

The Effect of Cognitive Motor Dual Task-Based Exercise Game Therapy on the Quality of Life and Endurance in the Elderly

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Abstract

Imprisonment at an advanced age impairs physical, mental, and social well-being, declining quality of life for elderly Correctional Assisted Citizens (*Warga Binaan Pemasyarakatan/WBP*) at Class IIB Sleman Prison. The PKM-PM team from 'Aisyiyah University of Yogyakarta implemented a Cognitive Motor Dual Task (CMDT) program based on Exercise Game Therapy (EGT) to realize *Urip Apik* (good quality of life) via interactive physical-cognitive exercises. Conducted July 4–October 19, 2025, it involved 12 elderly WBPs, supported by health workers and officers. The program featured three stages: *Apik Raga* (physical coordination), *Apik Rasa* (cognitive-emotional well-being), and *Apik Rengkuh* (social confidence). Activities included discussions, assessments, interventions, and SF-36 evaluations, boosting average quality-of-life scores from 52.1 to 72.6 (39.35% improvement), especially in social functioning, emotional well-being, and energy. Internal questionnaires showed knowledge rising from 39.6% to 87.5% and skills from 64.6% to 89.6%, with gains in self-acceptance, motivation, and interaction. It aligns with Permenkumham No. 32/2018, Law No. 39/1999 on Human Rights, SDGs 3 and 10, and Asta Cita priorities for vulnerable groups.

Keywords: elderly inmates, quality of life, exercise game therapy

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INTRODUCTION

The increase in the number of elderly is a global phenomenon that marks a shift towards an ageing society (Ageing Population). According to (WHO, 2023), the number of elderly population world estimated to reach 2.1 billion people by 2050, an increase of almost double from 2020. In the area Southeast Asia, the elderly population reaches around 8% or 142 million people and is projected to triple in the same year. This condition shows that the increase in the number of elderly people is a major challenge for health and social welfare systems at the global and regional levels (Al Afif and Hidayati, 2021).

In Indonesia, a similar trend is also occurring. The Central Statistics Agency (BPS, 2024) reported that the population aged 60 years and above reached 11.78% or around 33.4 million people out of a total of 283.5 million people, an increase of 10.48% compared to the previous year. According to the Ministry of Health of the Republic of Indonesia (2024), the three provinces with the highest percentage of elderly people are the Special Region of Yogyakarta (13.81%), Central Java (12.59%), and East Java (12.25%). Based on the WHO classification, the elderly are divided into several age categories, namely 45–60 years old (middle-aged/intermediate age), 60–75 years old (elderly/main elderly), 75–90 years old (elderly/pre-elderly), and over 90 years old (very old/early age) (Akbar et al., 2021).

Research Global Age Watch which examines the quality of life of the elderly population in 96 countries Placing Indonesia is ranked 71st overall, and Ranked 70th in the health domain, showing the low welfare and quality of life of the elderly at the global level. The aging process causes various changes physical, psychological, social, and health, which affects the ability of the elderly to live Activity Daily Life (ADL) independently. These limitations are often exacerbated by degenerative diseases, decreased cognitive function, sleep disorders, chronic

pain, social isolation, and low life satisfaction. Many elderly people find it difficult to adapt to the aging process, feel lonely, frustrated, and lose confidence, thus negatively impacting their quality of life (Al Afif and Hidayati, 2021).

According to WHO, quality of life is an individual's perception of their position in life according to the cultural context and values they embrace, taking into account personal goals and expectations. Quality of life is measured through Four main domains, namely physical, psychological, social, and environmental (Akbar et al., 2021; Bowling & Stenner, 2011; Langhammer et al., 2018; Zhao et al., 2016). The physical domain includes health conditions and daily activity abilities; the psychological domain includes positive feelings, self-esteem, and self-satisfaction; the social domain deals with social interaction and support; Meanwhile, the environmental domain includes security, access to health services, and housing conditions. Thus, quality of life reflects a balance between physical health, mental well-being, social relationships, and a supportive environment (Astuti, Tri Wahyuningsih and Ratna Wulan Hadian, 2025).

