



Development Of Laras Jiwa Gymnastics Model Using Traditional Music Of Central Java As An Effort To Improve The Cognitive Function Of The Elderly In The City Of Semarang

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Abstract

The increasing number of elderly people demands the formulation of innovative efforts to maintain the quality of life, especially in dealing with the decline in cognitive function that accompanies the aging process. This study aims to develop and evaluate the effectiveness of the exercise Laras Jiwa model based on traditional Central Javanese music in improving the cognitive function of the elderly. The research method used Research and Development (R&D) through ten stages of development. The study subjects were elderly aged 60–70 years from three clinics in Semarang City. The research instruments included validation sheets from health experts, gymnastics experts, art or music experts, observation sheets, and the Mini Mental State Examination (MMSE). The results of the Shapiro Wilk normality test showed that the pre-test and post-test cognitive function data were normally distributed ($p > 0.05$), so the analysis was continued using parametric statistics. The results of the paired sample t-test showed a significant difference between the MMSE scores before and after the implementation of the Exercise Laras Jiwa program for 12 weeks ($p < 0.05$). These findings confirm the effectiveness of Exercise Laras Jiwa as a local culture-based physical activity model in improving the cognitive function of the elderly.

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INTRODUCTION

Exercise is a form of physical activity that is carried out in a planned and sustainable manner with the aim of maintaining and improving physical fitness, mental health, and the quality of life of individuals, both from physical and psychological aspects. Exercise activities that contribute to improving the immune system and physical fitness are forms of physical exercise that are able to provide adequate stimulus or workload to the cardiovascular and respiratory systems, especially the heart and lungs (Lisdiana et al., 2021). The implementation of a regular exercise routine supported by a healthy diet and a balanced lifestyle plays an important role in realizing optimal health conditions, which are characterized by physical, mental, and social well-being, so that individuals are able to carry out life activities productively and avoid diseases and health problems.

According to the World Health Organization (WHO), health is not only the absence of disease, but also a state of overall well-being (Schramme, 2023). Health is very important for human life, There are so many factors that contribute to human health, including nutrition, physical activity, the level of stress experienced, personality and behavior, as well as behavior (Natalina et al., 2022). In 2025 in the world, it is estimated that there are around 1.2 billion people in the world who are currently more than 60 years old and will increase to 2 billion in 2050, where 80% of the population lives in developing countries, namely in Indonesia, Indonesian citizens approximately have a population of 231.4 million people and will certainly continue to experience an increase in the population, especially the elderly (Lestari & Widyyati, 2020).

A person who has entered the elderly category (60 years and older) is important to maintain health, because an elderly person will experience a decline in biological, psychological, physical, and social levels both consciously and unconsciously (Karunianingtya & Kumaat, 2021). Elderly

is an abbreviation for elderly, which refers to individuals who have entered old age and undergone various biological, psychological, physical, and social changes and are also usually over 60 years old.

These changes that are often experienced have an impact on all aspects of an individual's life, including health (Arini et al., 2020). However, as we age, various bodily functions decline so that the elderly become more susceptible to diseases, both physical and mental. Lack of physical activity or movement, such as regular exercise, is one of the main causes of declining health in the elderly. A sedentary or sedentary lifestyle can increase the risk of various degenerative diseases such as diabetes, hypertension, heart disease, and cognitive impairment. Based on research conducted by Tabita Ma Windri et al. (2019), cited by (Handayani et al., 2020), it is known that before the implementation of physical activity, the average quality of life of the elderly was at 62.8%, and after intervention it increased to 65.25%.

