Indonesian Journal of Global Health Research
Volume 7 Number 4, August 2025
e-ISSN 2715-1972; p-ISSN 2714-9749
http://jurnal.globalhealthsciencegroup.com/index.php/IJGHR

THE IMPACT OF GAME-BASED AND DIGITAL INTERVENTIONS ON COGNITIVE, EMOTIONAL, AND PHYSICAL HEALTH OUTCOMES IN OLDER ADULTS: A SYSTEMATIC REVIEW

Ucik Nurmalaningsih*, Joni Haryanto, Rista Fauziningtyas, Lilik Choiriyah, Basri
Faculty of Nursing, Universitas Airlangga, Mulyorejo, Surabaya, Jawa Timur 60115, Indonesia
*ucik.nurmalaningsih-2023@fkp.unair.ac.id

ABSTRACT

The aging population faces increasing risks of cognitive decline, depression, and reduced physical capacity. Innovative interventions such as game-based systems, experiential learning, and eHealth solutions offer promising strategies to promote healthy aging by enhancing cognitive, emotional, and physical health among older adults. Aim: This study aims to review and analyze the effectiveness of various game-based, experiential, and digital interventions on cognitive function, emotional well-being, and physical health outcomes in elderly populations. Methods: A systematic analysis was conducted on ten studies involving older adults, including randomized controlled trials, pilot studies, cohort studies, and meta-analyses. The studies investigated interventions such as cognitive games, recollection-based occupational therapy, experiential puzzle games, GAMotion, eHealth platforms, and dance-based rehabilitation. Intervention durations ranged from two sessions to twelve months, with diverse sample sizes and settings. Result:The interventions demonstrated significant improvements in cognitive functioning, reductions in depression and anxiety, enhanced physical capacity, improved quality of life, and increased social engagement. Game-based and experiential activities showed high adherence rates, suggesting good feasibility and acceptance among older adults. However, several studies were limited by small sample sizes and non-blinded assessments. Game-based, experiential, and digital interventions effectively promote cognitive, emotional, and physical well-being in older adults. These approaches are feasible, well-received, and offer valuable strategies for supporting active and healthy aging. Future research should focus on large-scale, long-term studies to confirm and extend these findings.

Keywords: cognitive function; depression; ehealth; game-based interventions; healthy aging; older adults; physical health; quality of life

How to cite (in APA style)
Nurmalaningsih, U., Haryanto, J., Fauziningtyas, R., Choiriyah, L., & Basri, B. (2025). The Impact of Game-Based and Digital Interventions on Cognitive, Emotional, and Physical Health Outcomes in Older Adults: A Systematic Review. Indonesian Journal of Global Health Research, 7(4), 69-78. https://doi.org/10.37287/ijghr.v7i4.5519.

INTRODUCTION

The elderly are classified as being in a vulnerable phase that must be paid special attention to by their environment, especially in their daily activities. This condition is related to a decline or change in body condition both physically, psychologically and mentally experienced by the elderly. Several conditions in the elderly can trigger a source of stress because they are associated with weakness and decline in fulfilling daily activities. (Lase & Souisa, 2021) . Conditions of decline and fragility in the elderly require adaptation and acceptance of changes in physical, psychological and mental conditions experienced by the elderly. (Lase & Souisa, 2021). Changes in conditions in the elderly are divided into two, namely biological theory and social psychological theory, which can trigger depression in the elderly. The changing conditions that occur in the elderly can result in the elderly slowly withdrawing from relationships with the surrounding community which can affect the social interactions of the elderly and have an impact on decreasing the social function of the elderly. (Pratiwi et al., 2020).

Decreased social function is characterized by interactions that occur in daily life. The social functions of the elderly include adaptation, growth, affection and solving relationships. Social function includes the elderly's relationship with the family as the main role at all levels of the elderly's health and welfare. (Ridiansya, 2019). Social changes occur because of changes in the quality of life of the elderly along with changes in the social environment, such as losing a spouse, entering retirement, children starting to leave the house because they have their own place to live or because they are married and have a partner, and so on. These changes will affect the decline in social interactions in the elderly who gradually withdraw from relationships with society. Poor social interaction in the elderly can affect the quality of life of the elderly where this will cause the elderly to feel isolated so that the elderly like to be alone and will cause the elderly to be depressed (Juita & Shofiyyah, 2022). The clinical conditions of older adults also make them likely to develop depression. Physical and cognitive problems and functional loss are the primary causes of depression (Y. Kim et al., 2022a)

