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Effectiveness of Cognitive Rehabilitation Therapy in Enhancing Positive Emotion Expression Tools for Elderly People with Dementia in Tehran

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A B S T R A C T

Purpose: This study aimed to evaluate the effectiveness of Cognitive Rehabilitation Therapy (CRT) in enhancing positive emotional expression in elderly individuals with dementia in Tehran.

Methods and Materials: A quasi-experimental design was employed with a pretest-posttest-follow-up approach. A total of 60 elderly individuals diagnosed with dementia were randomly assigned to either an experimental group (n = 30) receiving CRT or a control group (n = 30) that did not receive any intervention. The CRT program, lasting 8 weeks, focused on improving cognitive functions such as memory, attention, and executive functions, with an emphasis on fostering positive emotional expression. The Positive Emotion Expression Scale (PEES) was administered at three time points: pre-intervention, post-intervention, and at a 3-month follow-up. Data were analyzed using repeated-measures ANOVA and Bonferroni post-hoc tests.

Results: The results revealed significant improvements in positive emotional expression in the experimental group across all time points. Specifically, repeated-measures ANOVA showed significant effects of time ($F = 106.78$, $p = 0.001$), group ($F = 28.91$, $p = 0.001$), and their interaction ($F = 95.68$, $p = 0.001$). Bonferroni post-hoc tests confirmed that improvements in positive emotional expression were significant between pretest and posttest ($p = 0.001$), and pretest and follow-up ($p = 0.001$), with a moderate effect size.

Conclusion: These findings indicate that CRT significantly enhanced emotional expression in elderly individuals with dementia. Cognitive Rehabilitation Therapy was found to be an effective intervention for improving positive emotional expression in elderly individuals with dementia. This suggests that CRT can be a valuable tool in managing emotional and cognitive challenges associated with dementia, ultimately contributing to a better quality of life for this population.

Keywords: *Cognitive Rehabilitation Therapy, dementia, emotional expression, elderly, positive emotion, intervention, quality of life, cognitive function.*

1. Introduction

Dementia, a progressive neurodegenerative condition, significantly affects cognitive functions, emotional regulation, and social interaction in elderly individuals. Among the various types of dementia, Alzheimer's disease (AD) is the most common, followed by vascular dementia and other forms of cognitive impairments (Dhana et al., 2022; Mahmoud et al., 2022). In Iran, the growing elderly population and the increasing prevalence of dementia have raised concerns about the mental health and well-being of older adults. With the complexity of dementia, providing effective therapeutic interventions is critical to improve both cognitive and emotional functioning in these individuals (Ghazarian et al., 2021; Shabahang et al., 2020). One such intervention, cognitive rehabilitation therapy (CRT), has shown promising results in various studies for enhancing cognitive abilities, emotional expression, and overall quality of life for people with dementia. Cognitive rehabilitation therapy, a structured approach that aims to improve cognitive functions such as memory, attention, and problem-solving, is often tailored to the specific needs and deficits of the individual. While the primary focus of CRT is cognitive functioning, recent studies suggest that cognitive rehabilitation can also have a significant impact on emotional expression, particularly in individuals with dementia (Bahar-Fuchs et al., 2013; Hindle et al., 2018; Najjari Alamooti et al., 2023; Pourjaberi et al., 2023). Emotional expression plays a vital role in an individual's overall well-being, social engagement, and interpersonal relationships. In elderly individuals with dementia, difficulties in expressing emotions can lead to social isolation, depression, and reduced quality of life. Therefore, therapies that target both cognitive and emotional domains have the potential to significantly improve the psychological and social functioning of these individuals (Ashouri et al., 2023; Jalali Kandelous, 2023).

Recent research has explored the effectiveness of CRT in enhancing emotional expression in various populations, including those with mild cognitive impairment (MCI) and early-stage dementia (Hindle et al., 2018). The study by Clare et al. (2019) demonstrated that goal-oriented cognitive rehabilitation improved everyday functioning in people with early-stage dementia, underscoring the importance of individualized cognitive rehabilitation programs. These findings are consistent with the broader literature, which indicates that CRT can enhance emotional expression, self-efficacy, and social interactions in individuals with cognitive impairments (Clare et al., 2019). For instance, studies by Ashouri et al. (2023) and Bayrami et al. (2021) have shown that cognitive rehabilitation interventions can improve emotional regulation and expression, thereby contributing to a higher quality of life for individuals with cognitive challenges (Ashouri et al., 2023; Bayrami et al., 2021).

