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ORIGINAL ARTICLE

The Effect of Mindfulness Training Based on Two-Dimensional Virtual Reality on Improving the Mental Health of Adults

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ABSTRACT

The purpose of this research was to investigate the effect of mindfulness training based on two-dimensional virtual reality on improving the mental health of adults. The present research method was a semi-experimental type with a follow-up design with a control group. Using a convenient sampling method, 30 adults with the age range of 20 to 40 years were selected from Rafsanjan city, and after obtaining consent and checking the inclusion criteria, they were placed in the experimental and control groups and randomly divided into two experimental groups (15 people) and the control group (15 people) were divided. First, a pre-test was administered to each group, and then the mindfulness training protocol(Torres, 2018, according to Azarnia et al., 1401) for adults was used for the experimental group during 8 90-minute sessions. While the control group did not receive any intervention. Finally, after completing the research, both groups did a follow-up and post-test. The instrument used included the General Mental Health Scale (GHQ-28) by Goldberg and Hillier(1979). Data analysis was also performed using repeated measures analysis of variance with between-group factors. The results showed that mindfulness training based on two- dimensional virtual reality is effective in improving the mental health of adults. It also showed that in the experimental group, there was a significant difference in mental health between the pre-test and the post-test, between the pre-test and the follow-up test, and between the post-test and the follow-up test, and mental health improved in the follow-up stage compared to the post-test. In general, according to the results obtained from this research, it was found that mindfulness training with virtual reality can be considered an effective intervention to improve the mental health of adults.

KEYWORDS

Mindfulness Training Based on Two-Dimensional Virtual Reality, Mental Health, Adults.

Introduction

Virtual reality (VR), introduced less than two decades ago, has become an effective tool in the health sector, particularly in mental health. By combining computer graphics, image processing, artificial intelligence, and sensory feedback (visual, auditory, and tactile), VR creates a simulated environment that gives users a sense of presence in a real-world setting. Key features of VR include high flexibility, safety, and visual appeal. In psychotherapy, VR engages patients with images, sounds, and physical movements, fostering a "sense of presence in the moment" that facilitates emotional experiences (such as anxiety) and therapeutic techniques like exposure therapy. Unlike traditional gradual desensitization methods (verbal/imaginative), the VR approach places individuals in a situation closely resembling reality. Domestic research (Ali Akbari et al., 2017) has shown that VR significantly reduces stress, anxiety, and depression in cancer patients. Additionally, VR-based mindfulness offers an interactive and engaging environment that enhances focus on the present moment, reduces mental judgments, and increases adherence to mindfulness practices. Given the prevalence of psychological disorders and their impact on treatment outcomes, the use of this technology is recommended for cancer patients.

Method

This semi-experimental study employed a pretest-posttest follow-up design with a control group and was conducted in 2024. The statistical population consisted of adults aged 20 to 40 years in Rafsanjan, Iran. A total of 30 individuals referred to three clinics who had been diagnosed with low mental health levels were selected through convenience and voluntary sampling. After assessing inclusion and exclusion criteria, participants were randomly assigned to either an experimental group (n=15) or a control group (n=15). The experimental group received eight 90-minute sessions of mindfulness training based on two-dimensional virtual reality using the Psious platform, while the control group received no intervention. Data were collected using the General Health Questionnaire (GHQ-28) at three time points (pretest, posttest, and one-month follow-up) and analyzed using repeated-measures ANOVA. The reliability of the instrument was confirmed with a Cronbach's alpha coefficient of 0.95.

Results

The results of repeated-measures ANOVA revealed a significant interaction effect between time of measurement and group (two-dimensional virtual reality-based mindfulness intervention): $F(2, 27) = 29.8$, $P = 0.000$), indicating a significant difference between the two groups in at least one of the measurement phases.

In the experimental group:

- A significant decrease in GHQ-28 scores (indicating improvement in mental health) was observed from pretest to posttest ($T(14) = 7.67$, $P = 0.000$).
- A significant decrease was also maintained from pretest to follow-up ($T(14) = 7.48$, $P = 0.000$), indicating sustained improvement.
- No significant difference was found between posttest and follow-up ($T(14) = 2.01$, $P = 0.063$), demonstrating the stability of the treatment effect.

In the control group:

- No significant difference was observed between pretest and posttest ($T(14) = -1.78$, $P = 0.096$).
- A significant increase in GHQ-28 scores (indicating deterioration in mental health) was found from pretest to follow-up ($T(14) = -2.32$, $P = 0.036$).
- No significant difference was observed between posttest and follow-up ($T(14) = -1.46$, $P = 0.160$).

Discussion and conclusion

The present study aimed to investigate the effectiveness of two-dimensional virtual reality-based mindfulness training on the mental health of adults aged 20 to 40 years. The findings demonstrated that the intervention significantly improved mental health in the experimental group, and this improvement was sustained at the one-month follow-up. These results are consistent with previous research (Ali Akbari et al., 2017; Barnes, 2016) and confirm that virtual reality technology, by providing an immersive, interactive, and multisensory environment, can make mindfulness exercises more engaging and effective for users, enhancing the sense of "being in the moment," a prerequisite for experiencing therapeutic emotions and reducing psychological symptoms.

The results of the control group are also noteworthy. Although no significant difference was observed between pretest and posttest, a significant increase in GHQ-28 scores (indicating deterioration in mental health) from pretest to follow-up in this group reflects a declining trend in mental health among the non-intervention population. This finding highlights the urgent need for psychological interventions in the studied community and underscores the importance of preventive and therapeutic measures. The stability of the treatment effect in the experimental group (no significant difference between posttest and follow-up) is a strength of this study, suggesting that the positive effects were not merely temporary and that participants were able to apply the learned skills in their daily lives.

Nevertheless, this study had certain limitations, including a relatively small sample size (n=30), the use of convenience sampling (which limits generalizability), a lack of strict control over confounding variables such as socioeconomic status and education level, and the use of self-report measures, which may be subject to response bias. Furthermore, the follow-up period was limited to one month, and longer-term follow-ups are needed to assess the durability of treatment effects.

In conclusion, two-dimensional virtual reality-based mindfulness training appears to be an effective, safe, and sustainable intervention for improving mental health in adults. It can serve as a complementary or alternative approach alongside traditional therapies, particularly for individuals who, for various reasons (such as geographical limitations, cost, or social stigma), lack access to in-person treatment. Given the growing prevalence of psychological disorders in modern societies and their detrimental impact on quality of life, it is recommended that this technology be integrated into counseling centers, psychological clinics, and the broader healthcare system. Further research with larger sample sizes, active control groups, extended follow-up periods, and diverse populations (e.g., patients with specific disorders or other age groups) is recommended to confirm and generalize these findings.

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Authors' Contribution

The sole author was responsible for the study's conceptualization, methodology, data collection, analysis, writing, and final approval of the manuscript.

Conflict of Interest

The author declares no conflict of interest regarding the publication of this article.

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Reference

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