The number of elderly people in Indonesia in 2020 reached 25.64 million people, with the number of elderly people being 5.29 million. According to census data from the Central Statistics Agency in 2022, data was obtained that the projected number of elderly people in 2035 will increase by 15.8% or around 48.2 million people in Indonesia. (Badan Pusat Statistik, 2022). The Central Statistics Agency, the number of elderly people in 2020 in East Java reached 13.8%. The city of Surabaya experiences significant improvement every year. According to BPS, in 2017, the number of elderly people in Surabaya reached 236,541 people or 8.23% of the total population with a life expectancy of 71 years. (Rosary et al., 2020)The prevalence of all depressive mental disorders in the elderly in the world is estimated at 15% of the global population (WHO, 2022). The prevalence of depression in the elderly in Indonesia is quite high, namely 6.1% (Riskesdas, 2022)The negative impact of decreased body function and psychosocial changes can cause depression. in the elderly is closely related to how increasing life expectancy is with various background problems in the elderly such as forced retirement, death of a partner, changes in decline in ability or physical strength, and deterioration in health as well as income and housing, thus affecting the sense of security of the elderly. These conditions are often closely related. its relationship as a background that is associated with depression in the elderly (Kaunang et al., 2019)

Depression is a mental disorder or emotional condition characterized by feelings of sadness, guilt, meaninglessness and withdrawal from other people. Depression in the elderly is characterized by symptoms such as feelings of isolation, loneliness, feelings of sadness or unhappiness, frequent crying, not being able to can sleep soundly, cannot concentrate, has no appetite or decreased weight, gets tired quickly, feels inferior and useless, decreased memory, decreased activity and there is a risk of suicide. (Manafe & Berhimpon, 2022)Depression is the most common mental problem among the elderly, especially in long-term care facilities. The purpose of the present study was to examine the effects of game intervention. Depression can be prevented by social interaction playing an important role in the lives of the elderly, such as increasing prices self and quality of life (Faujiah et al., 2023). Mental health disorders like depression and anxiety can have a significant impact on one's quality of life. Unfortunately, not everyone has equal access to resources and health education, hindering their health literacy(Respati et al., 2024)

The prevention, early detection, and treatment of depression in older adults are crucial. However, older adults tend to avoid using mental health services because of poor physical function, psychological barriers, and reduced mobility with game therapy (Y. Kim et al., 2022a)The intervention has been proven effective in reducing depression levels among the elderly by stimulating cognitive, emotional, and social aspects in an enjoyable manner. Structured play activities can enhance self-confidence, strengthen social relationships, and

redirect attention away from the negative emotions often experienced by the elderly, thereby fostering a more positive mood and improving their overall quality of life(Y. Kim et al., 2022a).

METHOD

A systematic review is a methodical scientific process conducted to produce evidence based on a selected topic (Delgado-rodríguez & Sillero-arenas, 2017). The quality assessment of the included literature was carried out by referring to guidelines from the Centre for Reviews and Dissemination and the Joanna Briggs Institute, with the preparation and evaluation conducted according to the PRISMA checklist (Nursalam, 2020). The selection process followed the JBI approach, involving independent screening of titles and abstracts by two reviewers, followed by full-text review to determine eligibility based on inclusion and exclusion criteria. Discrepancies were resolved through discussion or a third reviewer. This process ensured methodological rigor and reduced selection bias. Accurate assessment and evaluation of study quality are essential to minimize research bias (Ahn & Kang, 2018; Trim et al., 2023).

Eligibility criteria

To select articles to be analyzed, the authors used the PICO framework (Table 1). Literature search can be done by using PICO (Population/patient, Intervention, Comparison, Outcome).

