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THE EFFECT OF DEEP BREATHING RELAXATION TECHNIQUES COMBINED WITH HAND MOVEMENTS ON THE PHYSICAL FITNESS OF THE ELDERLY

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ABSTRACT

Older adults are individuals aged over 60 years who experience the aging process, which is accompanied by various physical, psychological, and social changes. One of the essential aspects of aging is physical fitness, which refers to the body's capacity or endurance to carry out daily activities. The Kogerta deep breathing relaxation technique is considered a relevant non-pharmacological intervention to improve the physical fitness of older adults. This study aimed to evaluate the effectiveness of the Kogerta deep breathing relaxation technique on the physical fitness of elderly individuals. This research employed a pre-experimental design and was conducted at the UPT Pelayanan Sosial Tresna Wredha Blitar in Tulungagung. The population consisted of 77 older adults, from which a sample of 20 participants was selected using purposive sampling. The results showed a decrease in the mean pulse rate from 90.10 to 75.65 beats per minute, and an increase in the mean walking distance from 437.50 to 526.50 meters after the intervention. Statistical analysis revealed a significant effect of the Kogerta deep breathing relaxation technique on physical fitness, with a p-value of .001 ($p < .05$). These findings suggest that the technique has a positive effect on the physical fitness of older adults. The integration of this relaxation technique into elderly care programs has the potential to enhance the overall quality of life among the aging population.

Keywords: older adults, Kogerta deep breathing relaxation, physical fitness

Background

Older adults are individuals aged over 60 years who undergo the aging process. Aging is a natural stage in the human life cycle that is accompanied by various changes, including physical, psychological, and social transformations that affect interactions with others (1). According to data from the Central Bureau of Statistics (Badan Pusat Statistik), over the past decade, the percentage of elderly people in Indonesia has increased—from 7.57% in 2012 to 10.48% in 2022 (2). Several provinces have recorded elderly populations exceeding 10%, particularly East Java Province, where the number of older adults continues to rise. The percentage of older adults in East Java has reached 13.57% of the total population. This indicates that East Java is among the provinces with a population structure that is transitioning toward an aging population (3). Elderly individuals with poor quality of life will increase the demand for long-term care and assistance, thereby increasing the country's economic burden, therefore various important efforts are made to overcome this problem(4).

The Indonesian government has a unified goal concerning elderly health, which is the collective effort between older adults and all citizens to support and achieve optimal elderly health outcomes (5). As individuals reach old age, physiological functions decline and quality of life tends to deteriorate. Therefore, older adults increasingly require assistance from those around them to carry out daily activities. They need activities that can optimize

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cardiorespiratory endurance, enhance muscle strength, improve muscular endurance, and promote better body composition. For this reason, maintaining good physical fitness is essential for the elderly population (6).

One of the key aspects of the aging process is physical fitness. Physical fitness refers to an individual's ability or endurance to perform daily activities over an extended period. It encompasses components such as speed, agility, balance, and coordination, as well as health-related elements including cardiorespiratory endurance, muscular strength, muscular endurance, flexibility, and body composition (7).

Deep breathing relaxation is a respiratory technique that can enhance alveolar ventilation, maintain effective gas exchange, reduce stress, and improve cough efficiency (8). This relaxation technique enables individuals to gain better self-regulation during the practice. Deep breathing exercises can be utilized by both healthy and ill older adults, with successful implementation relying on the patient's cooperation(9). Health problems that often occur in the elderly are pain, which causes the elderly to reduce their movement so that it affects physical fitness. The results of research at the Tresna Wherda Social Home in East Java showed that most elderly people experienced mild pain intensity (51.5%) (10).

Previous studies on the impact of elderly exercise on physical fitness have demonstrated a correlation between participation in exercise programs and improved physical condition in older adults. Specifically, there was a notable decrease in pulse rate following participation in elderly exercise sessions, as observed in the study conducted in Paling Serumpun Village, Hamparan Rawang District (11)

In the current study, elderly exercise is centered around the practice of deep breathing relaxation techniques. A recent development of this method includes the integration of coordinated hand movements. The combined deep breathing and hand movement relaxation technique, known as KOGERTA (*Kombinasi Gerak Tangan dan Relaksasi Nafas Dalam*), is designed to reduce stress levels through synchronized physical and respiratory activity. The coordinated hand gestures are intended to support concentration and deepen the breathing practice (12).