The quality of life domain includes four aspects, namely physical health, psychological health, social relationships, and the environment. Thus, it can be concluded that there is an improvement in the quality of life of the elderly by 2.48% after participating in physical activity. Therefore, encouraging the elderly to remain physically active is an important strategy in improving the quality of life, both from physical, mental, and emotional aspects. According to (Permana et al., 2009) individuals who enter the elderly and pre-elderly without realizing a significant decrease in movement function, this condition will certainly have a major impact on their ability to carry out daily activities, ranging from simple tasks to jobs that require more complex coordination and affect their independence and quality of life. Low levels of physical activity increase the risk of sarcopenia, which is characterized by a decrease in muscle mass and strength,

resulting in an increased risk of falls, decreased mobility, and reduced functional independence in the elderly (Sharew, 2022).

The aging process is a natural stage of life accompanied by biological, physiological, and psychological changes, including a decline in cognitive function due to deterioration in brain structure and function that affects memory, attention, and reasoning and problem-solving abilities (Sova et al., 2023). The elderly are a population group that is highly susceptible to mild cognitive impairment (MCI), which, if not treated properly, has the potential to develop into dementia, a serious condition that impacts an individual's social, emotional, and functional life.

Research (Fadhilah, 2021) shows that brain gymnastics has a significant effect on improving cognitive function in the elderly, as evidenced by pre-experimental design with a pre-test-posttest approach of one group and *paired sample t-test analysis* at Posyandu Nusa Indah. The similarity of the study with this study lies in the focus on improving the cognitive function of the elderly through gymnastic activities, but Fadhilah's research is still limited to testing the effectiveness of standard brain gymnastics without model development and without the integration of traditional music or cultural approaches, thus opening up opportunities for the development of Psychic Barrel Gymnastics based on traditional Central Javanese music that integrates neuromotor movements and local cultural elements.

In addition, research by Ervi Suminar and Levi Tina Sari (2023) proves that brain gymnastics has a significant effect on improving cognitive function in the elderly, especially memory, with an average increase of 3.6 points and a p value = 0.000, which shows the effectiveness of the intervention statistically. The use of a *nonequivalent control group design* strengthens the validity of the findings through a comparison between the treatment and control groups, although this

study still has limitations in the form of a relatively small sample number, limited site coverage, and no evaluation of the sustainability of the effects of the intervention in the long term, thus opening up opportunities for the development and testing of a more comprehensive and sustainable gymnastics model.

Although effective in improving the cognitive function of the elderly, existing brain gymnastics programs still face limitations in the form of movement complexity and low motivation of participants, so it is necessary to develop models with simpler movements and the integration of cultural-based music to increase participation and sustainability of training.

A contextual and culture-based approach to elderly intervention is an important strategy in increasing the effectiveness of the program, considering that there are still many brain exercise models that use high-intensity movements, are not in accordance with the physical condition of the elderly, and have not been integrated with local cultural elements, as the findings of initial observations in Prolanis Krisna Ceria which showed the low, monotonous, and unstructured physical activity of the elderly accompanied by symptoms of decreased cognitive function. so it is necessary to develop adaptive, safe, and traditional Central Javanese music-based gymnastics models, such as Laras Soul Gymnastics, to support the improvement of cognitive function and quality of life of the elderly holistically.

The findings of Kusuma Husada (2024) show that music therapy, especially traditional music, has significant therapeutic potential in improving the cognitive function of the elderly through regular and repetitive music rhythms that are able to stimulate brain activity and maintain neuronal connectedness thereby slowing down the decline in memory and concentration, while providing emotional and social benefits

through the historical content of Javanese culture that evokes memories and increases engagement affective in group activities, so that the development of a brain gymnastics model that integrates structured physical movements, cognitive stimulation, and cultural identity strengthening becomes a relevant and sustainable intervention approach for improving the quality of life of the elderly.

Research by Laksmidewi & Tjandra Dewi, (2021) in a study entitled *"Classic and Traditional Music Role in Cognitive Function and Critically Ill Patients"* shows that music therapy, both Western classical music and traditional music such as the Balinese flute, plays a significant role in improving cognitive function through neuroplasticity mechanisms and activation of the mesocorticolimbic dopaminergic pathway, as well as providing psychological benefits in the form of decreased anxiety and stress, but the research is still limited to receptive music interventions without the integration of physical activity or the development of structured intervention models and has not examined the potential of traditional music of Central Java as well as the integration of motor-cognitive stimulation in the elderly community, so further research is needed that is more contextual and applicative through the development of traditional music-based gymnastics models.

