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Research Paper

Effectiveness of Group Dialectical Behavior Therapy on Self-doubt, Thought Fusion and Depression in Women with Obsessive-compulsive Disorder

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ABSTRACT

Background: Obsessive-compulsive disorder (OCD) significantly impacts women, often contributing to self-doubt, thought fusion, and depression. Although dialectical behavior therapy (DBT) shows promise in addressing these issues, its effectiveness within this specific population warrants further investigation.

Objectives: The present study aimed to evaluate the effectiveness of DBT in reducing self-doubt, thought fusion, and depression in women with OCD.

Materials & Methods: This quasi-experimental research employed a pre-test-post-test design, incorporating a control group. The study sample comprised 51 patients who were referred to psychological clinics and medical centers in Ardabil City in 2024. Among them, 36 women with OCD were selected via convenience sampling and randomly assigned through a lottery method to either the experimental (n=18) or the control group (n=18). The experimental group received eight 90-minute sessions of DBT, while the control group received no intervention. Data were collected using the OCD questionnaire, Imposter syndrome scale (ISS), thought fusion instrument (TFI), and Beck depression inventory (BDI). The data were analyzed using multivariate analysis of covariance in SPSS software, version 27.

Results: The findings revealed that DBT significantly reduced self-doubt ($F=43.92$, $\eta^2=0.60$), thought-action fusion ($F=55.51$, $\eta^2=0.65$), thought-object fusion ($F=63.39$, $\eta^2=0.68$), thought-event fusion ($F=58.76$, $\eta^2=0.67$), and depression ($F=46.96$, $\eta^2=0.61$) in women with OCD ($P<0.01$).

Conclusion: This study underscores the efficacy of DBT in significantly mitigating self-doubt, thought fusion, and depression in women with OCD. The results highlight DBT's potential to modify maladaptive cognitive and emotional patterns, thereby fostering improved psychological well-being within this population.

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Introduction

Obsessive-compulsive disorder (OCD) is a chronic mental health condition marked by intrusive thoughts (obsessions) and repetitive behaviors (compulsions) to alleviate distress [1]. It significantly impacts daily functioning, relationships, and quality of life [2]. While OCD affects all demographics, its presentation and impact vary, particularly by gender [3]. Women are more affected due to biological, psychological, and sociocultural factors, with hormonal fluctuations exacerbating symptoms [4, 5]. Benatti et al. [6] found that adult-onset OCD is more prevalent in women (67%) compared to men (33%), with women experiencing a later onset age, though no gender differences were found in symptom severity or comorbid depression.

Societal and cultural pressures significantly contribute to the burden of OCD in women, amplifying obsessive thoughts and compulsive behaviors, especially in areas like parenting, relationships, and work [7, 8]. These pressures intertwine with self-perception, making women more vulnerable to self-doubt—a pervasive uncertainty about their abilities and decisions [9]. Self-doubt fuels the OCD cycle, as heightened responsibility and fear of mistakes align with cognitive distortions [10, 11]. This is particularly pronounced in women due to societal expectations that emphasize caregiving roles and increased scrutiny of their actions [12].

OCD involves intrusive obsessions and distress-driven compulsions, often fueled by cognitive distortions like thought fusion [13]. This distortion makes individuals believe their thoughts directly influence actions, morality, or reality [14]. It manifests as thought-action fusion, thought-event fusion, and thought-object fusion, and is more pronounced in women due to sociocultural and psychological factors [15]. Societal pressures, such as heightened responsibility, guilt, and perfectionism, amplify thought fusion, making women more likely to view their intrusive thoughts as reflections of their moral worth [16]. For example, a woman with OCD may compulsively check caregiving duties to reduce guilt, reinforcing the OCD cycle [17].

OCD in women often coexists with depression, creating a challenging cycle of intrusive obsessions, compulsive behaviors and emotional distress [18]. The constant cycle can leave women feeling overwhelmed, helpless, and exhausted, contributing to depression [19]. Gender-specific factors, such as societal expectations, caregiving roles and hormonal fluctuations, can intensify feelings of inadequacy, guilt and self-doubt [20]. Depression in women with OCD manifests as persistent sadness, low energy, and impaired cognitive functioning, which further complicates managing OCD symptoms [21]. This bidirectional relationship highlights the need for therapeutic approaches addressing both conditions simultaneously, considering the unique psychological and social pressures women face [22].