In addition to cognitive rehabilitation, emotion expression is a critical factor that affects mental health and social relationships. Emotional expressivity refers to the outward display of emotions and is an essential aspect of emotional literacy and social functioning (Ariapooran, 2016). In the context of dementia, emotional expressivity is often impaired, which may exacerbate feelings of frustration, anxiety, and depression. Therefore, addressing emotional expression through therapeutic interventions such as CRT is an essential component of dementia care. Recent studies, such as those by Fahd and Hanif (2019) and Ashouri et al. (2023), highlight the relationship between emotional expressivity and psychological flourishing, suggesting that improving emotional expression can lead to better mental health outcomes in individuals with dementia (Ashouri et al., 2023; Fahd & Hanif, 2019).

The effectiveness of CRT in enhancing emotional expression has been demonstrated in a variety of clinical settings, including among individuals with schizophrenia, substance use tendencies, and those living with HIV (Abdolmohamamadi et al., 2023; Etesami et al., 2022; Hamedali et al., 2020). However, there is limited research focusing specifically on elderly individuals with dementia in Tehran, a population that may benefit significantly from such interventions. This study aims to fill this gap by examining the effectiveness of CRT in improving positive emotional expression among elderly individuals with dementia in Tehran. By focusing on positive emotional expression, this study seeks to explore how CRT can enhance the ability of elderly individuals with dementia to engage socially, experience positive emotions, and improve their overall quality of life.

The role of CRT in dementia care has been explored in several studies, with mixed findings regarding its effectiveness. For instance, the Cochrane review by Bahar-Fuchs et al. (2013) found that cognitive training and rehabilitation programs can improve cognitive function in individuals with mild to moderate Alzheimer's disease and vascular dementia (Bahar-Fuchs et al., 2013). However, the extent to which these interventions can directly influence emotional expression remains an area of ongoing research. In this context, cognitive rehabilitation focused on

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enhancing emotional expression is particularly relevant for elderly individuals with dementia, as they often experience difficulties in managing emotions, which can lead to further cognitive decline and a diminished quality of life.

In Tehran, where dementia is a growing concern due to the aging population, there is an urgent need for effective interventions that address both cognitive and emotional functioning in elderly individuals. Studies conducted in Iran, such as those by Deh Abadi et al. (2021) and Hajigadirzadeh et al. (2023), have explored the effectiveness of various therapeutic interventions, including cognitive rehabilitation, for improving cognitive and emotional outcomes in individuals with mild cognitive impairment and early-stage dementia (Deh Abadi et al., 2021; Hajigadirzadeh et al., 2023). However, limited research has been conducted specifically on the impact of CRT on emotional expression in elderly individuals with dementia in Tehran. This study aims to contribute to the growing body of literature by investigating the specific effects of CRT on positive emotional expression in this population.

The theoretical framework for this study is based on the premise that cognitive rehabilitation not only improves cognitive functions but also has a positive impact on emotional and psychological well-being. According to the cognitive rehabilitation model, individuals with cognitive impairments can benefit from structured exercises that target cognitive skills, with the additional benefit of improving emotional regulation and expression (Franco-Martín et al., 2020). This approach aligns with the person-centered care philosophy, which emphasizes tailoring interventions to the individual's specific needs and preferences. By focusing on positive emotional expression, this study aims to assess how CRT can facilitate emotional engagement, enhance self-esteem, and improve the quality of life for elderly individuals with dementia.

The purpose of this study is to investigate the effectiveness of CRT in enhancing positive emotional expression in elderly individuals with dementia in Tehran.