In addition, Zhou et al., (2025) in a study entitled *"Effect of music therapy on cognitive function among older adults: a systematic review and meta-analysis of randomized controlled trials"* showed that music therapy has a significant effect on improving global cognition, memory, and executive function in the elderly, but the study is still limited to passive music interventions without the integration of physical activity and has not yet developed a model contextual intervention based on traditional music, so it is necessary to develop a Laras Jiwa gymnastics model based on traditional central Java music that

integrates cognitive stimulation and motor function according to the needs of the elderly community. Laras Jiwa gymnastics was developed as a low-intensity physical activity model that integrates simple movements, cognitive stimulation, and traditional central Javanese music as a holistic approach that is adaptive, safe, and culturally meaningful to improve cognitive function, emotional engagement, and quality of life for the elderly

METHODS

This research is categorized as *Research and Development (R&D) development research* which is oriented towards the design and testing of the feasibility and effectiveness of the Laras Jiwa Gymnastics model which is integrated with traditional music of Central Java as an effort to improve the cognitive function of the elderly in Semarang City. The development process was carried out by referring to the modified Borg and Gall model, as well as applying a mixed methods approach, where quantitative analysis was used to evaluate and test the effectiveness of the intervention using SPSS calculations, while qualitative analysis was used to assess aspects of the feasibility, practicality, and acceptance level of the gymnastics model.

The population of this study includes the elderly who are members of the Rahmatika Clinic, Prolanis Krisna Ceria, and Prolanis Jetis in Semarang City. The sample was determined through purposive sampling technique, involving 61 elderly people selected based on research criteria, consisting of 18 elderly people from Rahmatika Clinic, 20 elderly people from Prolanis Krisna Ceria, and 23 elderly people from Prolanis Jetis.

The instruments used in this study include expert validation instruments, cognitive function measurement tools, and observation and documentation instruments. Expert validation instruments are prepared in the form of questionnaires and given to

health experts, gymnastics, and art/music experts to assess aspects of material feasibility, safety and precision of movement, suitability of musical accompaniment, and the level of practicality of the Laras Jiwa Gymnastics model. Cognitive function measurement was carried out using Mini-Mental State Examination (MMSE) at the pre- and post-intervention stages to evaluate the effectiveness of the program. Observation and documentation instruments were used to record responses, levels of engagement, and obstacles that arose during the implementation of the trial.

The development of the Laras Jiwa model based on traditional Central Javanese music was carried out through systematic stages that began with the identification of problems of cognitive decline in the elderly. Furthermore, data collection was carried out through observation, interviews, documentation, and literature review to obtain an overview of model development needs. Based on these results, the initial design of the Laras Jiwa Gymnastics was prepared which included the purpose, movement structure, duration of training, and the selection of traditional musical accompaniment that was in accordance with the characteristics of the elderly. The product design is then validated by health experts, gymnasts, and artist/music experts to assess feasibility, safety, musical suitability, and practicality, and revised based on expert input.

The next stage is a small-scale trial that aims to determine the level of practicality and initial response of the elderly to the developed gymnastics model. The results of the trial became the basis for the implementation of the initial product revision before proceeding to large-scale trials to test the effectiveness of Laras Jiwa Gymnastics on improving cognitive function of the elderly through measurements before and after the intervention. Based on the results of large-scale trials, revisions were made to improve the model, until the final

product of Laras Jiwa Gymnastics was found that was declared valid, practical, and effective and worthy of being recommended for wider application in the elderly health development program.