Various therapeutic approaches are employed to treat OCD, but one particularly notable and impactful method is dialectical behavior therapy (DBT) [23]. This approach, which targets thoughts, cognition, and behavior, has proven highly effective in addressing the multifaceted challenges of OCD, especially in women [24]. DBT emphasizes skills such as emotional regulation, distress tolerance, mindfulness, and interpersonal effectiveness, making it particularly suitable for managing the cognitive distortions and emotional turbulence associated with OCD [25]. For women, who often experience OCD alongside heightened guilt, self-doubt, and sociocultural pressures, DBT provides practical tools to navigate intrusive thoughts and compulsive behaviors [26]. By equipping individuals with strategies to manage emotional responses and restructure maladaptive thought patterns, DBT not only reduces OCD symptoms but also enhances overall psychological well-being and resilience [27]. Liang et al. [28] showed that DBT effectively reduces anxiety, depression, stress, and OCD symptoms, especially during the COVID-19 pandemic, improving mental health outcomes. Ahovan et al. [29] demonstrated DBT's efficacy in significantly reducing OCD symptoms and enhancing cognitive emotion regulation. Little et al. [30] found that radically open DBT reduced OCD traits in chronic anorexia nervosa by addressing perfectionism, promoting flexibility, and enhancing social connectedness, leading to significant symptom remission.

OCD is a debilitating condition that disrupts daily life, relationships and well-being. Women with OCD face unique challenges due to cognitive distortions, emotional vulnerabilities, and sociocultural pressures, leading to heightened distress. Factors like self-doubt, thought fusion, and depression worsen symptoms and limit treatment effectiveness. Despite the severity of these issues, research on targeted interventions remains limited. This study evaluates DBT's effectiveness in reducing self-doubt, mitigating thought fusion, and alleviating depression, aiming to enhance therapeutic outcomes and improve the well-being of women with OCD.

Materials and Methods

The current research design was quasi-experimental with a pre-test-post-test design with a control group. The statistical sample of the research included 51 patients referred to psychological clinics and medical centers in Ardabil City in 2024. To identify women with OCD, the OCD questionnaire (OCDQ) developed by Sanavio [31] was first distributed among 51 women who were experiencing OCD. Then, the women who scored below 100 on the OCDQ were selected as the final sample for the study. Among the participants, 36 women meeting the diagnostic criteria for OCD were selected through convenience sampling. The sample size was determined using G*Power software, version 3.1 [32], resulting in 18 women per group. This calculation was based on previous research considering an effect size of 1.68, statistical power (1−β) of 0.97 and α=0.05 [33]. The research participants were assigned to the experimental (n=18) and control (n=18) groups using a lottery method. Inclusion criteria were personal consent, scoring below 100 on the OCDQ, being aged 18 to 50, and not having musculoskeletal problems. Exclusion criteria included being absent for more than two sessions, incomplete responses to the questionnaire, and exacerbation of OCD problems. It is important to note that this study adhered to all ethical considerations, including obtaining personal consent, preserving personal information and ensuring informed participation, by the ethical principles outlined in the Helsinki Declaration.

Study procedure

After coordinating and obtaining consent from the authorities of psychology and counseling clinics in Ardabil, the researchers visited a psychological clinic. Initially, general information was provided to the women and after obtaining their consent, the participants entered the study. To assess and treat women with OCD, DBT [34] was used. The researcher, with the assistance of a specialist, conducted the DBT in 8 sessions (two 90-minute group sessions per week) at the psychological services clinic. A summary of the content of the DBT sessions is presented in Table 1. The post-test was administered to the experimental group during the final session, while the control group completed the post-test questionnaire the next day.

Measurement tools

OCDQ: The Padova questionnaire was created by Sanavio [31] in Italy, has 60 items and is used to evaluate the severity of OCD symptoms in clinical and nor-

Table 1. Content of DBT sessions [34]

