



Research Paper: Comparing the Effectiveness of Reality Therapy and Positive Psychotherapy on Sleep Quality in Patients With Multiple Sclerosis



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ABSTRACT

Background: Multiple Sclerosis (MS) is one of the most common neurological diseases that severely affects the patients' quality of sleep

Objectives: This study aimed to compare the effectiveness of reality therapy and positive psychotherapy on sleep quality in women with MS

Materials & Methods: The research method was quasi-experimental with a pre-test, post-test design and a control group. The study population included all women with MS referred to the Guilan MS Association in the summer and fall of 2019 who were selected by purposive sampling method. They were randomly assigned in three groups of 15 people for reality therapy training, positive psychotherapy, and control group. Both experimental groups received eight 90-minute sessions of psychotherapy interventions, but the control group received no training. The Pittsburgh Sleep Quality Index (PSQI) was used to collect data. Data analysis was performed by Multivariate Analysis of Covariance (MANCOVA) and Bonferroni post hoc test in SPSS version 22.

Results: Both reality therapy and positive psychotherapy significantly improved sleep quality in women with MS ($P < 0.01$). Also, based on the results, the sleep quality of the reality therapy group showed a greater and more significant improvement compared to the positive treatment ($F = 19.43$, $P < 0.01$).

Conclusion: According to the obtained results, both methods have good practical capabilities for clinical interventions to improve sleep quality in patients with MS. Reality therapy is more effective than positive psychotherapy on the quality of sleep in women with MS.

Keywords: Reality therapy; Psychotherapy; Sleep hygiene; Multiple sclerosis

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Highlights

- Positive reality therapy and psychotherapy are both effective in improving the sleep quality of women with MS.
- Reality therapy is more effective than positive psychotherapy on sleep quality in women with MS.

Introduction

Multiple Sclerosis (MS) is one of the most common neurological diseases [1], causing inflammation and demyelination of the central nervous system. Damage to the myelin sheath in the nerve cell creates specific symptoms of the disease [2]. MS is one of the most significant life-changing diseases, as it usually affects the best part of a person's life and gradually progresses to disability and has no definitive cure. As a result, this disease has damaged the productive forces of society [3]. The prevalence of this disease is rapidly increasing. Atlas of MS (2016) has estimated its prevalence worldwide to be about two and a half million people [4]. In Iran, 5.78 out of every 100 people have been reported with MS [5].

MS causes many physical problems for people with the disease, including balance disorder, one of the most debilitating symptoms of this disease, muscle cramps, extreme fatigue, bladder dysfunction, disability, sexual dysfunction, etc. These complications always reduce the ability to perform daily activities in MS patients [6]. In addition to physical problems, these patients have always reported many sleep problems [7, 8].

In general, almost any physical illness that produces significant pain or discomfort can negatively affect the quantity and quality of sleep [9]. Sleep is a dynamic and highly organized biological process that is an essential part of life, and the quantity of sleep is known to be related to the quality of social interaction. The importance of sleep in health and disease has been considered since Hippocrates, and disturbed sleep is considered a significant cause of suffering and illness of human beings at any age [10]. During sleep, the body restores its energy, and nerve cells are regenerated. Sleep protects the body against extreme fatigue. However, sleep is not just a neuro-physiological component. Psychologically, sleep, through its restorative effect, treats stressed and nervous people. When the sleep nuclei in the brain are damaged, the Circadian Rhythm (CR) of sleep is disrupted, and sleep quality is impaired [11]. Inadequate sleep quality can cause psychological problems and consequently the

deterioration of the patients' condition [12]. Because of sleep quality problems in patients with MS, psychological interventions can be an essential and effective step in reducing their psychological problems and improving their sleep quality. In particular, evidence suggests that traditional cognitive-behavioral therapy does not improve cognitive function in these patients [13].

The development of psychological therapies over the past few decades has led to the development of new approaches to maladaptive cognitions that target broad, contextual goals. Treatments of insomnia have evolved similarly, and several therapies, including reality therapy, have begun to gather evidence as effective therapies for sleep-related processes over the past few decades. Reality therapy is a method of psychotherapy that is based on the Choice Theory and was founded by Glasser. This treatment is based on the principle that people choose their behaviors and are responsible for their lives and what they do, feel, and think [14]. This approach helps people control their behavior and make better choices and emphasizes that having a successful identity is achieved through successful work and the power of choice is an essential factor in their mental health [15, 16]. In other words, its primary goal is to help clients learn better ways to satisfy all their psychological needs [17]. Researchers have examined and confirmed the effect of reality therapy on a wide range of psychological symptoms [18-20].

