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Original Article

# Effectiveness of Kataria Laughter Therapy on Death Anxiety and Quality of Life in Elderly Women with Parkinson's Disease: A Quasi-Experimental Study

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**Abstract**

**Background and Objective:** Parkinson's disease (PD) is a progressive and enduring neurodegenerative condition that markedly impairs the overall health and daily functioning of the aging population. In recent years, non-medicinal strategies—most notably laughter-based yoga programs—are being increasingly acknowledged as practical supportive care alternatives. The present study aimed to evaluate whether a structured course of Kataria laughter therapy could meaningfully influence death-related distress and overall quality of life (QOL) in older women diagnosed with PD.

**Materials and Methods:** We used a quasi-experimental framework with pre- and post-intervention assessments and a matched control condition. From nursing homes in Dezful, Iran, 30 eligible older women were conveniently recruited and evenly randomized into an experimental (n=15) or control arm (n=15). The intervention group participated in ten 45-minute Kataria laughter sessions (twice per week across five consecutive weeks), while controls continued their standard daily routines without additional input. Assessment tools comprised the Collett-Lester Fear of Death Scale (CL-FODS) and the disease-specific Parkinson's Disease Quality of Life (PDQL) questionnaire. To analyse the data, we applied descriptive indices along with multivariate and univariate analysis of covariance (MANCOVA and ANCOVA).

**Results**: Multivariate testing demonstrated a significant overall effect attributable to the intervention (Wilks' Lambda=0.504, F=23.115, P<0.01, $\eta$ =0.622). Subsequent univariate ANCOVAs indicated that the laughter therapy led to a statistically meaningful reduction in death anxiety scores (F=9.357, P<0.01, $\eta$ =0.332) and a substantial enhancement in quality-of-life scores (F=14.719, P<0.01, $\eta$ =0.467) within the experimental group relative to controls.

**Conclusion**: Kataria laughter therapy emerges as a cost-efficient, safe, and drug-free intervention capable of both diminishing mortality fears and elevating perceived life quality among older women with PD. These findings endorse its value as a complementary component within standard geriatric care protocols.

**Keywords**: Complementary therapy, Death anxiety, Elderly, Laughter therapy, Laughter yoga, Parkinson's disease, Quality of life

## Background

Parkinson's disease (PD) is a progressively debilitating disorder of the central nervous system whose prevalence—estimated at 10 million cases internationally—makes it the second most frequent neurodegenerative illness, preceded only by Alzheimer's [21]. What makes PD particularly challenging is its dual clinical signature: classical physical deficits including tremor, rigidity, bradykinesia, and postural difficulties, combined with a range of neuropsychiatric and cognitive complications, such as low mood, anxiety, sleep-wake cycle disruptions, and impaired executive functions. It is this interplay of observable and invisible symptoms that severely erodes the quality of life (QOL) experienced by patients [1, 22].

The aging global population has brought increased attention to the psychological well-being of older adults. Studies indicate that 15-35% of elderly individuals experience significant psychological disorders, with anxiety being particularly prevalent [23]. Among the various forms of anxiety affecting the elderly, death anxiety—defined as an unpleasant emotional state, fear, and worry arising from the anticipation of one's own death or the death of

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significant others—is especially common [24, 25]. This phenomenon is particularly pronounced in patients with chronic, progressive conditions, such as PD, who face continuous physical decline and heightened mortality awareness [26].

Quality of life in PD patients is multidimensional, encompassing physical functioning, emotional well-being, social participation, and daily living activities [27]. Research consistently demonstrates that PD patients experience significantly lower QOL compared to healthy older adults, with non-motor symptoms often being more detrimental to QOL than motor symptoms [2, 3]. The Hoehn and Yahr staging system classifies PD into five stages based on symptom severity and functional impairment, with higher stages associated with greater disability and reduced QOL [4].