Session	Skill	Session Content
1	Introduction	In the 1st session, after introducing the goals and rules, group members are introduced to the three mental states: Logical, emotional and wise mind, in the mindfulness module. The group is informed that these mental states refer to logical, emotional and wise minds.
2	Mindfulness training	In addition to practicing the mental states from the previous session, this session focuses on teaching the "what" and "how" skills of mindfulness, including observing, describing, and participating. The "how" skills, such as adopting a non-judgmental stance, self-awareness, and acting effectively, are also introduced.
3	Mindfulness training	The "what" and "how" skills are practiced in the group. As these exercises are the core of DBT, they are taught early on.
4	Emotional regulation	This session reviews previous exercises and introduces part of the emotional regulation skills, including defining emotions and their components.
5	Emotional regulation	In this session, another part of the emotional regulation skills is taught, including identifying and labeling emotions, which increases the ability to manage emotions.
6	Emotional regulation	This session continues the review of previous skills and teaches acceptance of emotions, even negative ones, and strategies to reduce vulnerability to negative emotions.
7	Distress tolerance	This session introduces part of the distress tolerance components, focusing on crisis survival strategies, including: 1) Distraction skills and 2) Self-soothing through the five senses.
8	Distress tolerance	In the final session, previous teachings are reviewed, and crisis survival strategies, such as improving moments and the cost-benefit technique in the face of failure or distress, are practiced in the group. Additionally, training on how to generalize skills outside of therapy sessions is emphasized.

mal participants. Each item is given a score between 0 and 4 depending on how disturbed it is, resulting in a total score ranging from 0 to 240, with higher scores indicating greater OCD. A self-report measure called the Padova questionnaire distinguishes between obsessive thoughts' characteristics and practical obsessions' aspects [31]. For the Iranian population, Goodarzi & Firoozabadi [35] first standardized this questionnaire. For convergence validity, the correlation between the total score of the Padova questionnaire with Madsley's OCD questionnaire and Litan's OCD questionnaire was obtained between 0.65 and 0.75. Cronbach's α (0.95) and reliability (0.84) of this questionnaire were confirmed in the Iranian population. Cronbach's α coefficient on this scale was 0.83.

Imposter syndrome scale (ISS): Was utilized to assess self-doubt in this study. This scale was originally developed by Clance and Imes, providing a reliable measure of the feelings of inadequacy and uncertainty often associated with imposter syndrome and self-doubt [36]. The questionnaire comprises 20 items that prompt participants to indicate their level of agreement with each statement on a five-point Likert scale ranging from never=1 to very much=5. If the sum of the scores is <40, it is considered weak hypocrisy, between 41 and 60 is moderate hypocrisy, 61 to 80 is pathological hypocrisy, and 80 and above is considered severe hypocrisy. The conducted studies report high internal consistency with Cronbach's α coefficient of 0.85 to 0.94 for this scale [35]. In Mehrabizadeh Honarmand et al. [37] research to determine reliability, Cronbach's α coefficient was 0.83, Spearman-Brown method; 0.73 Guttman method; 0.73 has been reported. The present study reported Cronbach's α coefficient of 0.84 for this scale.

Thought fusion instrument (TFI): Is a self-report questionnaire consisting of 14 items that assess common beliefs related to the meaning and power of thoughts. It measures three components of thought fusion, with 6 items scored between 0–600, 4 items scored between 0–400, and 4 items scored between 0–400. Responses are rated on a 100-point scale, ranging from "0, I do not believe this at all" to "100, I completely believe this." The total score ranges from 0 to 1400, with higher scores indicating greater levels of thought fusion. Wells et al. [37] reported good internal consistency for this questionnaire, with a Cronbach's α of 0.89. Additionally, the correlation between the total items has been reported to range from 0.35 to 0.78. In Iran,Wellset al. [38] conducted a reliability analysis and reported an internal consistency coefficient (Cronbach's α) of 0.87 for the overall factor. For the TAF, TOF and TEF factors, as well as for split-half reliability, the values were 0.77, 0.82, 0.80 and 0.73, respectively. In the present study, the Cronbach's α coefficient for the total score and the three subscales ranged from 0.81 to 0.90 [39].

Beck depression inventory (BDI): Is a widely used self-report questionnaire designed to measure the severity of depression symptoms in individuals aged 13 and older [40]. The BDI consists of 21 multiple-choice items, each corresponding to a specific symptom of depression. The scoring method of the items ranges from 0 to 3, with total scores ranging from 0 to 63, where higher scores indicate greater levels of depression. Beck et al. [40] reported the validity of this test as 96.0, with internal consistency ranging from 73.0 to 92.0 with a mean of 86.0, and Cronbach's α coefficient for patients and non-patients as 0.86 and 0.81, respectively. In Iranian studies, the reliability of this inventory has also been reported with a Cronbach's α of 0.82 [41]. In the current study, Cronbach's α coefficient of this scale was also obtained at 0.89.

