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Original Research

Comparison of Hatha yoga and elderly exercise in quality of life in elderly

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Abstract

Background: The projection of elderly will increase from 12 to 22% between 2015 and 2050. As the age increases, there will be changing in physical condition related to health. Aging-related physical changes of elderly will affect their daily activity and eventually will impact quality of life (Qol). Staying active and involved in activities is one of the keys for being positive in their quality of life. Even though Hatha yoga is a popular form of exercise for the elderly, few of them are aware of its many advantages.
Aim: This study compares elderly exercise programs with Hatha yoga in an effort to enhance quality of life in older adults.
Material and methods: A randomized controlled trial of 26 participants was divided into two groups: 13 of them did Hatha yoga, and 13 of them did elderly exercise. Both groups participated in three times a week exercise for six weeks. Before and after the intervention, quality of life was measured with the EQ-5D-5L.
Results: The delta post-test utility index score of the elderly exercise group (0.15 ± 0.10) was lower than that of the Hatha yoga group (0.46 ± 0.11), which was statistically significant (<0.001). The VAS score of the Hatha yoga group was higher (85.15 ± 7.38) than that of the elderly exercise (74.15 ± 7.97), and the difference was significant (p=0.001). A significant p<0.001 is produced by the difference between the scores for elderly exercise (2.46 ± 1.98) and Hatha yoga (13.62 ± 5.47).
Conclusions: When it comes to enhancing elders' quality of life, Hatha yoga outperforms elderly exercise in terms of EQ-5D-5L.

Keywords: *elderly, EQ-5D-5L, exercise, hatha yoga, quality of life*

INTRODUCTION

The World Health Organization (WHO) projects that the proportion of people over 60 in the world will increase from 12 to 22% between 2015 and 2050.[1] As a person gets older, changes in physical condition will appear that are related to their health condition. The condition of the elderly affects daily life activities which in turn can affect their quality of life (QoL). Changes that occur in the elderly include the musculoskeletal system, including decreased muscle mass, decreased range of motion (ROM), decreased bone mass and density, cardiorespiratory function, sensory, visual, vestibular and somatosensory systems. There is a decline in cognitive and psychological function which causes a reduction in quality of life. Aging has correlation to perception of someone's satisfaction which is related to their status in life along with their purpose, hope, and social standard. Satisfaction perception become an important factor and must be assessed objectively. Quality of life which is correlated with health could be assessed from health status and perception of quality of life. To different degrees, the majority of older persons also suffer from lower quality of life and impaired capacity to do basic daily tasks, shortened life expectancy, and raised mortality risk. It's critical to make sure that, despite chronic conditions, the extra years of life are worthwhile as individuals live longer. The importance of health promotion programs and QoL efforts for senior citizens residing in nursing homes (NH) will only increase in the future.[2]

Quality of life is the extent to which a person is well-fit, comfortable, and able to participate in or enjoy life's events. The phrase "health-related quality of life" encompasses a wide range of elements, including the absence of physically upsetting symptoms (dyspnea, pain, constipation, nausea, etc.); emotional health) (happiness, absence of anxiety); physical and cognitive functional status (ability to perform daily tasks and higher-order functions, like engaging in pleasurable activities); quality of close interpersonal relationships (friends, family, etc.); engagement in and enjoyment of social activities; and contentment with the cost and

medical aspects of medical care. Healthcare professionals may be aware of some of the variables that affect health- related QoL in elderly, such as shorter life expectancy, cognitive decline, disability, chronic pain, social isolation, functional status, and reliance on caregivers.

A plethora of research, including recent systematic reviews, confirm that physical activity enhances quality of life. The advantages, which include enhanced psychological and quality of life, are described in the article "Exercise and physical activity for older adults" outlining the benefits, which include improved psychological and QoL.[2,3] While there appears to be a positive correlation between physical exercise and certain dimensions of QoL, the exact nature of this link is not well-understood.