Tabel 1.
PICO *framework*

PICOS framework	Inclusion Criteria	Exclusion Criteria
Population	Older adults (aged ≥60 years), including those with mild cognitive impairment (MCI), Alzheimer's disease, depression, chronic conditions, or Parkinson's disease. Participants must be cognitively and physically capable of engaging with interventions.	-
Intervention	I Game-based systems (e.g., cognitive games, GAMotion, puzzle games), experiential learning approaches, eHealth interventions (e.g., ElderTree), recollection-based occupational therapy, and dance-based rehabilitation integrated with technology.	-
Comparator	Usual care (e.g., basic nursing, health education, traditional physical or recreational activities) or no structured intervention.	-
Outcomes	Primary outcomes: cognitive function improvement, depression and anxiety reduction, enhanced physical health	Studies that did not address the improved quality of life
Study Design and publication type	Rondomized control trial (RCTs), Exsperiment Design, Observasi, Pilot Intervention	Letter to editor, Commentaries, Qualitative studies, Abstract only, Case series, case reports, reviews, Discussion papers, meta-analyses, conference papers, oral presentations and article available in abstract.
Publication Years	Year 2020-2024	Before 2020
Language	English	*Other languages except english*

Search strategy

Using four databases—Scopus, EBSCO Host, ProQues, and Pubmed—the literature search procedure was conducted between March 4, 2025, and March 8, 2025, to identify relevant research and facilitate researchers in using keywords and *boolean operators* (AND, OR NOT or AND NOT) where this is used to expand or specify the search, making it easier to determine the article or number that you want to use. The keywords in the systematic review that are adjusted to the Medical Subject Heading (MeSH) (Nursalam, 2020) The keywords identified are ("Intervention, Strategy, Method" AND "Games" AND "Elderly " AND "Depression" AND "Quality Of Life"

Selection Process

The first literature search was restricted to the language and year of publication. Articles: After searching for articles in four databases using MeSH-adjusted keywords, the search results were compared using the Zotero reference manager to look for duplicates. Two rounds of additional screening were then performed. Title and abstract screening comes first. Full text screening comes in second. The search and screening process is depicted in Figure 1: *PRISMA flow diagram.*.

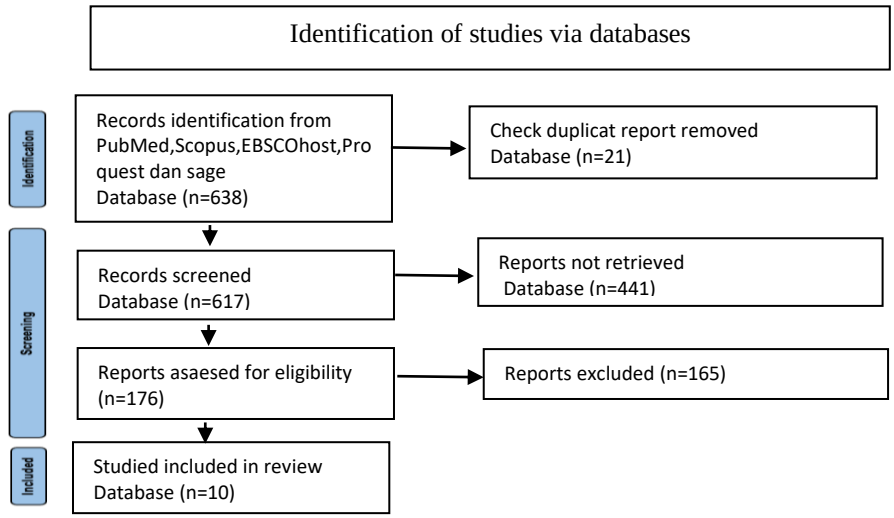

Figure 1. *PRISMA flow diagram*

RESULT

The results consistently demonstrated the beneficial impacts of game-based and experiential interventions on elderly populations. Cognitive game training significantly improved cognitive function and reduced depressive symptoms among participants with mild cognitive impairment (Xue, 2021).Similarly, recollection-based occupational therapy was effective in enhancing cognitive abilities, emotional stability, and social engagement among patients with mild Alzheimer's disease (D. Kim, 2020).Experiential learning through puzzle games notably enhanced strategic thinking and cognitive engagement(Salazar et al., 2022) GAMotion intervention led to significant improvements in physical capacity, intrinsic motivation, and quality of life domains, such as mobility, self-care, and daily activities (Salazar et al., 2022).Systematic review and meta-analysis revealed that serious games consistently reduced depression among older adults across various settings (Y. Kim et al., 2022b).Additionally, the ElderTree eHealth intervention improved the quality of life and socioemotional health among older adults with multiple chronic conditions (Gustafson Sr et al., 2024).Dance-based rehabilitation showed promise in improving motor functions and overall well-being in Parkinson's disease patients (Bevilacqua et al., 2025).High adherence rates across studies suggested good feasibility and acceptability of these interventions among older populations.

