

# THE EFFECTIVENESS OF BALANCE EXERCISE FOR OLDER PEOPLE IN POSYANDU WREDA PRATAMA PADUKAHAN KALIRANDU, BANGUNJIWO, KASIHAN, BANTUL YOGYAKARTA

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## Abstract

**Background** : Aging is a natural process characterized by the decrease in the function of various organs of the body. This process is causing older people to have risk of various health problems. One of the health problems that experienced by older people is body balance disorders. Body balance is influenced by complex and coordinated interactions of sensory components (visual, vestibular and proprioceptive input) and motor or musculoskeletal responses.

**Objective** : To provide an overview of the implementation of community nursing intervention and service in balance exercise to older people that have balance disorders in Padukahan Kalirandu, Bangunjiwo, Kasihan, Bantul, Yogyakarta.

**Research Method** : This study used quasi experiment method, which aims to determine the effectiveness of giving balance exercise interventions to older people. The sample in this study was 46 respondents. The location in this research was Posyandu Wreda Pratama Padukahan Kalirandu, Bangunjiwo, Kasihan, Bantul, Yogyakarta.

**Results** : The results of this study show decrease in the average results of body the balance before and after the intervention was given. The results before the intervention are 13.93 seconds and after the intervention it was decreased to 12.13 seconds.

**Conclusion** : The conclusion of this study showed that there is relationship between the provision of balance exercise with reduced risk of falls to older people in Posyandu Wreda Pratama Padukahan Kalirandu, Bangunjiwo, Kasihan, Bantul, Yogyakarta.

**Keyword** : older people, balance exercise

## Introduction

Indonesian Central statistics agency [1], the older people population in Indonesia has increased, where in 2014 the population of the older people was 20.24 million and in 2017 it was 23.4 million. Older people people who are placed in rural areas are 50.36% and those who live in urban areas are 49.64%. The highest population of older people from each region in Indonesia as stated by the National Older people Day Activities (HALUN) are found in Special Region of Yogyakarta (DIY) wich ranked first with a percentage of 13.9%, the second was Central Java as much as 12.46% and the lowest percentage in Papua with a percentage of 2.8% [2].

Aging is a natural process characterized by the decrease in the function of various organs of the body. This biological process is slowly causing older people to face the risk of experiencing various health problems. One of the health problems experienced by the older people is a body balance disorder. Body balance is dependent on complex and coordinated interactions of sensory components (visual, vestibular and proprioceptive input) and motor or musculoskeletal responses. Both are controlled through various of central nervous systems or central mechanisms [3,4].

Musculoskeletal changes that occur in the older people are degradation of bone, muscle joints and connective tissues strength. There is a decrease in absorption of calcium which caused bones to become porous. The joint has decreased of synovial fluid viscosity and degenerative changes in the joints. This changes is the cause of a decrease in flexibility, limited

flexion and extension of the joints. Other changes that greatly affect the body's balance are changes in the nervous system [5]. Allah SWT has explained about his might towards his servants who He been created. In wich the Creation of Allah SWT who is an adult with a strong condition, then the older people who experience in a weaker state. The Word of Allah SWT in QS. Ar - Rumm verse 54 [6]:

﴿ اللَّهُ الَّذِي خَلَقَكُمْ مِنْ ضَعِيفٍ ثُمَّ جَعَلَ مِنْ بَعْدِ ضَعِيفٍ قُوَّةً ثُمَّ جَعَلَ مِنْ بَعْدِ قُوَّةٍ ضَعْفًا وَشَيْبَةً يَخْلُقُ مَا يَشَاءُ وَهُوَ الْعَلِيمُ الْقَدِيرُ ﴾

Meaning: "Allah, He who created you from a weak state, then He made (you) after the weak condition became strong, then He made (you) after the strength was weak (back) and gray. He made what He wanted and He is the Knower, the Almighty."

As the result of the interview with the care giver of the older people in Posyandu Wreda Pratama found that there was no program designed to prevent body balance disorders, falls and injuries for the ederly. Program of Puskesmas Kasihan 1 itself does not include balance disorders prevention or intervention for the older people. Community health nurses as health professional who are close to the community including the older people have a substantial role in preventing balance disorders, falls and injuries. Community health nurses used the nursing care approach and nursing services in these promotive-preventive efforts.

## Research Methods

The methodology of this study was quasi-experimental which aims to determine the effectiveness of balance

exercise interventions to older people [7]. The criteria of inclusion and exclusion of samples in this study are:

Inclusion criteria:

- A) Willing to be a research respondent
- B) There was no movement disorder

Exclusion criteria:

- A. Older people who were absent during the intervention 4 time
- B. Using motion aid

### Research Result

Characteristics distribution of the respondents in this study consists of age, gender, education, job, and disease history presented in table 4.1. The total Respondents in this study were 46 people. Based on research conducted in October 2018, the results are as follows:

Table 4.1 Demographic Data Frequency Distribution Respondents it consist of Age, Gender, Education, Job and Older people History in the Wreda Pratama (n = 46)