Although sleep is a powerful and highly regulated biological stimulus, the ability to fall asleep at any time and maintain sleep without waking up is very fragile and is affected by several factors. Identification of these factors is the key to insomnia treatment [21]. Positive psychological structures (e.g., optimism and hope) have been associated with better sleep quality in previous work [22]. However, such studies have not examined the effect of a wide range of positive psychological structures or the effectiveness of positive psychotherapy on sleep-related health behaviors. Positive psychotherapy originates from the positive psychology approach and is a multi-component model that enhances therapeutic change by creating interaction, pleasure, and meaning [23]. This approach, which is a combination of Beck's

cognitive approach in clinical practice, the Mihaly cognitive-attention syndrome, and Seligman's positive psychology, teaches clients to be more optimistic. The main goal of this therapy is to extend the psychologist's focus beyond the disease and its direct relief. The exercises used and suggested in this therapy directly target patients' interpersonal relationships. Also, in some therapy sessions, patients are trained to use their abilities and strengths, which also helps them reduce their psychological problems by strengthening their self-confidence [24]. In addition, Lyubomirsky and Laius believed that positive interventions reduce depression and increase happiness and psychological wellbeing by increasing positive emotions, positive thoughts, and satisfying basic needs such as autonomy, love, belonging, and communication [25]. Cucarella and Perza showed that positivist psychology was effective in reducing stress in female patients [26]. In addition, other separate studies have shown that positive psychotherapy reduces patients' emotional and mental memory problems [27, 28].

Glasser's view of psychopathology in the reality therapy approach does not address the patient or a defect in behavior. In this view, to change the clients' mental state, the choice of useful and effective behavior is considered instead of ineffective behavior, and by increasing the power of choice and behavior based on reality, the patient's mental function is improved. On the other hand, positive psychotherapy is a different approach from other therapy models because it focuses on positive emotions and relationships, and wellbeing. According to what was said, the goals and techniques in the above two therapies are different. In reality therapy, selection, control, and internal factors are considered, and in positive psychotherapy, capabilities are. So it seems that comparing the effectiveness of these two therapeutic approaches should help select a more appropriate approach to improve sleep quality in patients with MS. Also, the researcher's investigation on internal and external studies in the field of reality therapy and positive psychotherapy indicates that the effectiveness of these two treatment models has been studied on populations with various problems, and useful results have been obtained. However, the effectiveness of these two approaches on sleep quality in patients with MS has not been studied so far. Therefore, the present study aimed to compare the effectiveness of reality therapy and positive psychotherapy on sleep quality in women with MS.

Materials and Methods

This study was quasi-experimental research with a pre-test, post-test design and a control group. The study population included all female patients with MS referred to Guilan MS Association, Iran, in the summer and fall of 2019 (1197 people). Of them, 45 patients from the mentioned community were selected by purposive sampling method (taking into account the inclusion criteria) and randomly placed into three groups: reality therapy training (15 people), positive psychotherapy (15 people), and control group (15 people). This number was selected based on the sample size proposed for the experimental and quasi-experimental studies (at least 15 people for each group) [29]. The inclusion criteria include completing the consent form to participate in the training program, not suffering from acute psychological problems by the psychiatrist's discretion, and the literacy level of at least third grade of guidance school to answer the questionnaires. Considering that the condition for membership in the MS association was the definitive confirmation of the disease by trusted experts, the criterion of the disease was membership in this association. The exclusion criteria included participation in other treatment programs, unwillingness to participate in the program, and two consecutive absences from intervention sessions.

After selecting the statistical subjects, both experimental groups received eight 90-minute sessions of intervention treatment, and the control group remained without any intervention. Because of the follow-up and encouragement of researchers, there was no subject withdrawal, and if any of the subjects missed only one training session, the researcher held extra programs to her catching up with the group.

Finally, after 4 weeks of holding training sessions, a post-test was taken from all three groups, and the data were analyzed with descriptive statistics (including mean and standard deviation) and Multivariate Analysis of Covariance (MANCOVA) in SPSS v. 22.