The increase in the elderly population is also seen in Correctional Institutions (Lapas). Based on data from the Directorate General of Corrections (2021), the number of elderly Correctional Assisted Citizens (WBP) in Indonesia reached 4,408 people or around 5.5% of the total 238,000 WBPs (Bahar & Subroto, 2023). Elderly WBPs have different physiological and psychosocial needs than productive age WBPs (Beard et al., 2016). They are more susceptible to experiencing a decline in physical, psychological, and social function due to the aging process, lack of physical activity, and limited space for movement in the prison environment (Maschi et al., 2012; Williams et al., 2012). This condition is also regulated in Permenkumham Number 32 of 2018 and Law Number 39 of 1999 concerning human rights which affirms protection for vulnerable groups, including the elderly (Wardana and Subroto, 2023).

Incarceration at an advanced age has a complex impact on the physical, mental, and social well-being of inmates (Aday & Krabill, 2011). Therefore, the fulfillment of the rights of elderly prisoners is an essential aspect in efforts to improve their quality of life in the penitentiary environment (Wardana and Subroto, 2023). This problem is even more complex because the elderly WBP is a unique group that is rarely targeted by community service programs or research. In contrast to the elderly outside the prison who have family, community, and access to open health services, elderly WBPs live in limited space, social isolation, and stigma as inmates (Pichierri et al., 2011; Theill et al., 2013). Therefore, an intervention approach is needed that Directional, innovative, and sustainable to improve their quality of life.

Answering these problems, we present Cognitive Motor Dual Task (CMDT) based on Exercise Game Therapy (EGT) as an innovative, practical, and scientific-evidence-based solution. CMDT combines motor and cognitive exercises simultaneously to improve executive function, muscle strength, balance, and quality of life in the elderly (Hao et al., 2025). This method is relevant to be applied in the prison environment because it is practical, efficient, and can be done with simple means (Skjaeret et al., 2016; Valenzuela et al., 2018).

This approach is combined with Exercise Game Therapy (EGT), which is an interactive game based on physical exercise that combines motor and cognitive activities in a fun, challenging, and directed way (Maggio et al., 2025). EGT activities are attractive, varied, and foster the active involvement of the elderly to improve physical health and psychological well-being. This method is flexible, can be adjusted to the capabilities of the elderly WBP, and has the potential to become a sustainable routine with the assistance of officers and health workers. The solution has been systematically implemented in PKM-PM activities (Lauenroth et al., 2016).

Meanwhile, *Apik Rengkuh* aimed to strengthen social interaction, self-confidence, and motor–cognitive skills through communication, group collaboration, and creative art-based activities conducted in a safe and enjoyable environment. Program evaluation was conducted to assess changes in quality of life through post-intervention measurement using the SF-36 questionnaire, supported by vital sign assessments, with the results serving as a basis for determining program effectiveness and guiding further program improvement.

RESULTS AND DISCUSSION

Results of the Implementation of the Activity Program

The PKM-PM program at the Class IIB Sleman Prison was carried out for approximately four months (July 4-October 19, 2025) with a 100% achievement rate. The activity involved elderly WBP and was accompanied by officers and health workers, with a duration of 2.5 hours each session. A description of the program's achievements is presented in the following section and reinforced with supporting evidence (Appendix 6).

Observation and Focus Group Discussion (FGD)

The activity was carried out on August 4, 2025, showing that sports facilities have not been optimally utilized and there is no special program for the elderly, they complained of body fatigue, decreased memory, and boredom due to monotonous activities, so more effective interventions are needed.



Figure 2. Observation and Focus Group Discussion (FGD)

Program Socialization

The activity was held on August 7, 2025 to introduce the CMDT method with EGT and build full understanding and support from partners. Elderly WBP hopes that this activity can improve health while reducing boredom, while officers and health workers feel helped by the guidance of the elderly WBP.