The physiological process that underlies the improvement of physical fitness through the KOGERTA method involves the frequent engagement in physical activity, which leads to an increase in endorphin levels. Elevated endorphin production is associated with a reduction in adrenaline and noradrenaline levels, contributing to a lower heart rate, reduced cardiac workload, and vasodilation. As a result, individuals experience greater relaxation and comfort, leading to improved physical fitness (13).

A previous study on the effectiveness of the KOGERTA deep breathing relaxation technique in reducing blood pressure among hypertensive clients in Kesamben Village revealed a significant effect of this technique on lowering blood pressure. The study concluded that following the intervention involving the KOGERTA breathing relaxation exercises, there was a notable decrease in the average systolic and diastolic blood pressure of the participants (14).

Building on the findings of prior research, it is evident that the KOGERTA deep breathing relaxation technique may offer benefits in improving the physical fitness of older adults. Therefore, the present study aims to further explore the impact of the KOGERTA technique on physical fitness among the elderly population. This research is expected to provide deeper insights into how such interventions may enhance quality of life and physical independence in older adults, particularly within settings such as the Tresna Werdha Social Care Home.

Methods

The research design employed in this study is a one-group pretest–posttest design. The population consisted of all cooperative older adults residing in a long-term care environment

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(Tresna Werdha Social Service Center), totaling 77 individuals. The sample comprised cooperative older adults who met the inclusion criteria, which were: willingness to participate and comply with the research procedures; experiencing physical decline or lack of physical fitness; the ability to communicate verbally; and the ability to participate in exercise and ambulate independently. The sample was selected using purposive sampling.

The independent variable in this study is the deep breathing relaxation technique combined with hand movements (KOGERTA), while the dependent variable is cardiorespiratory endurance. The study was conducted at the Tresna Werdha Social Service Unit in Blitar, Tulungagung, from January 22, 2024, to February 23, 2024.

Data collection methods involved the use of the Standard Operating Procedure (SOP) for KOGERTA training as the research instrument. Physical fitness in elderly participants was assessed using the Six-Minute Walk Test (6MWT), and pulse rate was measured before and after the intervention. Data analysis was performed using univariate and bivariate analysis techniques, specifically the Wilcoxon Signed-Rank Test.

Results

General data

Table 1 Characteristics of Research Respondents

Characteristics Respondent	Frequency	Percentage (%)
Age		
60 – 64 years old	1	5
65 – 69 years old	4	20
70 – 74 years old	8	40
75 – 80 years old	5	25
81 – 84 years old	1	5
85 – 90 years old	1	5
Gender		
Male	4	37
Female	16	63
Complaints:		
Cough	2	15
Flu	3	23
Fever	1	8
Body Aches	7	54
Degenerative Diseases		
Hypertention	9	64,3
Diabetes Mellitus	5	35,7
Ability to Perform Daily Activities		
Able to Bathe Independently	13	65
Able to Eat Independently	20	100
Able to Sleep Normally	11	55
Able to Perform Personal Hygiene Tasks	10	50

Based on Table 1, it can be seen that less than half, 40% (8 elderly individuals), who experienced physical fitness impairments were aged between 70 and 74 years, majority, 80% (16 elderly individuals), of those experiencing physical fitness impairments were female. It can be seen that more than half, 54% (7 elderly individuals), reported experiencing body aches. An shows that more than half, 64.3% (9 elderly individuals), were affected by hypertension as a degenerative disease. Whereas that 100% (20 elderly individuals) were able to eat independently.

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Specific data

Table 2. Pulse Rate Measurement Results (Pre-test and Post-test)

Pulse	N	Mean	Std.Deviation	Min	Max
Pre – tes	20	90,10	17,293	50	120
Post – tes	20	75,65	6,327	64	85

Based on Table 2, the pre-test results from 20 elderly participants showed that the average pulse rate was 90.10 beats per minute, with a standard deviation of 17.293. The lowest recorded value was 50 beats per minute, while the highest was 120 beats per minute. In contrast, the post-test average pulse rate was 75.65 beats per minute, with a standard deviation of 6.327. The lowest post-test value was 64 beats per minute, and the highest was 85 beats per minute.