Research tools

Pittsburgh Sleep Quality Index (PSQI)

Pittsburgh Sleep Quality Index (PSQI) was developed by Buysse et al. to measure sleep quality and help diagnose the people who have good or bad sleep [30]. It consists of 18 items that determine people's sleep quality by evaluating 7 characteristics during the last month. These characteristics include sleep quality in terms of the individual, the time it takes for the person to fall asleep, the

Table 1. Summary of group reality therapy sessions

Sessions	Description
1	Aim: Introduce the treatment plan, its underlying logic, and group organization
2	Aim: Introduce why and how we issue behavior and introduce the basic needs and their impact on mutual relations - Explaining that everything we do is a behavior, and all our behaviors are aimed at a goal; - The goal of all our behaviors is to satisfy one of our basic needs; - Introducing five basic needs of survival, love, power, freedom, fun, and then understanding and drawing a profile of our needs.
3	Aim: Familiarity with negative thoughts and ways to moderate them, positive thinking and its effect on health and lifetime - Emphasis on the control of thoughts and actions directly and control of feeling and physiology indirectly, by providing the behavior car metaphor and examples; - A group exercise to demonstrate the effectiveness of thought and action change on emotion and physiology; - Scoring the subjects' comfort and happiness of body and the subjects' emotions in the current situation between 0 and 100 and then evaluating and re-scoring the emotional and physical feelings between 0 and 100 after a creative 10-15 minute visualization of the relaxing scenery to achieve this objective experience that change in thought and action results in a change in physiology and emotion.
4	Aim: Familiarity with control theory, seven destructive habits, and seven loving habits - Homework is to observe these behaviors until the next meeting
5	Aim: To introduce the four conflicts; submission of homework reports by all members and having a group discussion about it; introducing the four conflicts: 1) Forcing the equivalent person to do what he/she doesn't want to do, 2) Forcing you by the equivalent person to do what you do not want to do, 3) Two-way compulsion to do what neither wants to do, and 4) Self-compulsion to do what you do not want to do; - Assessing the conflicts in the life of the subjects and determining its prevalence between 0 and 10.
6	Aim: To teach the quality world concept - Introducing the quality world and identifying the desired world of the subjects; - Investigate the gap between the quality world (what I want), the real world (what I have), and the consequences of anxiety, depression, and anger caused by this gap; - Expressing the experiences of the subjects.
7	Introducing WDEP and closing group therapy sessions W: What are your Wants; D: What are you Doing now for your wants? E: self-Evaluation, Does what you do get you to what you want? P: Plan of action, Helping the subject to identify specific ways of changing failed choices into successful choices
8	Discuss the lessons learned and achievements of these sessions concerning possible future challenges and problems in adapting to the consequences of MS; - Filling the "Note for yourself" form; the most important things (things that I have learned in this workshop and I have decided to apply it in my work and life and alongside my illness are: - Problems or obstacles that can happen in this regard? What solutions can I use to fix them? What effect will it have on my life and job if I make these changes?



duration of sleep, sleep efficiency, problems during sleep time, use of sleeping medication, and dysfunction of daily performance. Each of the 7 subscales in this questionnaire has a score of 0 to 3, where high scores indicate poor sleep. A total score greater than 5 indicates that the participant has poor sleep quality and severe problems in at least two areas. The reliability of this scale was calculated as 0.83, and its validity by a sensitivity of 89.6% and a specificity of 86.5% is at an appropriate level [30]. In Iran, the validity of this questionnaire for the Iranian population has been confirmed at the Tehran Psychiatric Institute. Also, the reliability coefficient of the questionnaire through Cronbach alpha was calculated as 0.81 [31]. Heidari et al. also reported validity of 0.86 and a reliability of 0.89 for this questionnaire [32].

Protocol of group reality therapy sessions

In this study, the reality therapy intervention was based on Glasser's reality therapy training package [33], held during eight 90-minute sessions, one session per week for the study participants (experimental group). Details and summaries of the sessions are provided in Table 1.

Protocol of positive psychotherapy training sessions

In this study, a positive psychotherapy intervention was based on the reality therapy training package [34], was held during eight 90-minute sessions and one weekly session for study participants (experimental group 1). Details of the sessions are provided in Table 2.