No	Characteristic	Frequency	Percentage %
1	Gender		
	Male	15	32,6
	Female	31	67,4
2	Age		
	60-74 years old	24	52,2
	75-90 years old	22	47,8
3	Education		
	Not educated	5	10,9
	Did not complete elementary	4	8,7

	school		
	Elementary School	12	26,1
	Junior High School	6	13
	Senior High School	11	23,9
	College	8	17,4
4	Job		
	Pensionary	9	19,6
	Housewife	22	47,8
	Laborer	6	13
	Entrepreneur	9	19,6
5	History of Disease		
	Hyperthention	11	23,9
	Diabetes Mellitus	5	10,9
	Hearth Disease	4	8,7
	Asthma	2	4,3
	Hypothention	1	2,2
	No History Disease	23	50

Source: Primary Data (2018)

Table 4.1 shows that the characteristics of female respondents in Posyandu Wreda Pratama were 31 respondents (67.4%), in the age range of 60-74 years were 24 respondents (52.2%), had a history of elementary school education (SD) were 12 respondents (26.1%), the majority worked as housewives were 22 respondents

(47.8%), and did not have a history of disease were 23 respondents (50%).

Table 4.2 Description of body balance (risk of fall) in the community of older people in Wreda Pratama (n = 46)

	Mean	SD
Body balance	13,93	1,88

Source: Primary Data (2018)

Table 4.2 shows that the average body balance score of the respondents are 13,93 with standard deviation of 1,88 . It can be concluded that the older people body balance are impaired since the normal mean are 12 based on CDC score [8].

## Discussion

### 1. Characteristics of Respondents Age, Gender, Education, Job and Disease History

#### A. Age

The majority of the age characteristics in this study are in the age range of 60-74 years (52.2%) which have fall risk. As the older people get older, the body will have massive change in muscle strength, gait, walking strength, body function in general [9]. The condition of the body which has decreased is in accordance to the word of Allah in QS Ar-Rumm verse 54 [6] : "Allah, He who created you from a weak state, then He made (you) after the weak condition became strong, then He made it (you) after strong are weak (back) and gray. He made what He wanted and He is the Knower, the Almighty. "

As the older people age they will go through change in Psychological function resulting in degenerative disorders. One of degenerative disorder

that often occur is musculoskeletal disorder that can increase the risk of falls in older people [10]. The Increase of age in older people can increase risk of fall and is caused by several factors wich consist of age, pathological conditions, environmental factors, physical, psychological, financial, cognitive and religiosity changes [11,12].

The result of research [12] explained that age influence risk falls significantly (value  $p = 0.019$ ; OR = 9), which can be interpreted that the more a person ages, the person have 9 time higher risk of fall. Age is one of the factors that causes most the older people to fall, this is caused by morphological changes in muscles that can cause functional changes in the muscles strength and contraction of muscle, elasticity and flexibility of muscle, and speed of movement. Decreasing muscle function and strength will cause a decrease in the ability of the older people to maintaining body balance [13,14].

The disruption in the balance of the body are the effects of aging, accidents, and disease factors, but out of all of them, aging is the main factor that causes most the occurrence of body balance disorders in the older people [13,15]. As people age, the body will go trough degeneration and decrease in their ability to carry out daily life activities, also the flexibility will decrease and cause greater risk of fall. According to the results for [16] 265 patients of older people wich stated that 23.4% of all patients experiencing decreased ability to carry out daily activities, 70% of them were aged at 60-69 years, and aged > 80 years had a decreased ability to carry out daily activities – even more significantly.

## **B. Gender**

This study explained that there are significantly more female respondents than men, that are 31 respondents (67.4%). Women's life expectancy is higher than of that of men, in accordance to the Indonesian Ministry of Health [17] which explained that the women's life expectancy is higher (9.53) than men (8.54), this is seen in the presence of older people woman that are more than the older people men. This study is also in line with Bora's research (2015) which explained that women have a life expectancy of 2.1% higher than men aged 60 years and 1.3% higher at 70 years of age. Clinically women have a greater risk of fall than men. It occur after older people woman experienced menopause which cause decrease in bone mass by 7% while in men is only around 1%. Reduced bone mass is caused by the decrease of the amount of the estrogen hormone which cause osteoclastogenesis to reduce. Osteoclasts are bone cells that influence the degenerative process of the bone, if a degenerative disorder is characterized by a decrease in bone mass, this will result in an imbalance between resorption of calcium and bone formation. The imbalance is due to several factors which consists of aging factor and reduced gonadal (genital) gland function. Based on the explanation above, it can be concluded that gender of female has a higher fall risk than men [5,12].

## **C. Education**

The highest level educational characteristics in the results of this study were 12 whose are elementary schools

respondents (12.1%). People with satisfactory level of education is expected to be able to improve knowledge and understanding in this case in term in terms of health and self care however the results of the study showed that the level of education is quite low. The results of this study showed that the level of formal education level is still relatively low which caused by the economic conditions of respondents who have low income, so that they prioritize work rather than continue higher to education. The low level of education of a person will influence the level of knowledge in prevention to falls [18].