The growing disillusionment with purely drug-based regimens—largely due to their limited efficacy and troublesome side-effect profiles—has fuelled a search for safer, more holistic adjunctive options to address the emotional and mental health needs of patients with enduring conditions [5]. In this context, laughter yoga, specifically the Kataria variant, has emerged as a compelling candidate: it is economically viable, intrinsically enjoyable, and carries practically no risk of adverse reactions [28]. Conceived by Dr. Madan Kataria in 1995, this intervention merges self-induced laughter with classical yogic breathing (pranayama) and gentle calisthenic movements [28]. Underpinning the entire practice is a well-documented psychophysiological phenomenon—namely, that the brain and body respond to volitional laughter in a manner essentially indistinguishable from their response to spontaneous laughter, ensuring that both deliver similar therapeutic effects [6].

Physiologically, laughter has been associated with a cascade of beneficial changes: diminished circulating cortisol and adrenaline, a notable surge in endogenous endorphin production, strengthened immune responses, superior cellular oxygenation, and widespread skeletal muscle relaxation [7, 8]. At the psychological level, the same intervention has proven capable of alleviating depressive feelings, anxious states, and subjective stress, while concurrently fostering a more positive mood, reinforcing social ties, and elevating the individual's overall sense of well-being [9, 10]. These dual-domain findings are further corroborated by a systematic review conducted by Kuru Alici and Dönmez (2020), which concluded that laughter yoga yields measurable improvements across multiple physical parameters—specifically blood pressure, cortisol profile, and sleep quality—as well as an array of psychosocial dimensions including life satisfaction, perceived QOL, loneliness, death anxiety, depression, mood, and happiness in older adult populations [14].

Despite these promising findings, limited research has specifically examined the effects of laughter therapy on death anxiety and QOL in elderly patients with PD. Most previous studies have focused on motor symptoms or employed pharmacological interventions [29].

Therefore, the present study aimed to investigate the effectiveness of Kataria laughter therapy on death anxiety and QOL in elderly women with PD.

## Materials and Methods

### Study Design

This investigation was structured as a controlled quasi-experimental trial, featuring both a baseline and a follow-up assessment phase, along with a distinct comparison group. The research protocol gained prior ethical approval from the Research Ethics Committee at the Dezful Branch of Islamic Azad University, Iran, and written informed consent was obtained from each participant before they entered the study.

### Participants

The statistical population comprised all elderly women with PD residing in nursing homes in Dezful, Iran. A convenience sample of 30 participants was selected based on the following inclusion criteria: (1) confirmed diagnosis of PD by a neurologist; (2) age between 55 and 75 years; (3) normal intellectual functioning based on medical records; and (4) willingness to participate. Moreover, exclusion criteria included: (1) significant physical disabilities preventing participation; (2) sensory impairments (e.g., hearing loss); (3) absence from more than two treatment sessions; and (4) concurrent participation in other psychological interventions.

Through a simple randomization procedure, the sample was evenly split, yielding 15 individuals for the experimental condition and an equal number for the control condition. To minimize the influence of confounding variables, the two groups were intentionally equated at the outset with respect to their mean age, Hoehn and Yahr disease staging, and the scores they obtained on the outcome measures prior to the start of the therapy sessions.

### Instruments

#### Collett-Lester Fear of Death Scale (CL-FODS)

For the assessment of existential anxiety, we utilized the Collett-Lester Fear of Death Scale (CL-FODS), a 32-item self-rating scale originally developed by

Collett and Lester in 1969 [11]. Its content is organized around four core areas of concern—namely, the respondent's personal death, their own dying experience, the passing of other individuals, and the dying process experienced by others. Each item is scored on a 5-point Likert scale, from 1 (not at all) to 5 (very much). The possible scores for any single subscale vary between 8 and 40, whereas the overall composite score can fall anywhere from 32 to 160; higher scores on either level are indicative of stronger death-related fears. It is noteworthy that the Persian version of this measure has been reported to have appropriate reliability in local contexts [30]; in our specific sample, its internal consistency (Cronbach's alpha) was calculated at 0.84.