Statistical analyses

Descriptive statistics, including Mean±SD, frequency, and percentage, were calculated. Univariate analytic statistical tests, such as independent t-test, paired t-test, one-way ANOVA and Pearson correlation, were used where applicable. For inferential analysis, Multivariate Analysis of Covariance (MANCOVA) was employed to analyze the scores. The significance level for all statistical tests, including assumption testing, was set at 0.05. All data analysis was performed in SPSS software, version 27.

Results

The Mean±SD of the age of the experimental and control groups were 37.22±4.80 and 38.10±3.94, respectively. Demographic data, as displayed in Table 2, highlights no statistically significant differences between the two groups.

The Mean±SD of pre-test-post-test scores of self-doubt (imposter syndrome), thought fusion, and depression among women with OCD in the experimental and control groups are presented in Table 3. According to Table 3, there was no significant difference in the pre-test score of the two experimental and control groups.

Table 2. Demographic information of study participants in the experimental and control groups

Variables		No. (%)		P
		Experimental	Control	
Duration of OCD (y)	1-3	11(61.1)	10(55.6)	0.068
	>4	7(38.9)	8(44.4)	
Marital status	Married	12(66.7)	11(61.1)	0.079
	Single	6(33.3)	7(38.9)	
Education	Diploma	4(22.2)	4(22.2)	0.053
	Bachelor's	11(61.1)	10(61.1)	
	Masters	3(16.7)	4(22.2)	

Table 3. Descriptive indices of study's variables in control and experimental groups

Variables	Group	Mean±SD		P¥
		Pre-test	Post-test	
OCD	Intervention	109.84±6.5	98.86±7.02	0.001
	Control	109.3±6.47	109.73±6.91	0.705
	P£	0.581	0.001	
Imposter syndrome	Intervention	60.33±2.47	57.05±2.79	0.001
	Control	60.22±2.57	60.44±2.35	0.896
	P£	0.797	0.001	
Thought-action fusion	Intervention	271.55±5.29	265.50±5.95	0.001
	Control	271.22±5.18	271.72±5.25	0.850
	P£	0.829	0.001	
Thought-object fusion	Intervention	246.54±4.7	239.44±6.46	0.001
	Control	246.38±4.7	246.71±4.54	0.916
	P£	0.992	0.001	
Thought-event fusion	Intervention	163.42±4.85	156.5±6.76	0.001
	Control	163.32±4.71	163.61±4.59	0.945
	P£	0.896	0.001	
Depression	Intervention	38.5±1.75	35.11±2.34	0.001
	Control	38.39±1.71	38.54±1.79	0.849
	P£	0.861	0.001	

¥Within-group comparison, £Between-group comparison.

Table 4. Comparison of post-test marginal mean scores between the two groups

Dependent variables	Group	Marginal Mean	95% CI	F	P	η^2
Imposter syndrome	Intervention	57.01	56.25-57.76	43.92	0.001	0.60
	Control	60.49	59.73-61.24			
Thought-action fusion	Intervention	265.31	264.03-266.59	55.51	0.001	0.65
	Control	271.91	270.63-273.18			
Thought-object fusion	Intervention	239.35	237.99-240.7	63.39	0.001	0.68
	Control	246.81	245.46-248.16			
Thought-event fusion	Intervention	156.46	155.1-157.81	58.76	0.001	0.67
	Control	163.65	162.29-165.01			
Depression	Intervention	35.05	34.29-35.81	45.96	0.001	0.61
	Control	38.61	37.85-39.37			

CI: Confidence interval.

The results of the Levin test to examine the homogeneity of variance of dependent variables in groups showed that the variance of self-doubt (F=3.37, P=0.075), thought fusion (F=2.82, P=0.102) and depression (F=3.11, P=0.094) were equal in the groups. The results of the Box test to evaluate the equality of the covariance matrix of dependent variables between the experimental and control groups also showed that the covariance matrix of the dependent variables is equal (Box M=20.96, F=1.17, P=0.284). Also, the results of the chi-square-Bartlett test to examine the sphericity or significance of the relationship between self-doubt (imposter syndrome), thought fusion, and depression showed that the relationship between them is significant (χ^2=209.70, df=14, P<0.05).