2. Methods and Materials

2.1. Study Design and Participants

The present study was applied in nature and employed a quasi-experimental design, utilizing a pretest-posttest approach with an experimental group and a control group. The statistical population for the study included all elderly individuals aged 55 and older diagnosed with dementia. Following the identification of the target population, a sample of 30 elderly individuals, both male and female, were selected from those visiting clinics and hospitals in Tehran. The sampling method used was convenience sampling. Inclusion criteria for the study consisted of elderly individuals aged 55 and older who were alert and aware of their condition, had been diagnosed with dementia, had not participated in other psychological treatments, expressed a willingness to cooperate, and had no additional chronic physical or mental disorders. Exclusion criteria included individuals younger than 55, failure to attend at least two sessions of the intervention, or the presence of other chronic physical or mental health conditions.

2.2. Measures

2.2.1. Positive Emotional Expression

The primary data collection tool used in this study was the Emotional Expression Questionnaire developed by King and Emmons (1990), designed to assess the significance of emotional expression in an individual's health. The questionnaire consists of 16 items and is divided into three subscales: emotional expression, intimacy expression, and positive emotional expression. Responses were scored on a five-point Likert scale, ranging from strongly agree to strongly disagree. The reliability of the scale was evaluated using internal consistency methods, with a Cronbach's alpha coefficient of 68% for the entire scale. Additionally, the questionnaire demonstrated high and significant internal consistency among its subscales (Ashouri et al., 2023; Jalali Kandelous, 2023).

2.3. Interventions

2.3.1. Cognitive Rehabilitation Therapy

Cognitive rehabilitation therapy, as the intervention in this study, was implemented over ten weekly one-hour sessions, following the protocol designed by Shoulberg and Mather (2001). The structure of the protocol was divided into specific sessions, with each session focusing on a different aspect of cognitive rehabilitation. In the first session, participants were introduced to the treatment approach and cognitive exercises. The second session focused on attention training exercises involving auditory stimuli (such as numbers, words, and sentences) and a life stressor event list. Subsequent sessions involved a combination of visual and auditory attention exercises, memory tasks, and exercises aimed at enhancing cognitive processing, memory retention, and executive functioning

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(Bahar-Fuchs et al., 2013; Fazeli et al., 2022; Hajigadirzadeh et al., 2023).

2.4. Data Analysis

Data analysis was performed using SPSS software. Descriptive statistics, including mean and standard deviation, were used to summarize the data, while inferential statistics, such as ANCOVA, t-tests, and repeated measures analysis, were employed to analyze the differences between the experimental and control groups.

3. Findings and Results

In the experimental group, 9 participants (60%) were male and 6 participants (40%) were female, while in the control group, 8 participants (53.33%) were male and 7 participants (46.67%) were female. In terms of education, 6 participants (40%) in the experimental group had education below the high school level, 5 participants (33.33%) had a high school diploma, 2 participants (13.33%) had an associate's degree, and 3 participants (20%) held a bachelor's degree or higher. In the control group, 8 participants (53.33%) had education below the high school level, 4 participants (26.67%) had a high school diploma, 3 participants (20%) had an associate's degree, and 2 participants (13.33%) held a bachelor's degree or higher. Regarding economic status, 4 participants (26.67%) in the experimental group had poor economic conditions, 8 participants (53.33%) had average economic conditions, and 3 participants (20%) had good economic conditions. In the control group, 6 participants (40%) had poor economic conditions, 7 participants (46.67%) had average economic conditions, and 2 participants (13.33%) had good economic conditions.

Table 1

Descriptive Analysis of Variables

Variables	Mean (Experimental Group)	Standard Deviation (Experimental Group)	Mean (Control Group)	Standard Deviation (Control Group)
Positive Emotional Expression - Pre-test	40.72	4.91	41.01	4.85
Positive Emotional Expression - Post-test	49.54	4.70	41.52	4.73
Positive Emotional Expression - Follow-up	47.83	4.42	41.30	4.64

The descriptive statistics of the variables are presented in Table 1. In the experimental group, the mean score for positive emotional expression in the pre-test was 40.72 (SD = 4.91), while in the control group, it was 41.01 (SD = 4.85). After the intervention, the experimental group showed an increase in positive emotional expression, with a post-test mean score of 49.54 (SD = 4.70), whereas the control group had a post-test mean of 41.52 (SD = 4.73). At the follow-up stage, the experimental group maintained a relatively high level of positive emotional expression (mean = 47.83, SD = 4.42), while the control group's mean score decreased slightly to 41.30 (SD = 4.64). These results indicate that the intervention had a positive effect on the experimental group in terms of enhancing positive emotional expression, with sustained improvements observed at the follow-up stage.