Seniors' self-reported quality of life and physical function scores were found to have increased after taking yoga lessons.[3] Yoga combines physical exercise with an inwardly focused, attentive concentration on awareness of the breath, energy, and self. It is a type of mind-body fitness. In addition to promoting and improving respiratory and cardiovascular function, Yoga techniques also aid in the treatment and recovery from addiction, reduce stress, depression, anxiety, and chronic pain, enhance sleep quality, and enhance overall well-being and QoL. Hatha yoga is a physical practice that emphasizes breath control and physical aspects of health. Regarding breathing control in sync with movements, mindfulness, and meditation after a workout, Hatha yoga is a better option for senior citizens than other forms of exercise. Hatha yoga is, therefore, thought to have some bearing on QoL.[4]

One type of exercise that is commonly done in Indonesia is for the elderly, either in "posyandu" or in communities. Elderly exercise is a collection of body movements carried out in an orderly and planned manner which aim to improve the body's ability to perform certain functions. The State Minister for Youth and Sports (Menpora) developed elderly exercise as an effort to improve the health of the elderly. In Indonesia, elderly exercise is a common sport recommended for the elderly because it is light and easy to do.

Elderly exercise is a type of exercise that has light to moderate intensity, with movements that are easy to do and do not pose a risk of injury. The movements are regular, not jerky, and rarely change suddenly. Doing exercise regularly will increase muscle strength and endurance, joint flexibility, balance, improve cardiorespiratory fitness, improve blood circulation, and prevent osteoporosis.

The Euro-Qol Group3 created the Euro-Quality of Life-Five-Dimension (EQ-5D), a generic tool that is frequently used for utility measurement in pharmacoeconomic research as well as health- related quality of life assessments. The EQ-5D is composed of two components: the EQ-5D visual analog scale (EQ-5D VAS) and the EQ-5D descriptive system. The five dimensions that make up the EQ-5D description system are mobility, self-care, regular activities, pain/discomfort, and anxiety/depression. In contrast, the EQ VAS uses a vertical, visual analog scale to record the respondent's self-rated health, with the endpoints labeled "Best imaginable health state" and "Worst imaginable health state."

To the best of the author's knowledge, no prior studies have evaluated the effects of elderly exercise and Hatha yoga practice on quality of life in the aged population over 60 in Indonesia, hence the researcher's desire in doing this research.

MATERIAL AND METHODS

Subjects

The research was carried out from January to February 2023in the Center for Social Services for the Elderly, Pucang Gading, Semarang, Central Java, Indonesia. In total, 28 elderly patients took part in the trial. A Hatha yoga group (n = 14) and an elderly exercise group (n = 14) were assigned to each subject.

The inclusion criteria were being between the ages of 60 and 75, having a body mass index (BMI) of >18.5 and ≤25, understanding directions, being independent while walking, sitting, and standing, and being self sufficient when performing daily tasks. Acute injuries and musculoskeletal diseases, the possibility of severe osteoporosis and femur fractures, and concurrent conditions that make exercise difficult (uncontrolled diabetes mellitus, stroke, lung disease, cerebellar disorders,

Parkinson disease, knee/hip osteoarthritis) were among the exclusion criteria. Muscular strength and history of uncontrolled hypertension with MMT ≤4, the inability to complete the exercises twice, missing the exercise program three times in a row, or missing the study assessment twice in a row were among the reasons for termination. The Health and Medical Research Ethics Commission of Diponegoro University in Semarang, Central Java, Indonesia, has approved the research's ethical clearance.