The homogeneity of regression coefficients was examined through the interaction of dependent variables and independent variables (intervention method) in the pre-test and post-test. The interaction of these pre-tests and post-tests with the independent variable was not significant and indicated the homogeneity of the regression slope. Therefore, all assumptions of multivariate analysis of covariance were met. Table 4 shows the results of multivariate analysis of covariance for comparison between the two groups. The marginal post-test score adjusted for baseline covariate showed that there was a significant difference between the two groups in terms of self-doubt (F=43.92), thought-action fusion (F=55.51), thought-object fusion (F=63.39), thought-event fusion (F=58.76), and depression (F=46.96) at the level of 0.001.

Discussion

The present study was conducted to evaluate the effectiveness of DBT in addressing key cognitive and emotional challenges, including self-doubt, thought fusion, and depression, among women diagnosed with OCD. By focusing on these interconnected dimensions, the research sought to determine how DBT can contribute to reducing cognitive distortions, alleviating emotional distress, and improving overall psychological functioning in this specific population. DBT demonstrated a significant reduction in self-doubt among women with OCD, effectively targeting cognitive vulnerabilities and fostering greater confidence in their decision-making and self-perception [25]. The reduction in self-doubt observed among women with OCD following DBT underscores the therapy's effectiveness in mitigating core cognitive vulnerabilities that sustain OCD symptoms [23].

Self-doubt, characterized by persistent uncertainty about one's abilities, decisions, and identity, plays a crucial role in the obsessive-compulsive cycle [34]. Women with OCD are particularly susceptible to heightened self-doubt due to societal expectations and internalized perfectionism, which often drive compulsive behaviors aimed at validating their competence or moral integrity [5]. DBT addresses this maladaptive cognitive pattern by integrating mindfulness and cognitive restructuring, enabling individuals to observe their thoughts without excessive judgment or reactivity [29]. This approach helps disrupt cycles of overthinking and self-criticism, allowing indi-

viduals to develop a more balanced and objective self-view [24]. Furthermore, DBT's emphasis on emotional regulation and distress tolerance provides women with essential strategies to navigate anxiety and fear linked to decision-making and perceived imperfections [34]. By equipping participants with the skills to decouple cognitive distortions from emotional responses, DBT fosters greater self-confidence and psychological resilience. Additionally, the interpersonal effectiveness component of DBT reinforces this transformation by promoting assertive communication and boundary-setting, ultimately strengthening self-concept [27]. By addressing self-doubt on both cognitive and emotional levels, DBT not only alleviates immediate distress associated with OCD but also facilitates long-term improvements in self-perception and decision-making, empowering women to engage with life more confidently and flexibly [26].

The application of DBT proved highly effective in diminishing thought fusion, helping participants detach intrusive thoughts from actions or moral judgments, and promoting healthier cognitive processing. The effectiveness of DBT in reducing thought fusion among women with OCD underscores its ability to address the cognitive distortions that exacerbate OCD cycles [23]. Thought fusion—where individuals conflate intrusive thoughts with actions, intentions, or moral judgments—intensifies distress and perpetuates compulsive behaviors [15]. DBT helps participants disrupt this fusion by emphasizing mindfulness practices, which teach them to observe their thoughts as transient mental events rather than reflections of reality or personal morality [25]. This shift allows individuals to weaken the perceived connection between their thoughts and real-world consequences, thereby reducing the emotional charge of intrusive thoughts and preventing their escalation into compulsions [30].

Moreover, DBT's focus on distress tolerance and emotional validation equips participants with the tools to manage the anxiety triggered by intrusive thoughts without resorting to compulsive responses [34]. By validating their emotional experiences while simultaneously learning to sit with discomfort, participants gain the capacity to resist the urge to overanalyze or act on their thoughts [29]. Furthermore, cognitive restructuring techniques within DBT help reframe intrusive thoughts, encouraging participants to challenge and replace irrational beliefs with more adaptive perspectives [24]. This multifaceted approach not only reduces the intensity of thought fusion but also fosters healthier cognitive processing, enabling women to navigate intrusive thoughts with greater psychological flexibility and resilience [28].

DBT resulted in a marked decrease in depressive symptoms, addressing the emotional burden frequently associated with OCD and enhancing overall psychological well-being and resilience. The marked reduction in depressive symptoms observed among women with OCD following DBT highlights its capacity to address the intertwined emotional and cognitive challenges of these conditions [26]. Depression in OCD often arises from feelings of helplessness, guilt, and exhaustion due to the relentless cycle of obsessions and compulsions [20]. DBT's emphasis on emotional regulation equips individuals with practical skills to identify, process, and manage overwhelming emotions, thereby breaking the cycle of emotional suppression and rumination that underpins depressive states [29]. By fostering greater emotional awareness, DBT enables participants to engage more actively with their emotions rather than becoming overwhelmed by them, leading to a reduction in depressive symptoms [34].