Table 2. Summary of positive psychotherapy training sessions

Sessions	Description
1	Aim: Explain how to do the work, the reason for choosing people, familiarity with the concept of positive thinking, familiarity with the group, and the regulations governing it (90 minutes) -Assignment: At the end, the participants were told to set their expectations according to the topics raised to participate in the group for the next session and prepare appearances of positive and negative thoughts other than what was said in the group for the next session.
2	Aim: Familiarity with negative thoughts and ways to moderate them, positive thinking, and their effects on health and longevity -Assignment: choose a positive subject and a negative subject and visualize it in your mind and then remember its image.
3	Aim: Familiarity with negative thoughts, ways to moderate them, positive thinking, and their effect on people's health and longevity -Assignment: start your morning with a positive topic such as sunrise, remembering sweet memories, or talking to those you enjoy.
4	Aim: To teach positivity by challenging negative thoughts, changing mental images, using constructive language, and revising beliefs -Assignment: list five positive factors in your life (including people, activities, or any event that they consider positive).
5	Aim: Teaching to be positive by institutionalizing a positive thinking strategy in life, continuing to practice positive thinking, opportunities for positive thinking by coping and adapting to problems we cannot solve -Assignment: for the next session, make a list of positive words in your life and repeat them until they gradually become part of your vocabulary.
6	Aim: To try living positively through building a positive relationship - Health is a prerequisite for positivity, establishing good relationships with others, and loving from the heart; -Assignment: make a list of your positive belongings and focus on them.
7	Aim: To be positive by teaching how to stop thinking, calming down, and changing attitudes, including coercion, restraint, and defiance -Assignment: practice the ability to trust your abilities.
8	Aim: to bring a laugh to life, to build self-confidence, and to create a good habit of exercising in accordance with the disease -Assignment: practice the ability to trust your abilities.

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Results

In the present study, 45 female patients with MS were studied in 3 groups: reality therapy training (15 patients), positive psychotherapy (15 patients), and a control group (15 patients). Demographic characteristics is shown in [Table 3](#).

According to [Table 4](#), the average quality of sleep and its components in the control group in the pre-test and post-test phase do not show any change. But in the experimental group, it decreased in the post-test stage compared to the pre-test stage. The results of the Shapiro-Wilk test indicate that the distribution of data is normal in sleep quality variables and its components ($P > 0.05$), and the premise of the normal distribution of data for covariance analysis is thus established. Also, the assumed results of homogeneity of covariance matrices of variance (M-Box test) indicate no difference between the variances (M-Box=62.690, $F=1.731$, $P=0.079$). Default homogeneity of regression line slope and the existence of a linear relationship between the covariate and the dependent variable for sleep quality and its dimensions was also investigated, which showed that these two assumptions were established. Following are the results related to the validity indicators of multivariate analysis

of covariance ([Table 5](#)). The results of validity indicators of multivariate analysis of covariance ([Table 5](#)) showed that the effect of group on the composition of the studied components is significant ($P < 0.05$). Accordingly, the square of Eta shows that the difference between the two groups is generally significant with respect to the components of the dependent variable. To determine the more accurate effects of treatments on sleep quality subscales in women with MS, the results of adjusted means and Bonferroni post hoc test have been reported ([Table 6](#)).

According to [Table 6](#), the sleep quality in the reality therapy group showed a more appropriate and significant improvement compared to the positive treatment ($P < 0.05$). But in all sleep quality subscales, there is no significant difference between reality therapy and positive psychotherapy ($P > 0.05$).

Discussion

This study aimed to compare the effectiveness of reality therapy and positive psychotherapy on sleep quality in women with MS. The results showed that reality therapy significantly affected sleep quality and its components

Table 3. Demographic characteristics of the studied samples

Variables		Reality Therapy (n=15)	Positive Psychotherapy (n=15)	Control Group (n=15)
Age (y) (Mean±SD)		31.60±8.87	32.67±7.31	34.78±9.30
Marital status (No.)	Married	8	12	11
	Single	7	3	4
P			0.260	
χ ²			2.70	
Education (No.)	BA	7	9	8
	MA	6	5	4
	PhD	2	1	3
P			0.800	
χ ²			1.65	
Duration of illness (No.)	5-6 months	2	3	2
	10-11 months	10	9	8
	7-9 years	3	3	5
P			0.730	
F			0.318	
Duration of marriage (No.)	2-4 years	8	8	6
	5-6 years	7	7	9
P			0.922	
F			0.081	
Number of children (No.)	2	4	4	6
	1	6	7	7
	0	5	4	2
P			0.746	
χ ²			1.94	