### Parkinson's Disease Quality of Life (PDQL) Questionnaire

For the evaluation of disease-associated QOL, we utilized the PDQL, a 37-item scale first reported by De Boer et al., which is expressly tailored to this patient group. Its content is organized around four major areas of concern: motor difficulties, systemic physical symptoms, emotional functioning, and social interaction. Scoring is performed on a 5-point Likert continuum ranging from 1 (always) to 5 (never), producing an aggregate score that spans a theoretical range of 37 to 185—where higher numbers are consistently linked to a better perceived state of health and well-being. Empirical evidence has previously affirmed the PDQL as a relevant, consistent, and valid outcome indicator for this specific population [12]. Additionally, psychometric evaluations of the Persian translation have supported its sound validity and reliability [12]; along with these earlier findings, our own administration of the questionnaire produced a Cronbach's alpha of 0.90, indicating excellent internal consistency.

### Hoehn and Yahr (HY) Scale

For staging purposes, we applied the widely recognized Hoehn and Yahr scale, a standard metric that orders the progression of PD across five discrete phases, with staging decisions resting upon the combined assessment of symptom intensity and the individual's level of practical impairment [4].

### Intervention: Kataria Laughter Therapy Protocol

The experimental group received 10 sessions of Kataria laughter therapy over five weeks (two sessions per week, each lasting 45 min). All sessions were conducted by a certified laughter yoga instructor and followed the standardized protocol developed by Dr. Madan Kataria [28].

Each 45-minute session followed a structured format; it started with rhythmic clapping to stimulate acupressure points, followed by deep, diaphragmatic breathing exercises. The core of the session involved performing a variety of simulated laughter techniques, such as "greeting laughter" and "lion laughter," each lasting 21-31 seconds and interspersed with deep breaths. The session concluded with guided relaxation and positive affirmations.

The control group received no intervention during the study period and continued with their regular daily activities. At the conclusion of the study, the control group was offered the laughter therapy program as an ethical consideration.

### Procedure

All participants completed the CL-FODS and PDQL questionnaires at pretest (one week before the intervention) and posttest (one week after the final session). The questionnaires were administered individually by a trained research assistant blind to group allocation. The experimental group participated in the laughter therapy sessions as described, while the control group maintained their usual routine.

### Ethical Considerations

Ethical approval and oversight were guided by the principles of the Declaration of Helsinki. In practice, this meant that before any data were gathered, every prospective participant was given a full and clear briefing on the nature of the project, following which written consent was secured from all who chose to enroll. The confidentiality of personal information was rigorously preserved throughout, and no participant faced any monetary expense as a result of their involvement. Additionally, the control arm was guaranteed the opportunity to experience the laughter intervention once the trial's active phase concluded. Crucially, all volunteers were reminded that they retained the right to exit the study at any point, for any reason, with no adverse consequences.

### Statistical Analysis

The SPSS (version 22) software served as the analytical platform for all quantitative evaluations. The analysis was started by computing descriptive summaries (means and SDs) for the entire dataset. To fulfill the prerequisites of parametric testing, we assessed normality using the Kolmogorov-Smirnov and Shapiro-Wilk criteria, along with a check of the homogeneity of regression slopes. The core inferential analysis employed multivariate analysis of

covariance (MANCOVA), which allowed us to gauge the overall impact of the therapeutic sessions on both dependent variables in a single model, followed by disaggregated univariate analysis of covariance (ANCOVA) for each outcome individually. In each instance, pretest measurements were incorporated as covariates to offset potential baseline imbalances, and all decisions regarding statistical significance were made with reference to a conventional P-value threshold of 0.05.

## Results

### Participant Characteristics

A total of 30 older women with PD participated in this investigation, with 15 allocated to each of the two research arms. The active treatment group had a mean age of 66.8±6.1 years, while the control group's average age was 67.2±5.9 years. Clinically, all participants were classified as Hoehn and Yahr stages 1, 2, or 3, indicating mild to moderate disease severity. Necessarily, prior to the initiation of the intervention, the two sets were found to be essentially equivalent across all measured variables, with no significant differences detected in age, disease stage, or any baseline outcome parameters.