Table 3.
Summary of included studies

No	Author, year, country of origin	Samples	Intervention	Measurement
1	The effect of a game training intervention on cognitive functioning and depression symptoms in the elderly with mild cognitive impairment: A randomized controlled trial (Xue, 2021)	Methods: A non-blinded randomized controlled trial was conducted. Participants were 72 patients with MCI and depression from a nursing home in Wuhan.	The intervention group received a series of game training three times per week for 8 weeks. week The control group received usual nursing care,such as health education, during the	After The 8-week game training intervention significantly improved the cognitive and depression scores when compared with the control group and baseline scores

			8-week research period.	
2	*The Effects of a Recollection-Based Occupational Therapy Program of Alzheimer ' s Disease : A Randomized Controlled Trial* (D. Kim, 2020)	This study examined 35 patients with a mild stage of AD (Alzheimer's Disease) who visited A and B adult daycare center located in P city from February to March, 2019. The detailed recruitment criteria were as follows: (1) seniors aged 65 or older. (2) those who did not have a brain disorder other than dementia, (3) those who were diagnosed with mild AD, (4) those who were able to follow instructions and did not have any auditory or visual impairment, and (5) those who were informed of the purpose and the methods of the study and agreed to participate. The exclusion criteria were as follows: (1) those who had diffi culty in identifying objects due to poor eye sight or a visual perception issue, (2) those who had a serious physical disorder, (3) those who suff ered a brain injury apart from dementia, and (4) those who were unable to concentrate on an activity because of an unstable vital sign. Desain:Randomized Controlled Trial	The time for Intervention for 8-12 weeks . Before the intervention, the two groups' general characteristics and cognitive functions were fi rst examined to confi rm homogeneity. -The experimental group joined a recollection-based occupational therapy program constructed by the author where they were asked to engage in one activity every day from Monday to Friday. By contrast, the control group participated in the regular activities provided by their existing daycare centers. Regular activities included physical and recreational activities, arts and crafts, music activities, and rest.	This study found that the recollection-based occupa-tional therapy program is eff ective in boosting quality of life as well. This is because the therapy helps AD (Alzheimer's Disease) patients not only improve their cognitive functions but also speak and make nonverbal expressions more frequently; alleviating problematic behavior, feel stable emotions, and increase social exchange, thereby being able to lead to a better life
3	Loneliness, social isolation, depression and anxiety among the elderly in Shanghai: Findings from a longitudinal study. *Archives of Gerontology and Geriatrics*, (Zhang et al., 2023)	A longitudinal cohort study was conducted among 634 older adults from three districts of Shanghai. Data were collected at baseline and 6-month follow-up. Desain: A The study involved qualitative data collection	Elderly people are classified based on age, gender and their respective social interaction activities. Then the interview instrument is given and assessed	Depression, anxiety and stress are the effects of lonely elderly people
4	*Exploring the Impact of Puzzle Games for the Elderly from Experiential Learning*, Taiwan (Tu et al., 2022)	4 older adults aged 60–65 in sub-healthy condition; Qualitative experimental study with observational design	Participants engaged in guided experiential learning using the SET puzzle card game. Intervention was conducted over two main experimental sessions (practice and formal experiments), each including guided learning based on Kolb's cycle. Each session lasted 20–30 minutes and included multiple runs of the game.	Cognitive mapping and observational data showed that experiential learning significantly improved participants' level of thinking—from experience, to reflection, linking, and application. Interaction and guided facilitation enhanced cognitive engagement. Participants showed strategic thinking and cognitive stimulation throughout the process.
5	*Older Adults and Game-Based Systems: Engagement Model and Player Types of Characterization Based on Their Motivations*,	Not explicitly stated; Qualitative research based on systematic literature review and motivational model development	The GAMotion intervention was conducted over 4 weeks, using a giant exercising board game	Significant improvements in the intervention group were observed in physical capacity (Tinetti score, Timed Up and Go, SPPB,