Intervention

For six weeks, participants in the elderly exercise group engaged in elderly exercise three times a week, while those in the Hatha yoga group received instruction in Hatha yoga three times a week. Elderly exercise programs aimed at improving the health of the elderly is known as elderly exercise programs. It consists of core, cool-down, and warm-up exercises designed by the State Minister of Youth and Sports. The warm- up movements used in this study aim to stretch the neck, shoulders, arms, waist, legs, improve coordination, strengthen, and improve balance. Core exercises are done after warming up. Core training movements are a series of movements with a heavier load than the warm-up. Core movements aim to improve cardiorespiratory fitness, upper and lower extremity coordination, proprioception, balance, and leg muscle strength. The cool-down stage is the last stage of elderly exercise movements. Decreased body temperature, amount of sweat, and heart rate are signs of this stage. Cooling movements are used to lower temperature, blood pressure, and heart rate, as well as increase muscle flexibility and relaxation. Sixty minutes of light-to-moderate exercises are allocated to the elderly three times a week for six weeks. Hatha yoga is preceded by breathing exercises at the beginning of the practice. Pranayama is done using breathing control techniques that are always in rhythm with body movements. During breathing exercises, participants are asked to breathe as deeply as possible to take in as much oxygen as possible. Hatha yoga involves doing breathing exercises, or Pranayama, for ten minutes while sitting cross-legged in the Sukhaasana posture.

Yoga techniques for the body/physique are known as asanas. Asana practice is achieved at a slow tempo. Asana consists of several movements, namely standing position, sitting position, spinal rotation position, and sleeping position. The following postures are practiced for 40 minutes: Garudasana: seating eagle pose; Marjaryarsana: cat-cow stance; Urdhva Hastasana: straight standing pose with hands up; Utthita Parshvakonasana: stretched side angle position; Ardha Uttasana: standing forward bend; Vrikshasana: tree pose; Virabhadrasana 1: knight pose; Bhujangasana: cobra pose; The exercise begins with taking a deep breath, holding the breath, exhaling, then breathing normally along with the practice of holding the position for a few moments (5-20 breaths). Yoga is carried out in a calm, comfortable atmosphere and requires full concentration. Relaxation techniques are given at the beginning of the training and maintained throughout the exercise. Ten minutes are spent in the Shavasana position (supine sleeping posture) after exercise.

Measurements

Before and after the treatment, respondents' QoL was assessed using the EQ-5D-5L instrument. Using the evaluation set created for the Indonesian population, the EQ-5D-5L index was evaluated. There are five levels of answers (no difficulty to really serious problems) and five dimensions (mobility, self-care, typical activities, pain/ discomfort, anxiety/ depression) in the EQ-5D-5L. The EQ-5D-5L utility index ranges from a score of 1 (extremely good health condition) to 0 (very bad health condition equivalent to death). The analog scale for visuals (EQ-VAS), a component of the EQ-5D-5L, is another tool for evaluating respondents' health state.

With a score range of 0 (worst health condition) to 100 (highest health condition), it employs a 100-mm scale.[5,6]

Statistical methods

Two components of data analysis are hypothesis testing and descriptive analysis. Prior to testing the hypothesis, the data distribution was examined using the Shapiro-

Wilk test to see whether it was normal. A hypothesis test was performed using the Wilcoxon test to see whether the visual analog scale (VAS) values before and after the intervention differed. The study employed an independent t test hypothesis test to ascertain the disparity in EQ-5D-5L and VAS ratings between the elderly exercise group and the yoga group. All data were handled using a computer and SPSS® software. A p value <0.05 with a 95% confidence interval was deemed significant in this study.

RESULT

Up until the study's conclusion, a total of 26 participants were examined. Two people withdrew from the study: one was unable to participate in the exercise due to a fever, and the other did not participate in the regular exercise for two consecutive days. Flow diagram of the study is available in Figure 1. The average age of the participants in this study was 67.46 years for the Hatha yoga group and 68.92 years for the elderly exercise group. The characteristics of the research participants were split evenly between the elderly exercise group and the Hatha yoga group (p value >0.05). Table 1 displays a description of the subjects' characteristics.