### Descriptive Results

Table 1 Presents the descriptive statistics for death anxiety scores across the pretest and posttest phases for both groups. The mean death anxiety score in the experimental group decreased from 124.56 (SD=5.66) at pretest to 91.42 (SD=4.29) at posttest. In contrast, the control group demonstrated minimal change from 125.39 (SD=6.71) to 123.83 (SD=6.31).

**Table 1.** Mean and standard deviation of death anxiety scores by group and phase

| Phase | Group | N | Mean | SD |
|---|---|---|---|---|
| **Pretest** | Experimental | 15 | 124.56 | 5.66 |
| **Pretest** | Control | 15 | 125.39 | 6.71 |
| **Posttest** | Experimental | 15 | 91.42 | 4.29 |
| **Posttest** | Control | 15 | 123.83 | 6.31 |

Table 2 Presents the descriptive statistics for QOL scores. The mean QOL score in the experimental group increased from 78.63 (SD=4.17) at pretest to 106.19 (SD=5.63) at posttest. The control group indicated a minimal change from 80.57 (SD=3.92) to 81.39 (SD=4.21).

**Table 2.** Mean and standard deviation of quality of life scores by group and phase

| Phase | Group | N | Mean | SD |
|---|---|---|---|---|
| **Pretest** | Experimental | 15 | 78.63 | 4.17 |
| | Control | 15 | 80.57 | 3.92 |
| **Posttest** | Experimental | 15 | 106.19 | 5.63 |
| | Control | 15 | 81.39 | 4.21 |

### Assumption Testing

The Kolmogorov-Smirnov and Shapiro-Wilk tests confirmed that data for all variables were normally distributed (P>0.05 for all tests). The test for homogeneity of regression slopes demonstrated non-significant interactions between group and pretest scores for both death anxiety (F=2.037, P=0.121) and QOL (F=1.618, P=0.235), confirming that the assumption of homogeneity of regression slopes was met.

### Multivariate Analysis

The MANCOVA was employed to determine whether the intervention exerted a simultaneous influence on the two dependent variables, with the detailed outcomes presented in Table 3. The resulting multivariate test demonstrated a robust and significant effect (Wilks' Lambda=0.504, F=23.115, P<0.01, $\eta^2$=0.622), from which it can be concluded that Kataria laughter therapy had a substantial effect on at least one of the dependent measures.

**Table 3.** MANCOVA results for the effect of laughter therapy on death anxiety and quality of life

| Multivariate Test | Value | F | Hypothesis df | Error df | P | Partial $\eta^2$ |
|---|---|---|---|---|---|---|
| **Pillai's Trace** | 0.635 | 23.115 | 2 | 25 | 0.001 | 0.622 |
| **Wilks' Lambda** | 0.504 | 23.115 | 2 | 25 | 0.001 | 0.622 |
| **Hotelling's Trace** | 1.901 | 23.115 | 2 | 25 | 0.001 | 0.622 |
| **Roy's Largest Root** | 1.901 | 23.115 | 2 | 25 | 0.001 | 0.622 |

### Univariate Analyses

Univariate ANCOVA was conducted to examine the effect of the intervention on each dependent variable separately (Table 4).

**Table 4.** ANCOVA results for death anxiety and quality of life

| Variable | Source | df | F | P | $\eta^2$ |
|---|---|---|---|---|---|
| **Death Anxiety** | Pretest | (1, 43) | 6.632 | 0.006 | 0.163 |
| | Group | (3, 43) | 9.357 | 0.001 | 0.332 |
| **Quality of Life** | Pretest | (1, 43) | 23.401 | 0.001 | 0.315 |
| | Group | (3, 43) | 14.719 | 0.001 | 0.467 |

For death anxiety, the pretest covariate was significant ($F=6.632$, $P=0.006$, $\eta^2=0.163$), indicating that baseline scores influenced posttest outcomes. After controlling for pretest differences, the group effect was significant ($F=9.357$, $P<0.01$, $\eta^2=0.332$), indicating that 33.2% of the variance in posttest death anxiety scores was attributable to the intervention.

