ABSTRAK

Pengaruh Penambahan Intervensi *Motor Cognitive Training Immersive Virtual Reality* (*Dual Tasking*) Terhadap Perbaikan Multidomain *Frailty*

(Studi pada Lansia dengan *Frailty* Fisik di Panti Wreda)

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Latar Belakang: Peningkatan populasi lansia di Indonesia berdampak pada kenaikan kondisi *frailty* (kerapuhan) yang menurunkan kemandirian. Teknologi *Immersive Virtual Reality* (IVR) dengan metode *dual-tasking* motor-kognitif menawarkan stimulasi neuroplastisitas untuk memperbaiki berbagai domain *frailty* melalui pengaktifan sistem saraf tertentu.

Tujuan: Menilai pengaruh intervensi *motor cognitive training* IVR terhadap performa fisik dan multidomain *frailty* (kognitif, depresi, selera makan, kesepian, dan kualitas hidup) pada lansia frail di panti wreda.

Metode: Penelitian *quasi-experimental* dengan rancangan *pre-post test with control group* ini melibatkan 56 lansia frail di Semarang. Kelompok perlakuan (n=28) menerima intervensi IVR dua kali seminggu selama enam minggu, sedangkan kelompok kontrol (n=28) mengikuti senam rutin. Evaluasi menggunakan instrumen standar seperti SPPB, MoCA-INA, GDS-15, SNAQ, UCLA *Loneliness*, dan EQ5D-3L, EQ5D-VAS.

Hasil: Kelompok perlakuan menunjukkan peningkatan skor SPPB yang signifikan secara statistik ($p < 0,001$; median peningkatan 2,00) dibandingkan kontrol ($p = 0,001$). Perbaikan nyata terlihat pada kecepatan jalan ($p = 0,030$) dan kekuatan otot kaki ($p = 0,033$). Fungsi kognitif juga meningkat signifikan dengan median skor MoCA-INA mencapai 27,00 ($p = 0,011$). Selain itu, skor depresi dan kualitas hidup subjektif (EQ-VAS) membaik secara signifikan ($p < 0,05$), meskipun skor kesepian, kualitas hidup objektif dan selera makan tidak menunjukkan perbedaan bermakna.

Kesimpulan: Intervensi IVR efektif meningkatkan performa fisik, fungsi kognitif, dan persepsi kesehatan subjektif pada lansia *frail*.

Kata Kunci: Lansia *frail*, terapi VR, performa fisik, fungsi kognitif

ABSTRACT

The Impact of Immersive Virtual Reality Motor-Cognitive Training (Dual-Tasking) Intervention on the Improvement of Multidomain Frailty

(A Study on Older Adults with Physical Frailty in Nursing Homes)

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Background: *The increasing elderly population in Indonesia has led to a rise in frailty, which significantly reduces independence. Immersive Virtual Reality (IVR) technology, utilizing motor-cognitive dual-tasking methods, offers neuroplasticity stimulation to improve various frailty domains by activating specific neural systems.*

Objective: *To assess the effect of IVR motor-cognitive training on physical performance and multidomain frailty (cognitive, depression, appetite, loneliness, and quality of life) among frail elderly residents in nursing homes.*

Methods: *This quasi-experimental study with a pre-post test with control group design involved 56 frail elderly participants in Semarang. The treatment group (n=28) received IVR intervention twice weekly for six weeks, while the control group (n=28) participated in routine exercise. Evaluation was conducted using standardized instruments: SPPB, MoCA-INA, GDS-15, SNAQ, UCLA Loneliness, and EQ5D-3L/VAS.*

Results: *The treatment group showed a statistically significant increase in SPPB scores ($p < 0.001$; median increase of 2.00) compared to the control group ($p = 0.001$). Significant improvements were observed in gait speed ($p = 0.030$) and lower limb muscle strength ($p = 0.033$). Cognitive function also improved significantly, with the median MoCA-INA score reaching 27.00 ($p = 0.011$). Furthermore, depression scores and subjective quality of life (EQ-VAS) improved significantly ($p < 0.05$), although loneliness, objective quality of life (TTO), and appetite scores showed no significant differences.*

Conclusion*: IVR intervention is effective in improving physical performance, cognitive function, and subjective health perception among frail elderly individuals.*

Keywords*: Frail Elderly, Virtual Reality exposure therapy, Physical Functional Performance, Cognitive Function.*