in women with MS. The result was consistent with the findings of Lee et al., [35] Willie et al. [36]. In explaining this finding, based on the opinion of researchers, the emotional reaction to illness and physical pain affect the quality and quantity of sleep [37]. Therefore, when MS patients underwent this intervention, they could improve their sleep quality by controlling emotional reactions such as anxiety, stress, and depression. In particular, there is a significant correlation between sleep quality and reduced emotional disturbance [38]. It is also note-

worthy that sleep is a bio-cognitive process, and reality therapy intervention based on selection theory refers to explaining how and why the brain works. Therefore, from the point of view of this theory, providing education based on reality therapy paves the way for improving the biological process. According to the theory of neuroplasticity, neural pathways and synapses can be altered by changes in behavior, environmental processes, and neural processes. The reorganization of the views of different parts of the body in the cerebral cortex con-

Table 4. Mean and standard deviation of sleep quality and related components in the experimental and control groups

Variables	Groups	Mean±SD	
		Pre-test	Post-test
Subjective sleep quality	Reality therapy	1.667±0.488	0.667±0.488
	Positive psychotherapy	2.000±0.535	1.200±0.414
	Control group	1.47±0.99	1.53±0.99
Delay in falling sleep	Reality therapy	1.733±1.100	0.800±0.676
	Positive psychotherapy	1.533±0.743	0.867±0.640
	Control group	1.67±0.90	1.87±0.92
Duration of sleep	Reality therapy	1.333±0.976	0.640±0.533
	Positive psychotherapy	1.067±0.258	0.933±0.458
	Control group	1.73±0.96	1.73±0.88
Sleep efficiency	Reality therapy	0.941±0.800	0.258±0.067
	Positive psychotherapy	0.724±0.667	0.488±0.333
	Control group	1.03±0.93	1.03±0.93
Sleep disturbance	Reality therapy	1.733±0.799	1.200±0.561
	Positive psychotherapy	2.07±0.26	1.53±0.52
	Control group	1.93±0.46	0.46±1.93
Sleeping medication	Reality therapy	0.976±0.667	0.640±0.533
	Positive psychotherapy	0.41±0.20	0.41±0.20
	Control group	0.74±0.40	1.11±0.67
Dysfunction of daily performance	Reality therapy	1.333±0.816	0.667±0.488
	Positive psychotherapy	1.87±0.35	1.00±0.38
	Control group	1.47±1.06	1.47±1.06
Sleep quality	Reality therapy	9.267±2.604	4.467±1.959
	Positive psychotherapy	9.40±1.76	6.07±1.44
	Control group	9.60±4.55	10.13±4.66

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stantly occurs in response to activities, behaviors, and skill learning, so neural processes have flexibility. Reality therapy can make a difference in people's biological processes by changing their thoughts, feelings, and actions [39].

Reality therapy has techniques to help people change their inefficient behaviors to efficient ones, destructive

styles into wise alternatives, and above all, their unhealthy lifestyle to a healthy one [38]. In choice theory, behavior consists of four components: thinking, action, feeling, and physiology. Glasser suggested that we have considerable control or choice over the first two: thinking and acting. However, we have little ability to directly select the components of emotion and physiology because they are deeply unconscious. These four components

Table 5. Results of multivariate analysis of covariance of sleep quality and its components

Sources Change	Wilks Lambda	F	df 1	df 2	Sig.	Eta Squared	Power
Subjective sleep quality	0.837	0.416	7	15	0.877	0.163	0.135
Delay in falling sleep	0.481	2.308	7	15	0.082	0.519	0.643
Duration of sleep	0.359	3.834	7	15	0.014	0.641	0.881
Sleep efficiency	0.461	2.509	7	15	0.064	0.539	0.686
Sleep disturbance	0.409	3.101	7	15	0.031	0.591	0.791
Sleeping medication	0.326	4.431	7	15	0.007	0.674	0.927
Dysfunction of daily performance	0.591	1.484	7	15	0.246	0.409	0.431
Sleep quality	0.456	2.552	7	15	0.060	0.544	0.695