Figure 3. Program Socialization

Initial Inspection

The activity was held on August 11, 2025, focusing on assessing quality of life using the SF-36 questionnaire as the main instrument to describe the physical, psychological, and social conditions of the elderly WBP before the implementation of the program. In addition, vital signs were also measured to ensure the condition of the elderly WBP was in normal condition and suitable for participating in activities.

The measurement results using the SF-36 questionnaire instrument showed an average score of 52.1 from the range of 0–100, which is classified as a medium-low category. This value indicates a decrease in the quality of life of the elderly compared to healthy elderly people

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in general (70–90). This condition shows that limited movement space, lack of physical activity and social interaction, and psychological pressure in the prison environment also affect their physical and emotional well-being. These results are an initial reference in evaluating the effectiveness of the CMDT program in improving the quality of life of the elderly WBP.

Implementation of Activities

Apik Raga

Apik Raga will be held on August 15-25, 2025 in four meetings each consisting of two activities and involving 12 elderly WBPs. Based on observations, at the initial meeting of the elderly WBP appeared stiff and lacked confidence, but after a few meetings they became more excited, coordination of movements improved, and concentration was better. One of the elderly WBPs said that his body feels fitter and healthier because he can hone his physique and mindset through fun activities.

Apik Rasa

Apik Rasa was held on August 28-September 8, 2025 in four meetings, each consisting of two activities and involving 12 elderly WBPs which then increased to 14 at the fourth meeting. At this stage, elderly WBPs are able to adapt to more complex activities, as shown by improved coordination of movement, agility, focus, and problem-solving skills. They feel fitter, energized, and motivated to face physical and mental challenges in a positive emotional atmosphere.

Apik Rengkuh

Apik Rengkuh was held on September 12-26, 2025, in four meetings, each consisting of two activities, with the number increasing from 14 to 16 elderly WBPs at the second meeting. In the final stages, the atmosphere of the group becomes more familiar; The WBP encouraged each other, and some who were previously passive became very active in participating in the *Story Rope* and *Soul Narrative* games. This condition reflects increased self-confidence, social interaction, and psychological well-being in a safe and fun atmosphere. The results of the observation of activities can be seen in (Appendix 8).



Figure 4. A good performance

Program Evaluation

The program evaluation was carried out on October 2, 2025 involving 16 elderly WBPs, prison officers, and health workers. This activity included re-measurement of the SF-36 questionnaire instrument to assess changes in quality of life after the intervention as well as vital signs examination to ensure that the health condition of the elderly remains stable and shows good physiological adaptation during the program.

There was a significant increase in the SF-36 score, which reflected the overall quality of life of the elderly WBP. The average score rose from 52.1 to 72.6 (an increase of 20.5 points or 39.35%), with the largest improvements in aspects of social functioning, emotional well-being, and energy/fatigue. In the context of the prison environment with limited physical and social activities, the score shows that the quality of life of the elderly WBP is relatively good and close to the normal population range (70–90). This confirms the improvement of physical

fitness, activity ability, and psychosocial well-being after participating in a structured and sustainable CMDT program.