	Spain/Colombia/Portugal (Salazar et al., 2022)		combining strength, flexibility, balance, and endurance activities. Supervision was gradually reduced each week to foster autonomy. Sessions were held 4 times in week 1, 3 times in week 2, 2 in week 3, and 1 in week 4 (approx. 30 minutes per session).	muscle strength), intrinsic motivation, and three quality of life domains (mobility, self-care, usual activities). No significant improvement was found in the control group. High adherence (88.2%) suggests good feasibility. However, small sample size and non-blinded assessment were noted limitations.
6	*The Effects of GAMotion (a Giant Exercising Board Game) on Physical Capacity, Motivation and Quality of Life among Nursing Home Residents: A Pilot Interventional Study*, Belgium(Buckinx et al., 2020)	21 older adults aged 65+; Pilot interventional study with 11 participants in the intervention group and 10 in the control group	The intervention proposed in the study is the creation of a typology of older adult players based on their intrinsic and extrinsic motivations (achievement, relatedness, meaning, and autonomy), aiming to guide the design of game-based systems (GBS) that are better suited to the specific needs, interests, and abilities of this demographic. By identifying and recommending appropriate game dynamics, mechanics, and elements for each player type, the study offers a framework for creating more engaging, meaningful, and accessible gaming experiences for older adults, helping to bridge the digital divide and promote their participation and satisfaction in digital games.	The study concludes that the proposed player typology and engagement model offer valuable tools for designing game-based systems that better engage older adults, improving their physical, cognitive, and social well-being through more tailored gaming experiences. The classification serves not to limit older adults but to better understand their motivations, allowing designers to create more inclusive and enjoyable games while avoiding demotivating factors like competitive rankings or complex controls. Future work will involve validating the model with real users through experience evaluations and monitoring how players' motivations and engagement evolve over time.
7	Efficacy of a Mental Health Game-Board Intervention for Adolescents in Remote Areas: Reducing Stigma and Encouraging Peer Engagement (Respati et al., 2024).	This study employed a mixed-methods approach with an embedded experimental model. 45 students was choosen by cluster	Carpe Diem is a cooperative game for 4 to 8 groups of players (each group can contain 1-3 people, so Carpe Diem can be played by up to 24 people) where each player must work together to face their various challenges.	The quantitative pre-post test results showed an increased average score with significant differences in stigma and awareness of mental health problems. The content analysis showed that the Carpe Diem board game could help decrease stigma, increase awareness of mental health problems, and encourage peer engagement in health-seeking behavior. However, we also discovered that the board game needed improvements in its integration with the formal curriculum and real-life situations.

8	Effects of Serious Games on Depression in Older Adults: Systematic Review and Meta-analysis of Randomized Controlled Trials (Y. Kim et al., 2022a)	Method: A systematic review and meta-analysis of randomized controlled trials were conducted with total of 17 studies with 1280 older adults were included in the systematic review, and 15 studies were included in the meta-analysis.	Regarding games for PA, the devices used in the intervention were Microsoft Xbox 360	Serious games were beneficial in reducing depression in older adults. Regardless of the study setting, serious games appeared to reduce depression. Particularly, serious games including PA had a significant impact on reducing depression. Furthermore, high-quality randomized controlled trials are needed to establish substantial evidence for the effectiveness of serious games on depression in older adults.
9	An eHealth Intervention to Improve Quality of Life, Socioemotional, and Health-Related Measures Among Older Adults With Multiple Chronic Conditions: Randomized Controlled Trial (Gustafson Sr et al., 2024)	Method: In a nonblinded randomized controlled trial, 346 participants recruited from primary care clinics were assigned 1:1 to the ElderTree intervention or an attention control and were followed for 12 months.	The intervention arm or an attention control for a period of 12 months. Patients in the experimental condition received UC plus ET access and a laptop computer, along with internet for 12 months.	This study showed that Given the need for broadly applicable behavioral interventions that could be implemented in primary care to help manage patients' varied combinations of chronic conditions and can help improving Quality Of life in elderly
10	Exploring Dance as a Therapeutic Approach for Parkinson Disease Through the Social Robotics for Active and Healthy Ageing (SI-Robotics): Results From a Technical Feasibility Study (Bevilacqua et al., 2025)	Method: The study is designed as a technical feasibility pilot to test the SI-Robotics system. For this study, 20 patients with Parkinson Disease were recruited.	A total of 16 Irish dance–based rehabilitation sessions of 50 minutes were conducted (2 sessions per week, for 8 wks),	This research underscores the promise of merging dance therapy with interactive exergaming on a robotic platform as an innovative strategy to enhance motor function, balance, gait, and overall quality of life for patients grappling with Parkinson Disease and Improving Quality of Life