are closely intertwined, and the choices we make in our thinking and acting indirectly and significantly affect our feelings and physiology [40]. Sleep involves a sequence of neurophysiological changes in the brain. Proper sleep involves a dynamic interaction between voluntary decisions and involuntary biological activity. Turning off the lights, reducing the noise, and lying down are voluntary behavior, but the result is an involuntary increase in melatonin and a series of changes in brain activity patterns during the night. Sleeping ultimately depends on cooperation between behavior and biology, and the defect in any of them causes sleep disorders [41]. Therefore, reality therapy can make significant changes in the patient's feelings and physiology and provide a basis for improving the quality of sleep in MS patients through cognitive evaluation and training to stop rumination, change attention and provide a distraction. It changes the individual's knowledge about the disease and sleep quality problems by manipulating the patient's thinking and action [42].

Consistent with the above argument in the reality therapy intervention, the therapist asks the client: what options do you have to deal with your problem? The client should use the brainstorming method. The therapist challenges the patient's irrational thoughts by offering several options as well as questions. In other words, the patient's enjoyment and satisfaction with life are enhanced by creating a positive view of the disease, changing negative perceptions, and emphasizing the patient's different roles in life (for example, the patient is told that you aren't a prisoner of your MS and sleep problems, starting now you can have a better life by choosing a healthy lifestyle and changing your thoughts and attitudes) [43]. Therefore, based on Glasser's point of view, people are in any given situation because of their individual choices

and because they have not been able to satisfy their basic needs in a right and reasonable way. Humans can create a better situation by choosing an effective and appropriate way to meet their needs and positively affect their physiological processes, such as sleep quality [44].

The other part of the results showed that positive psychotherapy significantly affected sleep quality and its components in women with MS. The results obtained were consistent with the findings of Kim et al., [45] Pahlavan et al., [46] and Saghebi Saedi et al. [47]. In this regard, Kim et al. suggested in a study that positive psychology has a significant mediating effect on the relationship between sleep disorders and depressive symptoms and can reduce the symptoms of sleep disorders and depression caused by sleep disorders [45]. The present study findings are consistent with McEwen's theory of allostatic load. This theory interprets the individual's attempt to adapt to the demands of life as a cumulative physiological load imposed on the body. Accordingly, patients with MS who experience insomnia may experience increased stress and inability to participate in enjoyable activities, making them more vulnerable to sleep disorders [45]. Previous research findings have confirmed this finding. In a large study, Hamilton et al. reported that participants with low levels of psychological wellbeing showed more sleep disorders independent of age, gender, physical symptoms, and cognitive disorders [48]. Therefore, experiencing high levels of chronic stress in patients with MS leads to activation of the Hypothalamic-Pituitary-Adrenal (HPA) axis, an essential neuroendocrine mediator of the stress response. HPA axis hyperactivity, which leads to increased cortisol levels, may stimulate poor sleep in these patients and is associated with an increased risk of insomnia.

Table 6. Adjusted means and pairwise comparison of scores of sleep quality subscales based on Bonferroni test

Variables	Group 1	Group 2	Group 1 mean	Group 2 mean	Mean Difference	Standard Deviation	Significance
Subjective sleep quality	Control	Positive Psychotherapy	1.730	1.025	0.705*	0.210	0.002
	Control	Reality therapy	1.730	0.646	1.084*	0.175	0.000
	Positive psychotherapy	Reality therapy	1.025	0.646	0.379	0.200	0.067
Delay in sleeping	Control	Positive Psychotherapy	1.829	0.889	0.940*	0.240	0.000
	Control	Reality therapy	1.829	0.816	1.013*	0.199	0.000
	Positive psychotherapy	Reality therapy	0.889	0.816	0.076	0.228	0.751
Duration of sleep	Control	Positive psychotherapy	1.630	0.920	0.710*	0.201	0.001
	Control	Reality therapy	1.630	0.651	0.979*	0.167	0.000
	Positive psychotherapy	Reality therapy	0.920	0.651	0.269	0.191	0.168
Sleep efficiency	Control	Positive psychotherapy	1.034	0.142	0.892*	0.224	0.000
	Control	Reality therapy	1.034	0.157	0.878*	0.186	0.000
	Positive psychotherapy	Reality therapy	0.142	0.157	-0.014	0.213	0.947
Sleep disorder	Control	Positive psychotherapy	1.902	1.469	0.433*	0.187	0.027
	Control	Reality therapy	1.902	1.295	0.607*	0.156	0.000
	Positive psychotherapy	Reality therapy	1.469	1.295	0.174	0.178	0.335
Sleeping medication	Control	Positive psychotherapy	0.451	0.506	-0.055	0.267	0.838
	Control	Reality therapy	0.451	0.443	0.007	0.222	0.974
	Positive psychotherapy	Reality therapy	0.506	0.443	0.062	0.254	0.808
Dysfunction of daily performance	Control	Positive Psychotherapy	1.360	1.031	0.329	0.217	0.140
	Control	Reality therapy	1.360	0.742	0.618*	0.181	0.002
	Positive psychotherapy	Reality therapy	1.031	0.742	0.289	0.207	0.171
Sleep quality	Control	Positive psychotherapy	10.193	5.825	4.367*	0.580	0.000
	Control	Reality therapy	10.193	4.649	5.544*	0.512	0.000
	Positive psychotherapy	Reality therapy	5.825	4.649	1.177*	0.469	0.017