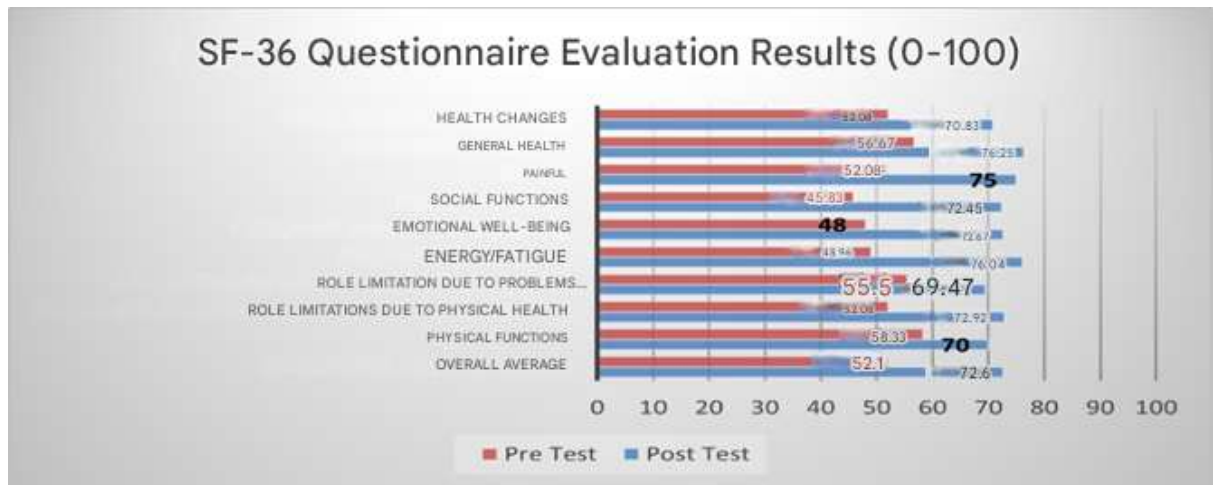


Figure 5. Results of Questionnaire Evaluation SF-36

Program Outcomes

The implementation of the PKM-PM programme has produced achievements that reflect the success in achieving the set goals, as presented in the following table.

Table 1. Program Outcomes

Stages of Activity	Achievement Indicators	Rate (%)
Observations and FGDs	The conditions, facilities, and needs of the elderly WBP were identified through observation and discussion with officers and health workers; Basic data was obtained as a reference to adjust the implementation of the program to suit field conditions.	100%
Program Socialization	Officers, health workers, and elderly WBPs understand the purpose and methods of EGT-based CMDT; Partner support and commitment are built.	100%
Initial Inspection	The vital sign measurement and filling out the SF-36 questionnaire were completed; Preliminary data were obtained on the physical condition and quality of life of the elderly WBP before the intervention.	100%
Program Implementation	All activities were carried out according to schedule with high participation; There is an increase in motivation, coordination of movements, concentration, and social interaction.	100%
Program Evaluation	Re-measurements of vital signs and SF-36 showed improvements in physical, psychological, and social aspects that reflected improvements in the quality of life of elderly WBP.	100%

Sustainability Potential

The EGT-based CMDT program has high potential to be sustainable because it has been integrated into the routine of coaching activities of the Sleman Class IIB Prison through the active support of coaching officers and prison health workers. The sustainability of the program is also supported by the existence of a partner handbook as a guide for independent implementation, supported by the existence of game props, as well as an MoU between the implementation team, the Sleman Class IIB Prison, and the Regional Office of the Directorate General of Corrections of Yogyakarta as the basis for long-term cooperation.

In addition, this method is practical, inexpensive, and easy to apply allowing this program to be replicated in other prisons in the DIY area as well as nationally. This activity has the potential to be part of a program to foster health for the elderly based on physical and cognitive

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activity in the correctional environment, in line with the policy direction of the Ministry of IMPAS in fostering vulnerable groups. Thus, EGT-based CMDT not only has a temporary impact during the implementation of PKM-PM, but also has the opportunity to become a model of sustainable intervention that consistently improves the quality of life of elderly WBPs.

CONCLUSION

The Cognitive Motor Dual Task (CMDT) program based on Exercise Game Therapy (EGT) effectively empowered elderly Warga Binaan Masyarakat (WBP) at Class IIB Sleman Prison to achieve *Urip Apik* (a good life). Through interactive, enjoyable physical-cognitive exercises, supported by officers and health workers, it significantly improved body function, mental clarity, life enthusiasm, quality of life, confidence, social togetherness, and positive outlook amid prison constraints, fostering active, healthy, happy, and empowered aging. Future research could explore long-term retention of these gains and scalability to other prisons via randomized controlled trials.

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