Risk of Bias in Study

The quality evaluation of the reviewed studies reveals that seven studies Achieved a perfect score of 100%, indicating high reliability and methodological rigor. These studies met all quality criteria, including clear inclusion criteria, detailed subject descriptions, valid and reliable measurements, and appropriate statistical analyses. In contrast four studies scored 87.5%, reflecting moderate quality. While these studies demonstrated strong methodologies, they lacked strategies to address confounding factors, which slightly undermines their robustness. Their shortcomings were primarily related to the absence of confounding factor identification and strategies to address them, which affects the reliability of their findings. Overall, the studies varied in quality, with the majority demonstrating robust designs and a few requiring improvements in handling confounding variables.Of the 10 studies found positive results in the application of games therapy to reduce depression and Improfing Quality Of life.

Population Characteristics

The number of respondents in this study was 2457 elderly with the youngest age being 65 years and the oldest being 90 years. The research was only conducted on elderly people who experienced depression and to know the improving of quality of life. The majority of studies analyzed targeted elderly populations with specific health conditions. Participants included older adults with mild cognitive impairment and depression(Xue et al., 2021), individuals diagnosed with mild Alzheimer's disease (D. Kim, 2020). and a general elderly population

classified by age, gender, and social activities (Zhang et al., 2023).Other studies focused on older adults aged 60–65 in sub-healthy conditions (Tu et al., 2022), residents of nursing homes aged 65 and above (Buckinx et al., 2020), and elderly individuals with multiple chronic conditions (Gustafson Sr et al., 2024). Additionally, a subset of studies involved patients with Parkinson's disease engaging in dance-based rehabilitation (Bevilacqua et al., 2025). Overall, the population varied in health status but was consistently within the older adult demographic, ensuring the interventions addressed cognitive, emotional, social, and physical dimensions relevant to aging populations.

Duration of Intervention:

The results of the study show that the duration of interventions varied across the reviewed studies. Several interventions, such as the game training programs and dance therapy, were conducted over a period of eight weeks ((Xue et al., 2021); (Y. Kim et al., 2022a); (Bevilacqua et al., 2025)). Other interventions had shorter durations, such as the GAMotion intervention, which was delivered over four weeks with a gradual reduction in supervision (Salazar et al., 2022).The experiential learning study involving puzzle games was conducted over two brief sessions of approximately 20–30 minutes each (Tu et al., 2022).In contrast, longitudinal and eHealth studies extended over longer periods, with follow-ups conducted after six months ((Zhang et al., 2023)and a full 12-month intervention period for the ElderTree eHealth platform (Gustafson Sr et al., 2024).These varying durations reflect the adaptability of interventions to different research designs and objectives.

Clinical Results

The Clinical results showed that studies demonstrated positive effects of game-based, social, and digital interventions on elderly participants. Game training interventions significantly improved cognitive functioning and reduced depression symptoms among older adults with mild cognitive impairment(Xue et al., 2021). Similarly, recollection-based occupational therapy enhanced cognitive abilities, stabilized emotions, reduced problematic behavior, and promoted social interaction in patients with Alzheimer's disease (Y. Kim et al., 2022a)). Experiential learning through puzzle games promoted cognitive stimulation, strategic thinking, and engagement (Tu et al., 2022).The GAMotion intervention yielded improvements in physical capacity, intrinsic motivation, and quality of life domains, although the small sample size was a limitation ((Buckinx et al., 2020); (Salazar et al., 2022)). Serious games were found to significantly reduce depression in older adults regardless of the setting (Y. Kim et al., 2022a),and eHealth interventions demonstrated effectiveness in improving quality of life among elderly patients with chronic conditions (Y. Kim et al., 2022a).Dance-based rehabilitation also showed promising outcomes in motor function and emotional well-being for Parkinson's disease patients (Bevilacqua et al., 2025)