Tabel 3 Distribution of 6 Minute Walk Test Measurement Results Data (Pre-test and Post-test)

Jalan 6 Menit	N	Mean	St d.Deviation	Min	Max
Pre – tes	20	437,50	60,426	300	5
Post – tes	20	527,50	63,815	400	6

Based on Table 3, the pre-test results from 20 elderly participants showed that the average distance covered in the six-minute walk test was 437.50 meters, with a standard deviation of 60.426. The minimum distance recorded was 300 meters, while the maximum was 500 meters. In the post-test, the average distance increased to 527.50 meters, with a standard deviation of 63.815. The minimum post-test distance was 400 meters, and the maximum was 600 meters.

Wilcoxon Signed Rank Test Results

The Wilcoxon Signed Rank Test was used to determine whether there is an effect of the kogerta deep breathing relaxation technique on the physical fitness of elderly individuals. Prior to conducting the Wilcoxon Signed Rank Test, a normality test was performed using the Shapiro-Wilk test, with the condition that $p < 0.05$. The result of the Shapiro-Wilk test was 0.00, which indicates that the data distribution in this study is not normal.

Table 4: Results of the Wilcoxon Signed Rank Test

		N	Mean Ranks	Sum of
Pre tes – pos tes denyut nadi	Negatives Ranks	3a	9,00	27,0 0
	Positive Ties Total	17b 0c 20	10,7	183,00
Pre tes – post tes jalan 6 menit	Negative Positive Ties Total	0d 18e 2f 20	,00 9,50	,00 171,00

Based on Table 8, the output of the Wilcoxon Signed Rank Test is as follows: (1) Pre-test – Post-test pulse rate: There were 3 respondents with a lower post-test result compared to the pre-test, with an average rank of 9.00 and a sum of ranks of 27.00. There were 17 respondents with a higher post-test result compared to the pre-test, with an average

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rank of 10.76 and a sum of ranks of 183.00. (2) Pre-test – Post-test 6-minute walk test: There were 18 respondents with a higher post-test result compared to the pre-test, with an average rank of 9.50 and a sum of ranks of 171.00, and 2 respondents with the same post-test result as the pre-test.

Table 5 Statistical Test Result

	Post tes – Pre tes denyut nadi	**Post tes – pre tes jalan 6 menit**
Z	-	-
Asymp Sig (2 - tailed)	,001	<,00

Based on Table 9, it can be seen that the statistical test results for the post-test – pre-test pulse rate yielded a z-value of (-3.176), while the z-value for the post-test – pre-test 6-minute walk test was (-4.093). Additionally, the asymptotic signed test result for the post-test – pre-test pulse rate was 0.001, and the asymptotic signed test result for the post-test – pre-test 6-minute walk test was <0.001.

Discussion

Cardiorespiratory Endurance of the Elderly Before and After the Intervention

Based on the study conducted on 20 respondents experiencing physical fitness impairments, it was found that the average pulse rate before the intervention was 90.10 beats per minute, with observed pulse rate values ranging from 50 to 120 beats per minute. The average pulse rate after the intervention was 75.65 beats per minute, with a range of observed values between 64 and 85 beats per minute. Research result show that the pulse rate of individuals prior to participating in elderly exercise programs was higher compared to after the intervention(15). In such conditions, the decrease in pulse rate following the intervention indicates an improvement in the respondents' physical fitness, which can be interpreted as a positive response to the physical training provided(11). The human body adapts to the stimulus of physical exercise. When a person engages in consistent physical activity, their body gradually adapts to the training, leading to enhanced physical fitness.

The results of this study show that deep breathing relaxation techniques combined with hand movements (*kogerta*) have a significant effect on the physical fitness of the elderly. other research show significant differences in elderly fitness levels before and after participating in *prolanis* exercise sessions. In her study, the pulse rate measured before the intervention was higher than after the intervention (16)

According to the researcher, a high pulse rate reflects a lower level of physical fitness, indicating the need for regular physical exercise. One such method is deep breathing relaxation training combined with hand movements (*kogerta*). The observed adaptation result—namely, a decrease in pulse rate—demonstrates that the heart is functioning more efficiently in pumping blood throughout the body. This, in turn, improves cardiorespiratory endurance, which is a physiological adaptation resulting from consistent physical exercise.

