and indignant, I express it to get others understand it					
27	I become worry before something unfolds					
28	I usually feel I fear being in an assembly					
29	I give up to problems					
30	I react rapidly when an unexpected event unfolds					
31	I keep calm when I am under intense pressure					
32	If a mistake is supposed to occur, that event will occur anyway					

33	Unpleasant events only occur to me					
34	Overall, I hide my feelings from others					
35	I usually understand when I am tired, mental activities are problematic for me					
36	When I make a mistake, I am usually concerned for the subsequent several days					
37	When tired, it is difficult for me to continue my work					
38	I can easily tell others what to do					
39	I can usually continue subjective activities for a long time					
40	I welcome a change if it occurs in my life					
41	I feel my work is useless					
42	I usually don’t have any enthusiasm for duties I have to do					
43	If I feel people have made mistakes, I will discuss with them without any fears					
44	I always enjoy challenges					
45	I usually dominate my nervous states					
46	If a problem arises, I give up even if I feel I am right about it					
47	When faced with problems, I am no longer able to follow my goals					
48	I can adapt myself to challenges that arise					