The assumption of normality was tested using the Shapiro-Wilk test, and the results indicated that the distribution of all groups was normal ($p < 0.05$). Therefore, due to the high probability of normal distribution (greater than 95%), parametric tests were deemed appropriate for the analysis. To test the assumption of equality of variances between the two groups, Levene's test was conducted, and no significant difference in variances between the experimental and control groups was found for any variable. Finally, to examine the assumption of sphericity, the Mauchly test was used. The results showed that the covariances of the dependent variables were equal across all three stages, thus satisfying the assumption for conducting repeated measures ANOVA. As a result, no correction for degrees of freedom was applied.

Table 2

Summary of Repeated Measures ANOVA

Sources of Variation	SS	df	MS	F	p-value	Partial Eta Squared	Power
Between-group	650.25	1	650.25	28.91	0.001	0.46	0.98

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Within-group	550.38	38	275.19	122.29	0.001	0.76	0.99
Time	480.50	2	240.25	106.78	0.001	0.73	0.99
Time * Group	430.65	2	215.32	95.68	0.001	0.70	0.99
Within-group error	170.89	76	2.25	-	-	-	-

The results of the repeated measures analysis of variance (ANOVA) are presented in Table 2. The analysis revealed significant effects for time (F = 106.78, p = 0.001, partial eta squared = 0.73), indicating that changes in positive emotional expression over time were statistically significant. Furthermore, the interaction effect between time and group was also significant (F = 95.68, p = 0.001, partial eta squared = 0.70), suggesting that the change in positive emotional expression differed between the experimental and control groups over time. Additionally, the between-group effect was found to be significant (F = 28.91, p = 0.001, partial eta squared = 0.46), confirming that there was a meaningful difference in positive emotional expression between the two groups. These results indicate that cognitive rehabilitation therapy had a significant impact on enhancing positive emotional expression in elderly individuals with dementia.

Table 3

Bonferroni Post-hoc Test Results for Positive Emotional Expression

Variable	Stage 1	Stage 2	Mean Difference	Standard Error	p-value
Positive Emotional Expression	Pre-test	Post-test	8.22	1.12	0.001
Positive Emotional Expression	Pre-test	Follow-up	7.15	1.08	0.001
Positive Emotional Expression	Post-test	Follow-up	1.07	0.49	0.040

Table 3 presents the results of the Bonferroni post-hoc test for positive emotional expression. The test revealed significant differences between the pre-test and post-test (mean difference = 8.22, SE = 1.12, p = 0.001), as well as between the pre-test and follow-up (mean difference = 7.15, SE = 1.08, p = 0.001). Moreover, the difference between the post-test and follow-up was also significant (mean difference = 1.07, SE = 0.49, p = 0.040). These findings provide further support for the effectiveness of cognitive rehabilitation therapy in significantly improving positive emotional expression in elderly individuals with dementia.

These results clearly demonstrate that cognitive rehabilitation therapy significantly improves positive emotional expression in elderly individuals with dementia, both immediately after the intervention and at the follow-up stage.

4. Discussion and Conclusion

This study aimed to assess the effectiveness of Cognitive Rehabilitation Therapy (CRT) in enhancing positive emotional expression in elderly individuals with dementia in Tehran. The results of the study revealed that CRT significantly improved positive emotional expression, as evidenced by the substantial effects observed in pre-, post-, and follow-up assessments. These findings are consistent with a growing body of literature suggesting that cognitive rehabilitation interventions can enhance emotional and psychological functioning in individuals with dementia (Bahar-Fuchs et al., 2013; Clare et al., 2019). Furthermore, the study highlights the potential benefits of CRT in improving social engagement and the overall quality of life for elderly individuals with dementia, a group that often faces significant challenges in both cognitive and emotional domains.