Table 1. Baseline Characteristic

Variable	Group		p
	Hatha yoga (13)	Elderly exercise (13)	
Female	7 (43.8%)	9 (56.3%)	
Male	6 (60%)	4 (40%)	-.687¥
Age (years)	67.460 ± 4.650	68.920 ± 7.630	-.501¥
BMI (kg/cm^2)	22.660 ± 2.320	21.260 ± 2.340	-.124‡
Body Height (cm)	157.540 ± 6.490	154.380 ± 9.540	-.334§
Body Weight (kg)	56.380 ± 7.740	50.620 ± 6.970	-.067‡

Note : ‡ Mann Whitney, § Independent t, ¥ Chi Square, *Significant (p < 0.05);

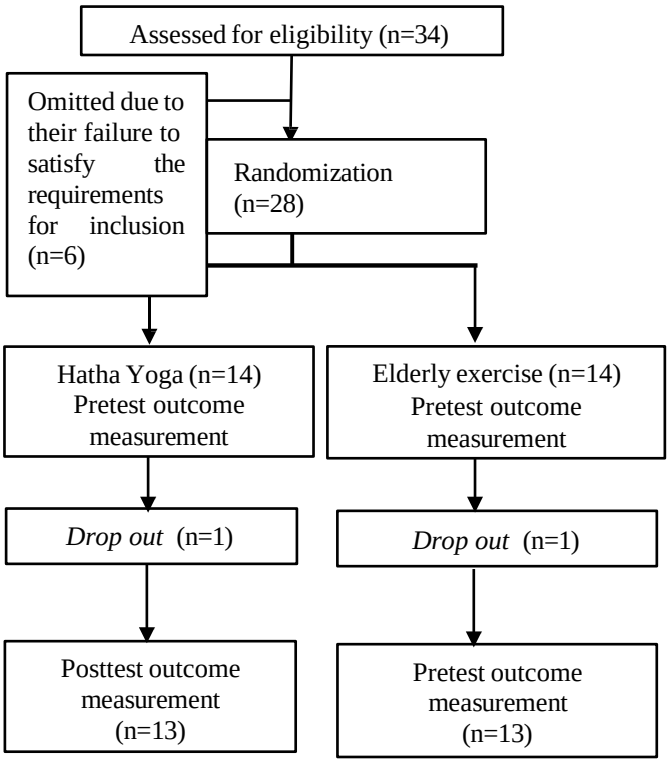

Image 1. Flow Diagram of the Study

Using the EQ-5D-5L descriptive method to self-report health

There are five domains of quality of life in EQ-5D- 5L questionnaire by EuroQol: mobility, self-care, routine activities, pain or discomfort, and anxiety or depression. Each domain has five health states from no problems until unable, which will be given score from 0 (best) to 5 (worst).

The EQ-5D-5L health states can be represented by a single summary number called index value.[7] Offering Hatha yoga to elderly has improved their utility index scores from 0.35 ± 0.,10 on the pre-test to 0.81 ± 0.06 on the post-test (p=0.001). By giving elderly exercise, there have been improvements in the utility index, which is significant (p=0.001) between pre-test scores (0.27 ± 0.12) and post-test (0.43 ± 0.07). Nonetheless, the elderly exercise group's delta post-test utility index score (0.15 ± 0.10) was lower than that of the Hatha yoga group (0.46 ± 0.11); this difference was statistically significant (<0.001).

Table 2. Utility Index and Normality Testing

Utility Index	Group	Mean ± SD	Median (min – max)	p£
Pre-test	Intervention	-.350 ± -.100	-.390 (-.220 – -.500)	-.037
	Control	-.270 ± -.120	-.290 (-.090 – -.460)	-.870*
Post-test	Intervention	-.810 ± -.060	-.810 (-.690 – -.910)	-.167*
	Control	-.430 ± -.070	-.440 (-.270 – -.530)	-.663*
Difference	Intervention	-.460 ± -.110	-.430 (-.280 – -.600)	-.213*
	Control	-.150 ± -.100	-.170 (-.000 – -.340)	-.857*

Note : * Normal (p > 0..05); £ Shapiro-Wilk

Table 3. Utility Index Pre and Post-Test

Utility Index	Group		p
	Intervention	Control	
Pre-test	-.35 ± -.100	-.270 ± -.120	-.081‡
Post-test	-.81 ± -.060	-.430 ± -.070	<-.001§*
p	<-.001¶*	<-.001¶*	
Difference	-.460 ± -.110	-.150 ± -.100	<-.001§*