For QOL, the pretest covariate was significant ($F=23.401$, $P<0.001$, $\eta^2=0.315$). After controlling for pretest differences, the group effect was significant ($F=14.719$, $P<0.01$, $\eta^2=0.467$), indicating that 46.7% of the variance in posttest QOL scores was attributable to the intervention.

These findings confirm both research hypotheses: Kataria laughter therapy significantly reduces death anxiety and significantly improves QOL in elderly women with PD.

## Discussion

The present research investigated the effectiveness of Kataria laughter therapy on death anxiety and QOL in elderly women with PD. The findings provide strong evidence that this complementary intervention is effective for both outcomes, with large effect sizes ($\eta^2=0.332$ for death anxiety and $\eta^2=0.467$ for QOL).

### Effect on Death Anxiety

The significant reduction in death anxiety in the experimental group is consistent with previous research on laughter therapy and psychological well-being in older adults. Our findings are supported by a systematic review which confirmed that laughter yoga has a positive impact on reducing existential fears and depressive symptoms in older populations [14]. Similarly, Armat et al. (2020) reported that laughter therapy effectively reduces anxiety and depression in retired women [13]. Evidence from a prior non-randomized pilot study carried out by the same authors indicated that laughter therapy can serve as a useful tool for diminishing both perceived loneliness and death-related anxiety in older populations residing in nursing homes.

Several mechanisms may explain this effect. First, laughter therapy induces physiological changes that directly counter anxiety, including reduced cortisol and adrenaline levels, increased endorphin release, and enhanced parasympathetic nervous system activity [7, 8]. Second, the group format of laughter yoga provides social support and reduces isolation, which are crucial for mitigating existential fears in elderly populations. Third, the playful, childlike nature of laughter exercises may facilitate psychological regression to a more carefree state, temporarily reducing the cognitive weight of mortality awareness.

The theoretical framework of terror management theory (TMT) provides additional insight. According to TMT, mortality salience triggers anxiety that individuals manage through cultural worldviews and self-esteem [15]. Laughter therapy may serve as a buffer against death anxiety by enhancing positive affect, social connection, and meaning-making—all of which are protective factors against existential distress [16].

### Effect on Quality of Life

The favourable shift in QOL recorded in our experimental group finds strong corroboration in the existing body of research on laughter therapy for PD. A recent randomized controlled trial, for example, has validated laughter yoga as a valuable therapeutic tool for reducing anxiety and depressive symptoms, and for fostering a better overall QOL in this population [31]. Similarly, the work of DeCaro and Constantine Brown (2016) revealed that as little as one session of laughter yoga could bring about meaningful gains in the well-being of PD patients and their support networks [6]. There is also evidence that laughter-based interventions—particularly when paired with clapping exercises—can effectively regulate stress physiology and contribute to both motor performance and life satisfaction among those affected by PD [32].

The multifaceted benefits of laughter therapy address the complex nature of QOL in PD. Physiologically, laughter improves oxygenation, muscle relaxation, and immune function [33]. Psychologically, it reduces depression and anxiety while enhancing mood and optimism [9]. Socially, the group format fosters connection and reduces isolation, which is particularly important for elderly individuals with mobility limitations [16].

The effect size for QOL ($\eta^2$=0.467) was larger than that for death anxiety ($\eta^2$=0.332), suggesting that laughter therapy may be particularly effective for enhancing positive outcomes (QOL) compared to reducing negative outcomes (death anxiety). This is consistent with positive psychology frameworks suggesting that interventions targeting positive emotions may have greater impact on well-being than those solely focused on symptom reduction [34].