The findings of this study highlight the importance of consistent and structured physical training. Regular and measured exercise enables the body to adapt to physical stimuli, ultimately leading to improved physical fitness.

Physical Fitness of Elderly Individuals Before and After the Intervention

A study involving 20 respondents demonstrated that interventions using interval training with light recovery periods can significantly improve physical fitness in individuals experiencing physical fitness impairments. The results showed an average increase in the 6-minute walk test distance from 437.50 meters to 527.50 meters, with the range shifting from 300–500 meters to 400–600 meters. These findings indicate the effectiveness of this approach in enhancing

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cardiorespiratory endurance and physical fitness among older adults.

This is consistent with research result which found that regular exercise, such as aerobic gymnastics, has a positive impact on physical fitness, particularly in the elderly population (17). His research indicated a difference in the percentage of successful outcomes in the 6-minute walk test between elderly individuals who regularly performed aerobic exercises and those who did not. Older adults who engaged in regular exercise were able to walk farther than the predicted distance, whereas those who did not exercise regularly failed to exceed their predicted walking distance(18)

According to the researcher, the intervention involving deep breathing relaxation techniques (kogerta) had a significant impact on cardiorespiratory endurance and physical fitness. The findings suggest that consistent and structured training can enhance both physical fitness and cardiorespiratory endurance. This study provides strong evidence that the kogerta deep breathing relaxation technique can serve as an effective intervention for improving cardiorespiratory health and physical fitness.

The Effectiveness of Deep Breathing Relaxation Technique Combined with Hand Movements on the Physical Fitness of Elderly Individuals

The analysis results indicate that the use of a deep breathing relaxation technique combined with hand movements has a significant impact on the physical fitness of elderly individuals at the UPT Social Service Center for the Elderly (Tresna Werdha) Blitar in Tulungagung. Statistical testing revealed a significance level of less than 0.05. Based on the average data, the pulse rate before the intervention was 90.10 beats per minute, which decreased to 75.65 beats per minute after the intervention. Similarly, the average distance covered in the 6-minute walk test increased from 437.50 meters before the intervention to 527.50 meters afterward.

The kogerta deep breathing relaxation technique influences the autonomic nervous system, resulting in positive physiological responses, including reduced pulse rate and improved physical health. This technique successfully induced a relaxation response in the elderly participants. These findings are consistent with a study, which demonstrated that kogerta deep breathing relaxation exercises can reduce the levels of adrenaline and noradrenaline hormones, leading to decreased heart rate, vasodilation, and reduced vascular resistance (14). As a result, the pulse rate decreases in line with the lowered heart rate and reduced cardiac output (19).

According to the researchers, the kogerta deep breathing relaxation technique is effective in improving the physical fitness of elderly individuals. This is because the technique consists of three phases—warm-up, core session, and cool-down—conducted over a duration of 20 to 40 minutes for each participant. The statistical significance level of less than 0.05 confirms that the observed differences between the pre- and post-intervention conditions did not occur by chance. This supports the conclusion that the relaxation technique, when combined with hand movements, has a measurable and meaningful impact on the physical health of the elderly. This study provides strong evidence that such interventions can serve as effective strategies for enhancing physical fitness and cardiorespiratory endurance among older adults. The movements carried out should be adjusted to the conditions of the elderly, one of which is a cultural approach, this will increase the interest of the elderly in following these movements, input for further researchers to create movements that are adjusted to their cultural background (20).

Conclusions and Recommendations

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Based on this research resulth, it can be concluded that the average pulse rate prior to the kogerta deep breathing relaxation training intervention was 90.10 beats per minute, while the average distance in the 6-minute walk test was 437.50 meters. Following the intervention, the average pulse rate decreased to 75.65 beats per minute, and the average distance in the 6-minute walk test increased to 526.50 meters.

The implementation of the kogerta deep breathing relaxation technique had a measurable effect on the physical fitness of elderly individuals. The Wilcoxon Signed Rank Test produced a p-value of less than 0.05, indicating that the intervention had a statistically significant effect on improving the physical fitness of the elderly. Input for further researchers to create movements that are adjusted to their cultural background..

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