Note: ‡ Mann Whitney, § Independent t, ¶ Paired t, *Significant (p < 0.05);

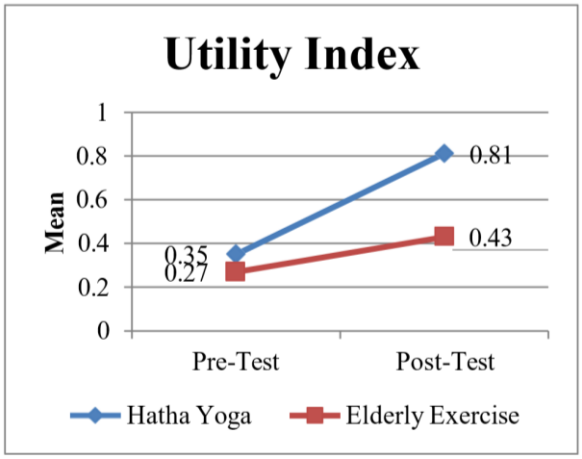

Image 2. Utility Index Score

By giving elderly exercise, there have been substantial improvements (p=0.007) in the VAS ratings between the pre-test (71.69 ± 8.13) and post-test (74.15 ± 7.97). Hatha yoga has improved the elderly's VAS ratings, with a substantial (p=0.001) difference between pre-test and post-test scores (71.54 ± 6.58 and 85.15 ± 7.38). The elderly exercise group's delta post-test VAS score (2.46 ± 1.98) was significantly (<0.001) lower than that of the Hatha yoga group (13.62 ± 5.47).

Table 4. Comparison of VAS Hatha Yoga vs Elderly Exercise

VAS	Group		p
	Hatha yoga	Elderly exercise	
Pre-test	71.540 ± 6.580	71.690 ± 8.130	-.958§
Post-test	85.150 ± 7.380	74.150 ± 7.970	-.001§*
p	-.002†*	-.007†*	
Delta	13.620 ± 5.470	2.460 ± 1.980	<-.001‡*

Note: † Wilcoxon, ‡ Mann Whitney; § Independent t, *Significant ($p < 0.05$);

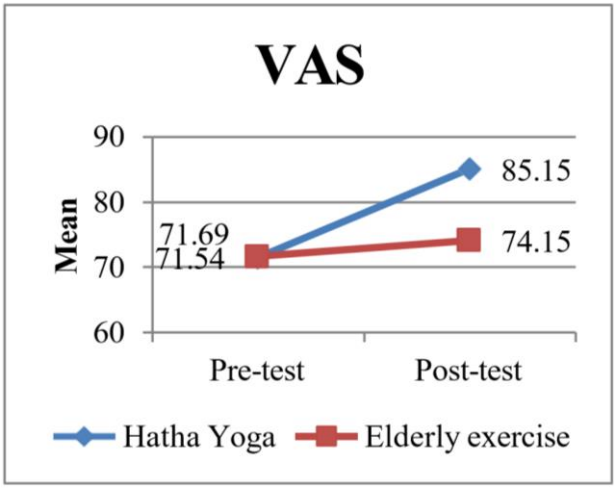

Image 3. VAS Score

DISCUSSION

The similarly distributed qualities of the research volunteers in both groups had no implication on the findings of the study. Female respondents were found to be more common than male respondents in this poll. The elderly exercisers in this study had an average age of 68.92 years, whereas the elderly in the Hatha yoga group had an average age of 67.46 years, according to the WHO elderly division. Hatha yoga and elderly exercise had BMIs of 22.66 ± 2.32 and 21.26 ± 2.34, respectively, which were within the normal weight range.