### Comparison with Previous Studies

A substantial and continually expanding evidence base supports the integration of laughter therapy into geriatric care, and our own observations align comfortably with this broader scientific consensus. Within the national literature, Memarian et al. (2017) were able to demonstrate that laughter yoga not only lessened anxiety but also improved the sleep architecture of elderly individuals with Parkinson's [35]. In a comparative trial, Shahidi et al. (2011) reported that this intervention holds its own against structured group exercise when it comes to alleviating depression in older women [18]. On a wider scale, systematic reviews have collated findings that consistently point to laughter yoga's beneficial influence on both physical health parameters and psychosocial dimensions, encompassing life satisfaction, QOL, mood elevation, happiness, and decreased levels of depression, loneliness, death anxiety, and cognitive deterioration. According to the international literature, Bressington et al. (2019) established the feasibility and clinical efficacy of a group-based laughter yoga format in tackling residual emotional symptoms, such as depression, anxiety, and stress [19]. Dogan (2020), using a meta-analysis, further quantified the anxiety-buffering effect of laughter therapy [7], while Tanaka et al. (2020) presented additional evidence from Japan, reporting a blend of psychological and physiological enhancements following regular participation in laughter yoga sessions among older citizens.

### Clinical Implications

The findings have several important clinical implications. First, Kataria laughter therapy offers a cost-effective, non-pharmacological intervention for managing psychological symptoms in PD patients. As Avicenna Journal of Neuro Psycho Physiology is an open-access journal with no article processing charges for authors, this research contributes to the growing body of evidence supporting accessible interventions. This is particularly valuable given the side effects and limited efficacy of pharmacological treatments for non-motor symptoms in PD [20]. Second, the group format makes it feasible for implementation in nursing homes, community centers, and outpatient clinics. Third, the absence of adverse effects makes it suitable for elderly patients with multiple comorbidities [36].

Healthcare providers, including nurses, psychologists, and occupational therapists, should consider incorporating laughter therapy into comprehensive care plans for PD patients. The intervention can be easily taught by certified instructors and sustained through peer-led groups, making it scalable for widespread implementation.

### Limitations and Future Directions

Several limitations should be acknowledged. First, the small sample size (n=30) limits generalizability. Future studies should employ larger, more diverse samples. Second, the lack of follow-up assessment prevents evaluation of long-term effects. Longitudinal studies are needed to determine the durability of intervention benefits. Third, the study included only women, limiting generalizability to male patients with PD. Future research should examine gender differences in response to laughter therapy. Fourth, the use of a convenience sample from a single geographic region may limit external validity. Multicenter randomized controlled trials are warranted.

Additional research directions include: (1) comparing laughter therapy with other complementary interventions (e.g., music therapy, art therapy); (2) examining dose-response relationships; (3) investigating mechanisms of action through biomarker assessment; (4) exploring the effects on specific QOL domains; and (5) developing home-based or telehealth versions of the intervention for patients with limited mobility.

## Conclusion

The present work demonstrated that Kataria laughter therapy is an effective intervention for reducing death anxiety and improving QOL in older women with PD. The intervention indicated large effect sizes for both outcomes, supporting its clinical utility as a complementary therapy. The favorable profile of laughter therapy, being both economical and safe, along with its demonstrated benefits for mental and social health, supports its incorporation into routine care for this population. Healthcare policymakers and practitioners should prioritize the implementation of such non-pharmacological interventions to address the holistic needs of this vulnerable population.

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Authors' Contribution

Study concept and design: S. Tanoorsaz, Z. Barzikar; Acquisition of data: Z. Barzikar, S. Moshtaghi; Analysis and interpretation of data: S. Tanoorsaz, Z. Barzikar; Drafting of the manuscript: Z. Barzikar, S. Moshtaghi; Critical revision of the manuscript for important intellectual content: S. Tanoorsaz; Statistical analysis: S. Tanoorsaz; Administrative, technical, and material support: S. Moshtaghi; Study supervision: S. Tanoorsaz. All authors read and approved the final manuscript.

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Conflict of Interests

The authors declare no conflicts of interest.

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