RESULTS AND DISCUSSION

The results of the experts' assessment showed that the Laras Jiwa Gymnastics model was included in the very *feasible* category, with a high percentage achievement from gymnastics experts (96.05%), music arts experts (96.31%), and health experts (96.88%). These results indicate that the developed model has met the main principles of physical activity for the elderly, especially regarding aspects of safety, intensity accuracy, and participant acceptance rate. The movements designed are *low impact* and systematically arranged so that they are in accordance with the physiological conditions of the elderly. Therefore, Mental Barrel Gymnastics has an adequate scientific basis and is feasible to be continued at the small-scale trial stage.

The results of the phase I small-scale trial involving eight elderly people showed an eligibility rate of 78.75% in the very good category, although improvements are still needed in the complexity of movements and clarity of instructions. Based on these results and the input of experts, a revision of the Laras Soul Gymnastics model was carried out. Furthermore, the phase II small-scale trial showed an increase in feasibility to 92.5% (excellent category), which confirms that the improvements made are effective in increasing acceptability and ease of implementation. Thus, the Laras Jiwa Gymnastics model was declared feasible to proceed to the large-scale trial stage.

This study aims to determine the effectiveness of the application of the gymnastics model in improving the cognitive function of the elderly in Semarang City. The large-scale trial involved 61 elderly people from three health service facilities,

namely Rahmatika Clinic (18 elderly people), Jetis Clinic (23 elderly people), and Prolanis Krisna Ceria (20 elderly people). Cognitive function measurement was carried out using the Mini Mental State Examination (MMSE) instrument through the initial test (pretest) and final test (posttest). The Pelas Jiwa Gymnastics intervention was carried out for 6 weeks with a frequency of two meetings per week, using a procedure consistent with small-scale trials.

1. Descriptive statistical analysis of research variables

Table 1. Normality Test of Jetis Elderly Data

Category	Df	Sig. Shapiro-Wilk
Pretest	23	.080
Posttest	23	.061

The normality test of pretest and posttest data in the Jetis elderly group was carried out using Shapiro-Wilk through the SPSS program as a prerequisite for parametric statistical analysis. The test results showed a significance value of the pretest of 0.080 and the posttest of 0.061, both of which were greater than 0.05 ($p > 0.05$). Thus, the data is declared to be normally distributed and worthy of further analysis using parametric statistical tests.

Table 2. Paired Sample t-Test for Jetis Elderly Data

Category	Df	Sig. Shapiro-Wilk
Pretest	23	.080
Posttest	23	.061

The normality test of pretest and posttest data in the Jetis elderly group was carried out using Shapiro-Wilk through the SPSS program as a prerequisite for parametric statistical analysis. The test results showed a pretest significance value of 0.080 and a posttest of 0.061, both of which were greater than 0.05 ($p > 0.05$). Thus, the

data is declared to be normally distributed and worthy of further analysis using parametric statistical tests.

Table 3: Prolanis Krisna Ceria Data Normality Test

Category	Df	Sig. Shapiro-Wilk
Pretest	20	.499
Posttest	20	.128

The results of the Shapiro-Wilk normality test in the elderly group Prolanis Krisna Ceria showed a significance value of 0.499 and a posttest value of 0.128 ($p > 0.05$), so that cognitive function data were declared to be normally distributed. With the fulfillment of these assumptions, further analysis can be carried out using a paired sample t-test to test the effect of the application of the Laras Jiwa Gymnastics Model based on traditional Central Java music on the improvement of cognitive function of the elderly.

Table 4. Uji Paired Sample t-test Prolanis Krisna Ceria

	Mean	Std. Mean	Df	Sig.
Pretest	-5.00000	.31623	19	0.000
Posttest				

After the data is declared to be normally distributed, analysis is carried out using *the paired sample t-test*. The test results showed a significant difference between cognitive function scores before and after the intervention ($t = -15.811$; $df = 19$; $p < 0.05$). The average difference in pretest and posttest scores was -5.00 with a standard error mean of 0.32 . Thus, the Laras Jiwa Gymnastics Model based on traditional Central Javanese music has been proven to have a significant influence on improving the cognitive function of the elderly.