Additionally, DBT's interpersonal effectiveness component plays a critical role in combating the isolation and relational strain often associated with depression in women with OCD [28]. Through improved communication and boundary-setting skills, participants are empowered to rebuild and strengthen their support networks, enhancing their sense of connection and social belonging. This, in turn, mitigates feelings of loneliness and fosters a more positive self-concept [19]. Moreover, DBT's structured focus on distress tolerance teaches participants how to navigate emotional crises without resorting to avoidance or maladaptive coping strategies, promoting resilience in the face of life's challenges [29]. These combined elements make DBT particularly effective in reducing depressive symptoms, improving psychological well-being and enhancing the overall quality of life for women grappling with OCD and its emotional burden [25].

Comparing DBT with other established therapeutic approaches for OCD, such as cognitive behavioral therapy (CBT), exposure and response prevention (ERP) and compassion-focused therapy (CFT), is essential. While CBT is widely known for targeting cognitive distortions and compulsive behaviors, DBT differentiates itself by focusing on emotion regulation and distress tolerance, which are particularly beneficial in managing the intense emotional reactivity often associated with OCD. ERP, as another prominent treatment for OCD, primarily works by exposing individuals to feared stimuli and preventing compulsive behaviors, whereas DBT addresses the underlying cognitive and emotional factors, like self-doubt and thought fusion, that drive the compulsions. CFT, which focuses on developing self-compassion to combat

negative self-evaluations, aligns with DBT's emphasis on improving self-perception and fostering emotional resilience. The comparison highlights DBT's comprehensive approach in treating OCD by addressing both the cognitive distortions and emotional challenges, which sets it apart from the more targeted approaches of CBT, ERP, and CFT [25, 30].

This study has several limitations. First, it focused solely on women with OCD in Ardabil, limiting the generalizability of the findings. The lack of a follow-up period also prevents evaluating the long-term effects of the intervention. Additionally, the study did not compare DBT with other established treatments for OCD, which could provide useful insights. The reliance on self-report instruments, like the OCDQ, may introduce bias, and the small sample size restricts statistical power. Future research should include a more diverse sample, incorporate follow-up periods, compare DBT with other treatments, use both objective and self-report measures, and expand the sample size to improve generalizability and validity.

Conclusion

DBT has demonstrated significant efficacy in addressing the interconnected cognitive and emotional challenges of self-doubt, thought fusion, and depression in women with OCD. By targeting the underlying mechanisms that sustain these vulnerabilities, DBT fosters a holistic transformation in psychological functioning. Its focus on mindfulness disrupts the cognitive distortions fueling self-doubt and thought fusion, enabling participants to detach from intrusive thoughts and build healthier perceptions of self and reality. Simultaneously, emotional regulation and distress tolerance empower individuals to manage the intense emotional burden associated with OCD and depression, fostering resilience and adaptive coping. By integrating these dimensions, DBT not only alleviates immediate symptoms but also promotes long-term psychological growth, offering a comprehensive framework for improving the well-being of women with OCD. This underscores the potential of DBT as a tailored intervention to address the multifaceted needs of this population and highlights the importance of continued research into gender-specific therapeutic strategies.

Ethical Considerations

Compliance with ethical guidelines

The current study was approved by the Ethics Committee of Tarbiat Modares University, Tehran, Iran (Code: IR.MODARES.REC.1402.001).

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Authors' contributions

Conceptualization: Giti Nozari Kohneh Shahri and Farzin Bagheri Sheykhangafshe; Methodology and Investigation: Giti Nozari Kohneh Shahri, Farzin Bagheri Sheykhangafshe, and Vahid Savabi Niri; Data collection and writing the original draft: Giti Nozari Kohneh Shahri and Atefeh Mahdavi Mehr, Formal analysis: Giti Nozari Kohneh Shahri, Hojjatollah Farahani and Atefeh Mahdavi Mehr; Software, validation and investigation: Atefeh Mahdavi Mehr; Supervision: Vahid Savabi Niri; Resources: Farzin Bagheri Sheykhangafshe; Validation, project administration and funding acquisition: Hojjatollah Farahani; Review and editing: All authors.

Conflict of interest

The authors declared no conflict of interest.

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