According to several studies, yoga in the elderly improves balance, pain reduction, and mobility among an older individuals yoga community.[8] The reason behind it probably is because yoga consists of physical, moral, and spiritual practices which could attain self-awareness and involves breathing exercise, relaxation and meditation practices. Based on one of the systematic reviews about yoga practice in older individuals, benefits can be shown in alleviating depression, improving lower limb

strength, lower body flexibility, balance, perceived mental and physical health, and vitality.[9] Additionally, yoga can reduce anxiety and enhance mental health, and walking speed, balance, and mobility which are substantial components of EQ-5D-5L domain's quality of life. A meta-analysis from Youkhana et al. also showed that mobility in elderly moderately improved by doing yoga exercise.[10] Studies showed that quality of life of elderly yoga assessed by Short-Form Health Survey (SF-36) was better compared to Tai-chi.[11]

Yoga also has a positive significant effect on perceived physical and mental health in older adults and increased health related quality of life. Other study also showed that yoga practice can improve the physical and mental health of older people using SF-36.[12] It could be a reference that the other tools of assessing quality of life also improved the quality of life in yoga practice.

Self-care, usual activities, and mobility all improved in this study. Yoga can improve flexibility and strength. Those fields have strong correlation with self-care, usual activities, and mobility domain. Strength is the amount of force that a muscle can produce or its skeletal strength. On the other side, flexibility is the viscoelasticity of muscles, ligaments, and connective tissues. Gait aspect also improved and has strong connection with mobility. One study showed older adult yoga practitioners improvement in the 6-minute walking test.

From the results of this study, Hatha yoga improved anxiety and depression better than elderly exercise. This result correlated with a review that stated benefits from participation in yoga are psychological health, like reductions in anger, anxiety, and fear of falling.[13]

Based on some studies, Hatha yoga indeed decreases the visual analog scale in the elderly.[14,15] This is because Hatha yoga uses the importance of breathing exercises, relaxation, and mental concentration.[16,17] Pain itself is a biopsychosocial problem and a subjective nature described as unpleasant sensory and emotional experience with cause of potential tissue damage.[17,18] Pain is frequently found in elderly people and more

than a half in long-term care facilities complained about pain that can lead to disability. Our study had the same findings of complaints by elderly who lived in the long-term care facility. Hatha yoga is one of the most commonly used of yoga practices. The purposes of yoga are physical rehabilitation and comprehensive care for the emotionally traumatized. However, the effectiveness of yoga for pain is still unclear but from this study and results from the previous study that assessed quality of life and pain scale in yoga practice it showed positive response and results. From theory, it is said that pain and yoga practice have a connection with Brain-Derived Neurotrophic Factor and Serotonin.[19,20] It is said that yoga could affect the serotonin and BDNF modulation of pain and improve the relief of pain and physical function. The results of clinically significant EQ-5D-5L showed the same result from the previous journal that showed improvement of EQ-5D-5L from yoga programs in a 10-weeks session in 52 older adults.[19] Researchers' blinding procedures were not used in this study so that measuring bias may manifest. If the measurements are blinded, the quality of experimental research and clinical trials utilizing randomization procedures will increase.

CONCLUSION

Based on the findings in this study, it suggests that elderly exercise and Hatha yoga can both enhance elderly's quality of life. Hatha yoga activities are more beneficial than elderly exercise, thus they can be used in nursing homes for residents who meet specific requirements. Therefore, we can conclude that Hatha yoga and elderly exercise each improved the QOL domain from EQ-5D-5L and VAS. But, Hatha yoga is better than elderly exercise in utility index and VAS score. However, the sample is small, 13 for each group. It is not sufficient enough to represent most of the elderly. However, from this experiment, we know that Hatha yoga can be applied as an alternative to improve the quality of life of the elderly. Further study is needed with more samples and randomization.

DISCLOSURES

Acknowledgment

We thank all the volunteers who participated in this study, as well as staff at Center for Social Services for the Elderly, Pucang Gading, Semarang, Central Java, Indonesia, for administrative support and for enrolling the participants

Conflict of Interest

No conflicts of interest are disclosed by the writers.

Author Contribution

Preparation, RS, TA, NSD; data gathering and analysis, RS, TA, NSD; drafting and approval, RS,TA,NSD.

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