*Significance level for 0.05.

Conversely, the symptoms of insomnia in patients may also increase cortisol levels, causing a vicious cycle [49]. Therefore, it seems that the psychological resources and positive cognitions generated by positive psychotherapy create a strong protective function in response to stress and improve the sleep quality of patients by modulating HPA-based activity and reducing overall cortisol levels. Previous studies have also supported this conceptualization, and research has shown that people with more psychological resources do not show an HPA response to crucial negative life events and daily stress [50, 51]. The broaden-and-build theory suggests that positive emotions associated with positive cognitions enhance patients' physical, intellectual, and social resources by expanding the action-thought repertoire [52]. Examples of these resources include the quality of social relationships and resilience, both of which have been suggested to improve sleep quality [53, 54]. In this regard, Solberg and Segerstrom argue that people with positive cognitions are often more flexible in using coping strategies and are more successful in dealing with controlled and uncontrollable stressors. Therefore, the positive cognition developed in a person following positive psychotherapy is likely to affect sleep quality through a combination of psychological, behavioral, and biological pathways [55].

In explaining this finding, we can refer to the techniques and exercises used in positivity intervention. Positive gratitude exercises seem to have been effective in this regard [56]. The development and construction of positive emotion models and cognitive sleep models are especially important for study [57]. The content of pre-sleep cognitions is also essential. Cognitive sleep patterns reflect the biases of people who have lower sleep quality in sensitive periods before going to sleep and cannot interpret this low quality (such as focusing on negative events or the idea that I cannot sleep well). This condition happens because schemes and hypotheses activate the information processing system. A clear explanation for this is that rumination about sleep problems can intensify sleep problems, which is, in fact, one of the best predictors of delayed sleep [57]. Gratitude exercises may encourage individuals to shift their focus from stressful topics to more adaptive and flexible plans, and this is related to the cognitive theory presented above. Positive psychotherapy may also be effective through processes that can build strong attitudes such as hope and optimism. Sleep seems to be a process through which positive emotions can show their effects on mental satisfaction [58].

It can also be stated that in patients with MS whose main symptoms are fatigue and insomnia, positive thinking training provides a general approach to life and some-

thing beyond the usual thoughts for the patient. Positive thinking enables them to focus on the positives rather than the negatives in all aspects of life. Good thoughts and feelings about oneself replace constant self-humiliation, make them think well about others and establish a good relationship with them, increases the expectation of the best in the world, and ultimately adds confidence in receiving the best of the world to one's beliefs. These positive changes will undoubtedly reduce negative thoughts and lead to improved sleep quality [52].

The results also showed a significant difference between the effectiveness of the two intervention methods on sleep quality scores. Reality therapy intervention had a more significant impact on sleep quality compared to the positive intervention. But there was no significant difference between sleep quality components. No research has been found inside the country or abroad to compare the effectiveness of these two therapeutic approaches on sleep quality in MS patients. Therefore, we mentioned studies that are approximate or similar to this study or studies that only consider the effectiveness of one of the interventions. Therefore, the results of this finding are consistent with parts of the findings of Lee et al., [35] Wiley et al., [36] Pahlavan and Ahi [45]; Kim et al., [45] and Saghebi Saeedi et al. [47]. In this regard, BaniHashemi et al. suggested that reality therapy and treatment based on acceptance and commitment to the quality of life (physical dimension of sleep) have the same effectiveness [59]. In explaining this finding, it can be said that reality therapists believe that responsibility and selection are effective on thoughts, excitement, behavior, and proper control and satisfaction of needs and causes positive thinking and positive mood [60].