## **D. Job**

The job characteristics of the respondents are housewife 22 respondents of housewives (47.8%). The number of jobs as housewives / not working is caused by the majority of the respondent are women. Job related to daily activities can affect strength, flexibility, and balance in motion functions and tissue resistance. The majority of respondents in this study have a job as housewives. Housewife has a more active level of activity which requires greater muscle flexibility and endurance. A person who is active in carrying out physical activity has a positive effect on muscle strength and prevents the progress of muscle weakening when they get older. The high risk of falls in the older people who are not active is caused by the decrease in muscle strength which cause changes in muscle performance and it affects balance when the older people do physical activity [16,19,20].

Bad balance during physical activity can cause risk of fall. The older people who are active while carrying out

physical activities will have many movements, it will caused contraction of muscle, so contractile of protein synthesis it takes will be faster, it will increase the actin filaments and myosin in myofibrils which will increase muscle mass. Increased muscle mass will affect the increase in components of muscle metabolism, that is ATP, which has an impact on increasing muscle strength. Optimal muscle strength will help the older people to keep their body balance [15].

### **E. Disease History**

Based on the results of the study, the majority of respondents had no disease history of 23 respondents (50%). A history of chronic diseases is one of the factors that influence the psychosocial changes of the older people in dealing with health problems. Older people health problems will affect the older people in socializing with the environment so that the older people will have higher risk to fall [21]. The prevalence of chronic older people disease in South Jakarta showed that 61.4% of the older people that experienced joint disease have a higher risk of falls. One of the chronic diseases experienced by the older people who often cause the risk of collapsing are osteoarthritis. Osteoarthritis is an illness of the joints that moves, the joints most often affected by osteoarthritis are joints that work as bearers of the body. It consist of the knee, pelvis, lumbar vertebra, cervix, and joints of the fingers. The disease can be the cause of the musculoskeletal system disorders. Someone who's exposed to this disease will be experiencing pain and stiffness in the joints. This disease will cause restricted movement caused by decreased

function of the bone and joints to support the body. These condition's might worsen with productivity of the older people and allow for changes in gait to be abnormal, and increase older people's risk of falls [22,23]

### **2. Body Balance (Falls Risk)**

The risk of falls also decreased in the community of older people in Wreda Pratama after undergoing exercise four times in a month every Sunday with 30-45 minutes. The results of the study showed that an increasing in body balance in the older people with body balance disorders. The TUGT value decreased from 13.93 to 12.13 (a decrease of 1.8 seconds) ( $p = 0,000$ ). Increasing body balance through a decrease in TUGT value proves that balance exercise is part of the effective nursing intervention models to overcome balance disorders so as to prevent falls.

These results are confirmed by research by Miko, Szerb, Szerb, and Poor [24] in Hungary. 12 months of balance exercise with a duration of 3 times a week for 30 minutes improves older people body balance ( $p = 0.005$ ; TUGT value from 8.89 seconds to 6.74 seconds). Older people who became a respondent as many as 100 people that the age more than 65 years old. The average of decrease in TUGT is 0.18 seconds a month. The results differ from those obtained by researchers, it caused some older people are still vigorous in carrying out daily activities independently.

Another study supporting the results of the study was Hirase, Inokuchi, Matsusaka and Okita [25] who conducted research in Japan on 45 older people people with an average age of 83.1 years old. His results showed that balance exercises performed once a week for 6

months with a duration of 1 hour per session significantly improved body balance (p value = 0.009). Further results of the analysis showed that the value of TUGT decreased from 15.9 to 13.9. While in the control group it increased from 14.3 to 15.0.

The older people who join balance exercise will have a good balance of body. A good balance of the body will minimize the risk of fall. Nurses and posyandu volunteer can collaborate to always monitor balance exercise programs. This exercise are important in order to improve balance, muscle strength, and flexibility in maintaining aging body functions.

### **Conclusion**

1. Characteristics of the older people who were the respondents of the study in Wreda Pratama were mostly female as many as 31 respondents (67.4%), aged 60-74 years old as many as 24 respondents (52.2%), had elementary education as many as 12 respondents (26, 1%), job as a housewife with 22 respondents (47.8%) and no disease history of 23 respondents (50%).
2. An increased in body balance after a body balance exercise of 4 meetings with a duration of 30-45 minutes from 13.93 seconds increased to 12.13 seconds.

### **Suggestion**

1. For the Development of Nursing

It is hoped that in order to continue to developing nursing science, especially community nursing and gerontological to providing a good communication, information and education to improve health promotion and health education in

an effort to preventing the older people to fall at home.

2. For Puskesmas Kasihan 1

It is hoped to provide health education about prevention to fall for the older people so that the older people can maintaining and preventing factors of fall, especially providing health education to structure the home environment.

3. For Posyandu

It is hoped will give motivation and encouragement to the older people to keep doing balance exercises.

4. For the Older people

It is hoped that the older people will continue to do a balance exercise program, and do routine at home.

5. For Further Researchers

It is hoped that the next researcher conducts research on the factors associated with the risk of falls in the older people by adding additional factors such as visual impairment, hearing loss, central nervous system disorders, and drugs that can be risk the fall in the older people.

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