Table 5. Normality Test of Rahmatika Clinic Data

Category	Df	Sig. Shapiro-Wilk
Pretest	18	.296
Posttest	18	.197

The Shapiro–Wilk normality test on the pretest and posttest data of the elderly at Rahmatika Clinic showed significance values of 0.296 and 0.197 respectively ($p > 0.05$), so that the cognitive function data were declared to be normally distributed. With the fulfillment of these assumptions, the next analysis can be continued using the paired sample t-test to test the effect of the application of the Laras Jiwa Gymnastics Model based on traditional Central Javanese music on the improvement of cognitive function of the elderly.

Table 6. Rahmatika Clinic Paired Sample t-Test

	Mean	Std. Mean	Df	Say.
Pretest	-4.22222	.36654	17	0.000
Posttest				

After the assumption of normality is met, the analysis is carried out using a paired sample t-test. The test results showed significant differences between cognitive function scores before and after the intervention ($t = -11.519$; $df = 17$; $p < 0.05$). These findings confirm that the Laras Jiwa Gymnastics Model based on traditional Central Javanese music has a significant influence on improving the cognitive function of the elderly at Rahmatika Clinic.

The Shapiro–Wilk normality test showed that the data on the cognitive function of the elderly at the pretest and posttest stages at the Jetis Clinic, Prolanis Krisna Ceria, and Rahmatika Clinic were normally distributed ($p > 0.05$), thus meeting the assumptions of parametric statistical analysis. Furthermore, the results of the paired sample t-test in all groups showed a significance value of $p < 0.05$, indicating a significant difference between cognitive

function scores before and after the intervention. The consistent increase in MMSE scores at the three research locations confirms that the Central Javanese traditional music-based Laras Jiwa Gymnastics Model is effective in improving the cognitive function of the elderly and has the potential to be implemented more widely in the elderly health coaching program based on local wisdom. These findings show that the implementation of Pelas Jiwa Gymnastics for six weeks with a frequency of two meetings per week is effective in providing cognitive stimulus for the elderly. The integration of simple rhythmic movements with the accompaniment of traditional Central Javanese music has been shown to increase the engagement, motivation, and cognitive activity of the elderly. The consistency of results in various health service settings confirms that the Laras Jiwa Gymnastics Model is applicable and adaptive, and has the potential to be widely implemented as part of promotive and preventive efforts in fostering the health of the elderly based on local wisdom.

The main advantages of the Laras Jiwa Gymnastics Model lie in the design of low impact movements that are adaptive to the characteristics of the elderly, a planned exercise structure, and the use of traditional Central Javanese music as a rhythm regulator as well as an emotional and cognitive stimulus. This approach based on local wisdom increases the motivation, engagement, and comfort of the elderly, while supporting the stimulation of coordination, concentration, and memory. Thus, this model is innovative, applicable, and relevant to the elderly health coaching program.

However, this model still has limitations, especially related to the variation in physical and cognitive abilities of the elderly who require different adaptation times and competent instructor assistance. In addition, the relatively short duration of the exercise and the nature of the group

intervention have not fully accommodated the individual needs of the elderly. Therefore, a more adaptive and gradual implementation is needed through movement modification and continuous assistance so that the benefits of intervention can be obtained optimally.

CONCLUSION

After the assumption of normality is met, the analysis is carried out using a paired sample t-test. The test results showed significant differences between cognitive function scores before and after the intervention ($t = -11.519$; $df = 17$; $p < 0.05$). These findings confirm that the Laras Jiwa Gymnastics Model based on traditional Central Javanese music has a significant influence on improving the cognitive function of the elderly at Rahmatika Clinic.

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environment, social support, learning quality, and school environmental conditions

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