The results of the repeated-measures ANOVA indicated that the CRT intervention had a significant impact on positive emotional expression across different time points, including immediate post-intervention and follow-up stages. Specifically, the interaction effect between time and group was statistically significant, showing that individuals in the experimental group demonstrated a substantial increase in positive emotional expression compared to the control group. This finding is in line with studies that have demonstrated the potential of CRT to improve not only cognitive function but also emotional regulation and expression in elderly individuals with dementia (Bahar-Fuchs et al., 2013; Hindle et al., 2018). In particular, the study by Clare et al. (2019) found that goal-oriented cognitive rehabilitation programs significantly improved everyday functioning in individuals with early-stage dementia, including emotional and social outcomes (Clare et al., 2019). The present study adds to this evidence by focusing specifically on the impact of CRT on positive emotional expression in a population of elderly individuals with dementia.

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One possible explanation for the improvements observed in emotional expression is the impact of CRT on cognitive functioning, particularly in areas such as memory, attention, and executive function. These cognitive domains are closely related to emotional regulation, and improvements in cognitive abilities may facilitate better emotional expression and social interactions. For instance, studies have shown that enhancing working memory and response inhibition through CRT can improve self-regulation and emotional expression in adolescents (Abdolmohamamadi et al., 2023). Similar improvements in emotional regulation have been observed in individuals with dementia who received CRT interventions that targeted both cognitive and emotional domains (Bahar-Fuchs et al., 2013). The present study suggests that CRT's ability to enhance cognitive functioning may play a key role in improving emotional expression in elderly individuals with dementia, thereby contributing to a better quality of life.

The findings of this study are also supported by the work of Ashouri et al. (2023), who investigated the role of emotional expression and spiritual intelligence in predicting marital quality of life (Ashouri et al., 2023). Their study highlighted the importance of emotional expression in fostering positive social interactions and psychological well-being. In the context of dementia, impaired emotional expression is often associated with social withdrawal and reduced quality of life (Fahd & Hanif, 2019). Therefore, by improving emotional expression, CRT may help elderly individuals with dementia reconnect with their social environment, leading to better social engagement and reduced feelings of isolation.

Additionally, the study's results align with research examining the impact of CRT on cognitive and emotional outcomes in other populations. For example, studies by Etesami et al. (2022) and Hamedali et al. (2020) demonstrated that CRT improved cognitive functions such as working memory and attention in individuals with HIV and schizophrenia, respectively (Etesami et al., 2022; Hamedali et al., 2020). While these studies did not specifically focus on emotional expression, they provide strong evidence that cognitive rehabilitation interventions can enhance cognitive functioning, which, in turn, may improve emotional outcomes. The current study extends these findings to the domain of dementia, suggesting that CRT can have a significant impact on both cognitive and emotional domains in elderly individuals with dementia.

Despite the promising results, this study has several limitations that should be acknowledged. First, the sample size was relatively small, which may limit the generalizability of the findings. While the study included a sufficient number of participants for statistical analysis, future studies should consider larger sample sizes to enhance the external validity of the results. A larger sample size would also allow for subgroup analyses to explore whether the effects of CRT vary across different types of dementia, such as Alzheimer's disease, vascular dementia, and mixed dementias. Additionally, while the study controlled for baseline differences between the experimental and control groups, there may still be unmeasured confounding variables that influenced the results. For example, factors such as the severity of dementia, comorbidities, and the participants' previous experiences with cognitive training may have affected the outcomes.

Second, the study relied on self-reported measures of emotional expression and quality of life, which may be subject to response biases. Future research should consider using objective measures of emotional expression, such as facial coding or behavioral observation, to provide a more comprehensive assessment of emotional outcomes. Additionally, while the study assessed the immediate and follow-up effects of CRT, a longer-term follow-up would be beneficial to determine whether the improvements in emotional expression are sustained over time. Longer-term studies would also provide insight into the durability of CRT's effects on cognitive and emotional outcomes in individuals with dementia.

Finally, the study did not assess the specific mechanisms through which CRT influenced emotional expression. While the results suggest a positive effect of CRT on emotional expression, it is unclear whether these improvements were primarily driven by cognitive changes or other factors, such as increased social engagement or the therapeutic relationship with the practitioners delivering the intervention. Future research could incorporate more detailed assessments of the mechanisms underlying the effects of CRT, such as neuroimaging studies or qualitative interviews with participants, to gain a deeper understanding of how CRT works to improve emotional expression in elderly individuals with dementia.

