

Empathy And Wellbeing In Dementia Caregiving: Impact Of Immersive Virtual Reality 360° (VR360) Training

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BACKGROUND

Informal caregivers of individuals with dementia frequently experience emotional strain, psychological distress and **empathy fatigue** — compromising care quality and caregiver wellbeing.

Virtual Reality (VR) and 360-degree video technologies are recognised as valuable enhancements to traditional training methods, effectively advancing knowledge and skills among formal and informal caregivers^{1,2}. These programs provide dementia-related information and care techniques, enabling caregivers to better manage the symptoms and behaviours associated with dementia³. Additionally, VR interventions have been found to foster skill-building, confidence, and competence among caregivers, contributing to improved caregiving outcomes⁴.

OBJECTIVES

- 1 Evaluate VR360 impact on caregiver burden (ZBI)
- 2 Assess changes in empathy traits — Empathic Concern, Fantasy, Personal Distress & Perspective Taking (IRI)
- 3 Examine changes in psychological distress: depression, anxiety & stress (DASS-21)
- 4 Determine moderating effects of gender, age & education
- 5 Identify domains of greatest improvement post-intervention

METHODS

One-Group Pretest–Posttest Quasi-Experimental

30 informal caregivers · Aged 40–65 (M=55.43, SD=6.21) · 50% female
Education: Secondary 20% · Post-Secondary 56.7% · Master's 23.3%

Burden: Zarit Burden Interview (ZBI-12)

Empathy: Interpersonal Reactivity Index (IRI-C) — 4 subscales, 22 items

Distress: DASS-21 — depression, anxiety & stress

Analysis: Paired t-tests · ANOVA · Hayes' PROCESS models 1 & 7 · MANOVA

FOUR VR360 SCENARIOS

1 Hoarding behaviour

360° cluttered home · recognise cognitive triggers · respectful redirection · labelled storage

2 Wandering & disorientation

Male resident insists on 'going home' · validation therapy · reminiscence-based redirection

3 Low mood & suicidal ideation

Withdrawn female client · depression cues · therapeutic communication · crisis intervention

4 Daily living — grooming & cooking

Hazardous practices due to cognitive decline · task adaptation · graded assistance

RESULTS — ALL OUTCOMES



30

Informal
Caregivers
Aged 40–65

4

VR360
Scenarios
~1.5 hrs total

d=.95

Largest
Effect Size
Anxiety reduction



Outcomes	Gender	Gender (<i>p</i>)	Age	Age (<i>p</i>)	Education	Education (<i>p</i>)
Perceived Burden						
Zarit Caregiver Burden Inventory	23.07	<.001	18.95	<.001	1.96	.162
Empathy-related Traits						
Perspective Taking	0.42	0.522	1.05	0.315	0.89	0.355
Empathetic Concern	1.23	0.278	0.67	0.421	0.56	0.461
Fantasy	0.95	0.339	1.32	0.261	1.02	0.323
Personal Distress	0.71	0.408	0.82	0.374	0.48	0.496
Interpersonal Reactivity Index Total	0.88	0.357	1.14	0.296	0.75	0.394
Psychological Distress						
Depression	5.86	.023	13.96	.001	2.59	.095
Anxiety	7.49	.011	0.69	.414	1.23	.310
Stress	1.01	.325	11.21	.003	4.66	.019
Overall DASS	8.01	.009	13.49	.001	0.50	.613

DEMOGRAPHIC MODERATORS

Gender (strongest moderator of burden)

- Females: ZBI reduction Δ =−3.2 (d=0.81) vs Males: Δ =−1.1 (d=0.33)
- Between-group effect d=−1.11 · partial η^2 =0.48 (p<.001)
- Gender:Education interaction: η^2 =0.671 for ZBI; η^2 =0.747 for DASS

Age (≥55 yrs showed greatest gains)

- Older caregivers: ZBI d=−1.21; Depression d=−1.35
- Accounted for 43% variance in ZBI reduction (η^2 =0.43)
- Older females: strongest response (ZBI d=−1.40; Depression d=−1.50)

Education (PROCESS moderation — Hayes Model 1)

- Secondary: greatest ZBI reduction (M=−3.63)
- Post-Secondary: M=−1.63 · Postgraduate: minimal change
- Immersive VR may be more accessible to lower-education caregivers

PROCESS Model 7: mediation through distress reduction operated consistently across ALL demographic groups



CONCLUSIONS

VR360 significantly reduced caregiver burden and psychological distress **while enhancing empathy** — particularly anxiety reduction (d=0.95) and emotional empathy.

The intervention was particularly effective for older female caregivers, with additive benefits for those who are both older and female (ZBI d=−1.40).

PROCESS moderation analysis confirms: **demographic differences reflect baseline distress levels rather than differential responsiveness** — the intervention mechanism operates consistently across all groups.

DISCUSSION HIGHLIGHTS

Burden reduction

ZBI: 33.97→32.13 (d=0.36) — consistent with Wijma et al. (2018)⁵; more conservative than Falconer et al. (2016, d=0.72)⁶ which used biofeedback.

Empathy enhancement

Empathic Concern, Fantasy, Personal Distress improved significantly. Perspective Taking non-significant — cognitive empathy requires explicit reflective VR design⁷

Anxiety as strongest domain

d=0.95 aligns with Dodlek et al. (2025)⁸: VR reduces anxiety 15–30% in caregivers. Immersive design provides cognitive distraction and emotional processing in a safe context.

Education gradient

Lower-educated caregivers benefited most (Secondary: M=−3.63). Immersive, experiential VR format may be more accessible than text-based training (PROCESS Model 1).

RECOMMENDATIONS

Prioritise older female caregivers

Target high-responder subgroups; supplement for younger males with additional support.

Add reflective prompts for cognitive empathy

Include structured debrief questions to stimulate Perspective Taking — the one non-significant domain.

Integrate into community support

VR360 as a scalable, repeatable tool within dementia community support networks.

Combine with psychoeducation

Festari et al. (2024) showed VR + psychoeducation yielded enhanced emotional wellbeing outcomes.

Longitudinal follow-up

Long-term effects and optimal refresher timing needed; short-term design is a study limitation.

LIMITATIONS

No control group

Ethical & funding constraints; causal inference limited. Pre-post design susceptible to maturation.

Small sample (N=30)

Uneven education distribution; generalisability limited. RCT with diverse cohorts needed.

Short-term assessment

Long-term sustainability of burden, empathy & distress gains not established.

VR content & cognitive empathy

Scenarios optimised for emotional empathy; explicit reflective design needed for Perspective Taking.