During treatment, the reality therapy approach helps patients choose the theory of choice or the internal control instead of external control. They accept that only the individual can do something for himself or herself, and with behavioral activation, setting objective goals and personal aspirations, and behaving in a committed manner to achieve them, the more positive emotions will emerge [61]. Reality therapy techniques such as living in the present, responsibility, fruitful relationships, and internal control can improve patients' happiness and achieve positive emotions and feelings [60, 61]. Because of this, reality therapy can make a difference in the thoughts and attitudes of MS patients towards life by increasing positive emotions. Langer and Rodin also state that by emphasizing control, responsibility, feeling, and the attitude that everything is under our control, reality therapy can help patients change their attitudes and make them optimistic and positively redefine their lives and

situations [62]. Therefore, in justifying the effectiveness of reality therapy, compared to positive psychotherapy, reality therapy is an intervention that uses positivity-related training in some sessions (the-7-habits techniques, destructive measures, etc.) (e.g., the sixth training session in the present study, which taught the identification of a quality world and a desirable world), in addition to the concepts related to the choice theory as well as acceptance of commitment therapy. In other words, the client, with the help of the therapist, tries to reduce destructive habits and cultivate good habits instead. Also, in the intervention process, the therapist seeks to moderate the contradiction between the patient's quality world and the patient's desired world and replace the negative emotions with positive emotions, which seems to justify the effectiveness of this therapeutic approach to a greater degree. This is because reality therapy intervention can consider more aspects of the mental health of MS patients, and this multidimensionality of the intervention also adds to its effectiveness. In terms of reality therapy, if people have a positive and realistic image of themselves and take responsibility for their actions, they will experience a sense of worth and feel better, and as a result, it will have a positive effect on their physical and mental health (sleep quality) and adaptation [63].

Because no research has so far compared the effectiveness of these two intervention methods, it was impossible to compare ours with the results of other studies. It can be said that reality therapy intervention is based on the principle that people choose their behaviors and are responsible for their own lives and what they do, feel, and think [14]. This approach helps people control their behavior and make better choices in their lives and emphasizes that having a successful identity is achieved through successful work and the power of choice is an important factor in their mental health [59-64]. Accordingly, such assistance to MS patients through reality therapy intervention makes them feel responsible for all their behaviors and thoughts. Therefore, such thinking can reduce emotional disturbance and improve mental health and sleep quality by preparing the ground for accepting the disease.

Considering the effects of both therapeutic and educational methods on improving sleep quality in women with MS, both methods have good practical capabilities for clinical interventions to improve sleep quality. In addition, based on the results of the additional impact of reality therapy on sleep quality compared to positive intervention, it is suggested that this treatment method be used more by counselors and psychologists of medical centers and MS associations to improve the sleep qual-

ity of patients with MS. The specificity of the statistical population to the female gender was the main limitations of the present study. Therefore, it is suggested that future studies are done with a control group, and also a similar study should be performed on both genders to make the results more powerful.

Conclusion

The results showed that reality therapy and positive psychotherapy are effective on the sleep quality of women with MS. Reality therapy also showed greater effectiveness on sleep quality in women with MS. The psychological resources and positive cognitions created by positive psychotherapy create a strong protective function in response to the stress of the disease and thus improve the sleep quality of patients. Also, according to the theory of neuroplasticity, reality therapy can make changes in the biological process of women with MS by changing the thoughts, feelings, and actions of patients, thus improving the quality of sleep of patients.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of Guilan University of Medical Sciences (No.IR.GUMS.REC.1399.067) and the Iranian Registry of Clinical Trial (IRCT20200616047804N1). All study procedures were done in compliance with the ethical guidelines of the 2013 version of the Declaration of Helsinki.

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Authors contributions

Conceptualization, supervision, and writing the original draft: Somayyeh Taklavi; Methodology, investigation: All authors; Writing, review, and editing: Abbas Abolghasemi.

Conflict of interest

The authors declared no conflict of interest.

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