DISCUSSION

The findings from these studies collectively emphasize that tailored, engaging interventions—whether through game-based activities, experiential learning, occupational therapy, or digital platforms—have substantial potential to enhance the physical, cognitive, and socioemotional health of older adults. Active engagement through games and interactive technologies can mitigate age-related decline, address loneliness, and improve mental health outcomes such as depression and anxiety(Y. Kim et al., 2022a). However, despite the promising results, several studies were limited by small sample sizes, short durations, lack of blinding, and varied measurement methods. These methodological limitations underscore the need for more rigorously designed randomized controlled trials with larger populations, standardized outcome measures, and long-term follow-up to better establish the effectiveness and sustainability of such interventions. Additionally, integrating these interventions into routine care practices could provide a holistic approach to elderly care (Salazar et al., 2022)According

to the previous research, gamification has been identified as a potential strategy for minimizing obstacles to participant engagement in interventions. Using gamification techniques in board games can improve players' cognitive knowledge and genencreased literacy increased awareness of this situation, resulting in a paradigm shift toward health-seeking behavior. rate a transformative shift in their attitudes and perspectives on a specific subject (Respati et al., 2024). Among the types of games, those that applied PA, including games for both accounted for approximately 70%. Our findings indicated that helping body movements directly by using various devices had a significant effect on reducing depression compared with games for CF. PA has been found to reduce depression through biological and psychosocial mechanisms(Y. Kim et al., 2022a)

CONCLUSION

In conclusion, the application of game-based systems, occupational therapies, experiential learning techniques, eHealth solutions, and social interaction models demonstrates a positive impact on the well-being of older adults. These interventions not only improve cognitive functions, physical capacity, and emotional stability but also contribute significantly to enhancing overall quality of life. The feasibility and high levels of participant engagement observed suggest that such interventions are well-received and practical for broader implementation. Future research should focus on expanding sample sizes, extending the duration of interventions, and incorporating longitudinal assessments to validate and strengthen the evidence base for the use of gamified and digital therapeutic approaches in elderly populations.

REFERENCES

Badan Pusat Statistik. (2022). Badan Pusat Statistik 2022.

Bevilacqua, R., Maranesi, E., Benadduci, M., Cortellessa, G., Umbrico, A., Fracasso, F., Melone, G., Margaritini, A., La Forgia, A., Di Bitonto, P., Potenza, A., Fiorini, L., La Viola, C., Cavallo, F., Leone, A., Caroppo, A., Rescio, G., Marzorati, M., Cesta, A., … Rossi, L. (2025). Exploring Dance as a Therapeutic Approach for Parkinson Disease Through the Social Robotics for Active and Healthy Ageing (SI-Robotics): Results From a Technical Feasibility Study. JMIR Aging, 8. https://doi.org/https://doi.org/10.2196/62930

Buckinx, F., Bruyère, O., Lengelé, L., Reginster, J. Y., Marchal, Q., Hurtrez, P., & Mouton, A. (2020). The effects of GAMotion (a giant exercising board game) on physical capacity, motivation and quality of life among nursing home residents: A pilot interventional study. Experimental Gerontology, 138(March), 110983. https://doi.org/10.1016/j.exger.2020.110983

Delgado-rodríguez, M., & Sillero-arenas, M. (2017). Systematic review and meta-analysis. Medicina Intensiva, xx. https://doi.org/10.1016/j.medin.2017.10.003

Gustafson Sr, D. H., Mares, M.-L., Johnston, D., Vjorn, O. J., Curtin, J. J., Landucci, G., Pe-Romashko, K., Gustafson Jr, D. H., & Shah, D. V. (2024). An eHealth Intervention to Improve Quality of Life, Socioemotional, and Health-Related Measures Among Older Adults With Multiple Chronic Conditions: Randomized Controlled Trial. JMIR Aging, 7. https://doi.org/https://doi.org/10.2196/59588

Juita, D. R., & Shofiyyah, N. A. (2022). Peran Keluarga Dalam Merawat Lansia. Jurnal Agama Sosisal Dan Budaya, 5(2), 2599–2473. https://e-journal.ikhac.ac.id/index.php/almada/article/view/2413

Kaunang, V. D., Buanasari, A., & Kallo, V. (2019). Gambaran Tingkat Stres Pada Lansia. Jurnal Keperawatan, 7(2). https://doi.org/10.35790/jkp.v7i2.24475

Kim, D. (2020). The Effects of a Recollection-Based Occupational Therapy Program of Alzheimer ' s Disease : A Randomized Controlled Trial. 2020.

