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The Effect of a Video-Based Orientation Intervention and Feature Importance Analysis Using Support Vector Regression

Method

Study Design

This study was designed as a randomized controlled experimental study to evaluate the effect of a video-based orientation training on stress and stigma levels among caregivers of psychiatric patients. Participants were randomly assigned to either the intervention group (receiving video training) or the control group (receiving routine care).

Research Questions and Hypotheses

This study aimed to address the following research questions:

- Is video-based orientation training effective in reducing perceived stress levels among caregivers of psychiatric patients?
- Is the intervention effective in reducing stigmatizing attitudes and beliefs toward psychiatric disorders?
- What are the most important variables that determine perceived stress and stigma levels?

Accordingly, the following hypotheses were tested:

- H1: Video-supported orientation training reduces the perceived stress level of caregivers of psychiatric patients.
- H2: Video-supported orientation training reduces stigmatizing attitudes and beliefs toward psychiatric disorders.
- H3: Perceived stress and stigma levels are influenced by various factors such as the caregiver's demographic characteristics, psychiatric diagnoses, and the caregiving relationship.

Place and Time of the Study

The study will be conducted between July 15 and September 30, 2025, in the closed psychiatric ward of a university hospital located in northeastern Türkiye. The psychiatric unit is a mixed-gender service with a capacity of 16 beds, structured to provide evaluation, treatment, and follow-up for patients with severe psychiatric symptoms. The unit is designed to support both acute intervention and stabilization, ensuring adequate safety and observation. It also organizes educational and social activities to enhance patients' insight, social skills, and adaptation to society. Psychosocial skills training is primarily provided by nurses in collaboration with occupational therapists.

Study Population and Sample

The study population consisted of relatives of patients admitted to the psychiatric unit between July and September 2023 (n=60). Sample size was determined using power analysis with the G*Power 3.1.9.7 software. Based on the perceived stress scale (PSS) mean scores reported in Zimmerman et al. (2023), the sample was calculated with a 5% type I error, 95% power, and an effect size of 0.924. Statistical analysis indicated that the study should include at least 56 participants (28 in each group). To account for potential data loss, 10% more participants were recruited, resulting in a total of 60 participants (30 in each group). Inclusion criteria: first-degree relatives (parent, spouse, or child) of admitted patients, aged 18 or older, willing to participate, and having sufficient reading, writing, and verbal communication skills. Exclusion criteria included individuals with a psychiatric diagnosis, history of alcohol or substance use, dementia, or other organic mental disorders based on DSM-5.

Randomization

A total of 60 caregivers were randomly assigned to either the intervention or control group (30 each). Group assignment was carried out using the envelope method to prevent bias. Each envelope contained a note stating either "Intervention Group" or "Control Group" and was randomly selected by the participants themselves.

Data Collection Tools

Data were collected through face-to-face interviews using a researcher-developed questionnaire, the Perceived Stress Scale-14 (PSS-14), and the Parents' Internalized Stigma of Mental Illness Scale (PISMI).

Perceived Stress Scale (PSS-14)

Developed by Cohen et al. (1983), this scale assesses perceived stress over the past month. The Turkish adaptation was done by Eskin et al. (2013). It includes 14 items rated on a 5-point Likert scale. Higher scores indicate higher levels of perceived stress. In the current study, Cronbach's alpha was 0.91.

Parents' Internalized Stigma of Mental Illness Scale (PISMI)

Developed by Boyd-Ritsher et al. (2003) and adapted to Turkish by Gül-Dikeç et al. (2019), this 29-item scale evaluates internalized stigma in parents of individuals with mental illness. It includes five subscales and uses a 4-point Likert scale. In this study, Cronbach's alpha was 0.96.

Procedure

This randomized controlled trial was conducted in accordance with the CONSORT guidelines. The PSS-14 and PISMI were administered before (pre-test) and one week after (post-test) the video-based orientation intervention. The intervention included four 45–60-minute video-supported sessions conducted in a suitable meeting room. Training was provided by a psychiatric nurse in collaboration with a psychiatric nursing associate professor. Control group participants received traditional verbal orientation.

Session Content:

1. Introduction to the research and psychiatric unit via video and Q&A.
2. Explanation and discussion of stigma and personal caregiver experiences.
3. Basic knowledge about psychiatric disorders, treatment, and caregiving.
4. Understanding and coping with stigma, including influencing factors and family impact.

Statistical Analysis

Statistical analyses were performed using R version 4.5.0. Descriptive statistics were computed, and appropriate tests (t-tests, Mann-Whitney U, Wilcoxon signed-rank, Chi-square, Fisher's exact, Pearson correlation) were applied based on data characteristics. Relationships were visualized with heat maps.

Support Vector Regression-Based Feature Importance Analysis

Support Vector Regression (SVR) was used to identify clinical and sociodemographic predictors of PSS and PISMI scores. SVR is suitable for small, nonlinear, and high-dimensional datasets common in psychiatry. Feature importance was evaluated using permutation-based analysis, with RMSE increases indicating variable contribution.

Ethical Considerations

Ethical approval was obtained from the Scientific Research Ethics Committee of Karadeniz Technical University (Date: , Number:). Participants were informed about the study, and written consent was obtained, including permission to use demographic and scale data for research purposes.