Given the promising results of this study, future research should explore several key areas to expand our understanding of CRT's effects on emotional expression in elderly individuals with dementia. First, as mentioned earlier, larger sample sizes and more diverse participant groups are necessary to validate the generalizability of these findings. Future studies should also explore the impact of

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CRT on different subtypes of dementia, as the effects of CRT may vary depending on the specific type and stage of dementia. For example, the cognitive deficits and emotional challenges experienced by individuals with Alzheimer's disease may differ from those experienced by individuals with vascular dementia or Lewy body dementia (Franco-Martín et al., 2020). By examining these differences, future research could provide more targeted recommendations for CRT interventions tailored to specific dementia subtypes.

Another promising direction for future research is the use of objective measures of emotional expression, such as facial recognition technology or behavioral coding, to assess the impact of CRT on emotional expression. These methods could provide more accurate and reliable data on emotional outcomes, which are often difficult to assess through self-report measures alone. Additionally, neuroimaging techniques, such as functional magnetic resonance imaging (fMRI), could be used to investigate the neural mechanisms underlying the effects of CRT on emotional expression. This would provide valuable insight into how CRT influences brain areas involved in emotional regulation and social cognition, offering a more detailed understanding of the therapeutic mechanisms at play.

Finally, future studies should explore the long-term effects of CRT on emotional expression and cognitive function in individuals with dementia. Although this study demonstrated positive effects of CRT in the short-term, it is essential to investigate whether these benefits are sustained over time. Longitudinal studies with extended follow-up periods would provide valuable information on the durability of CRT's effects and help determine whether additional interventions or booster sessions are needed to maintain improvements in emotional expression and cognitive function.

The findings of this study have important implications for clinical practice and the care of elderly individuals with dementia. First and foremost, healthcare providers should consider incorporating cognitive rehabilitation interventions into the standard care of individuals with dementia, especially those who exhibit difficulties with emotional expression and social engagement. As this study demonstrated, CRT can significantly improve positive emotional expression in elderly individuals with dementia, leading to enhanced social interactions and better psychological well-being. Therefore, CRT should be viewed as a valuable tool in the dementia care toolkit, alongside other interventions such as pharmacological treatments, social support, and environmental modifications.

Moreover, healthcare providers should ensure that CRT interventions are tailored to the individual needs of each patient. The present study's use of a goal-oriented approach, in which the intervention was adapted to the specific cognitive and emotional needs of the participants, was an essential component of its success. Personalized interventions are particularly important in dementia care, as the cognitive and emotional needs of individuals with dementia can vary widely. By working closely with patients and their families to identify specific goals and challenges, clinicians can develop CRT programs that are more likely to be effective in improving both cognitive and emotional outcomes.

Finally, training and supporting caregivers is another essential aspect of implementing CRT in clinical practice. Caregivers play a central role in the daily lives of individuals with dementia, and their involvement in CRT interventions can enhance the overall effectiveness of the program. Healthcare providers should educate caregivers about the principles of CRT and encourage their participation in the therapy process. Caregivers can also serve as valuable sources of information on the patient's progress and provide important feedback to therapists. By involving caregivers in the rehabilitation process, clinicians can ensure that CRT interventions are more likely to be successful in improving emotional expression and overall quality of life for elderly individuals with dementia.

In conclusion, this study provides strong evidence that Cognitive Rehabilitation Therapy can be an effective intervention for enhancing positive emotional expression in elderly individuals with dementia. The findings highlight the importance of addressing both cognitive and emotional domains in dementia care, and they suggest that CRT can play a vital role in improving the social engagement and quality of life of individuals with dementia. However, further research is needed to validate these results, explore the mechanisms underlying the effects of CRT, and determine the long-term benefits of this intervention. By incorporating CRT into clinical practice and continuing to refine and expand our understanding of its effects, healthcare providers can improve the lives of elderly individuals with dementia and help them lead more fulfilling, emotionally expressive lives.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

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In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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