Kim, Y., Hong, S., & Choi, M. (2022a). Effects of Serious Games on Depression in Older Adults: Systematic Review and Meta-analysis of Randomized Controlled Trials. Journal of Medical Internet Research, 24(9). https://doi.org/10.2196/37753

Kim, Y., Hong, S., & Choi, M. (2022b). Effects of Serious Games on Depression in Older Adults: Systematic Review and Meta-analysis of Randomized Controlled Trials. Journal of Medical Internet Research, 24(9). https://doi.org/https://doi.org/10.2196/37753

Lase, N. P., & Souisa, D. L. R. (2021). Peran Keluarga bagi Orang Usia Lanjut. SUNDERMANN: Jurnal Ilmiah Teologi, Pendidikan, Sains, Humaniora Dan Kebudayaan, 14(2), 87–96. https://doi.org/10.36588/sundermann.v14i2.76

Manafe, L. A., & Berhimpon, I. (2022). Hubungan Tingkat Depresi Lansia Dengan Interaksi Sosial Lansia di BPSLUT Senja Cerah Manado. Jurnal Ilmiah Hospitality 749, 11(1), 749–758.

Nursalam. (2020). Literature Systematic Review pada Pendidikan Kesehatan. In Fakultas Keperawatan Universitas Airlangga (Vol. 4, Issue 3).

Pratiwi, A., Hardiyanti, I. P., & Sari, R. P. (2020). Hubungan Interaksi Sosial dengan Depresi pada Lansia di RW 10 Pondok Sejahtera Kuta Baru Tangerang. Surya: Jurnal Media Komunikasi Ilmu Kesehatan, 12(2), 58–63.

Respati, T., Feriandi, Y., Frederico, R., Nugroho, E., Pardosi, J. F., & Withall, A. (2024). Efficacy of a Mental Health Game-Board Intervention for Adolescents in Remote Areas: Reducing Stigma and Encouraging Peer Engagement. The Open Public Health Journal, 17. https://doi.org/https://doi.org/10.2174/0118749445310785240603045859

Ridiansya, A. S. P. (2019). Hubungan Fungsi Sosial dengan Tingkat Depresi pada Lansia di Posyandu Lansia Kelurahan Karanglo Lor, Kecamatan Sukorejo. Nhk技研.

Riskesdas. (2022). Riset Kesehatan Dasar.2018.

Rosary, M. D., Handinoto, D. I., Perspektif, G. 1, Wredha, P., & Surabaya, D. (2020). Panti Wredha di Surabaya. Jurnal Edimensi Arsitektur, Viii(1), 249–256.

Salazar, J., Gutièrrez, F., Arango, J., & Paderewski, P. (2022). Older adults and types of players in game-based systems: Classification based on their motivations. ACM International Conference Proceeding Series, October. https://doi.org/10.1145/3549865.3549900

Tu, J. C., Yang, C. H., Liang, C. Y., & Chen, H. Y. (2022). Exploring the Impact of Puzzle Games for the Elderly from Experiential Learning. Thinking Skills and Creativity, 45(April 2022), 101107. https://doi.org/10.1016/j.tsc.2022.101107

WHO. (2022). World Health Organization. 2018.

Xue, B. (2021). mild cognitive impairment : A randomized controlled trial. February. https://doi.org/10.1002/mpr.1887

Xue, B., Xiao, A., Luo, X., & Li, R. (2021). The effect of a game training intervention on cognitive functioning and depression symptoms in the elderly with mild cognitive impairment: A randomized controlled trial. International Journal of Methods in Psychiatric Research, 30(4). https://doi.org/10.1002/mpr.1887

Zhang, Y., Kuang, J., Xin, Z., Fang, J., Song, R., Yang, Y., Song, P., Wang, Y., & Wang, J. (2023). Loneliness, social isolation, depression and anxiety among the elderly in Shanghai: Findings from a longitudinal study. Archives of Gerontology and Geriatrics, 110(February), 104980. https://doi.org/10.1016/j.archger.2023.104980.