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# Berg Balance Scale (BBS) for Early Detection of Fall Risk in the Elderly in the Work Area of Antang Health Center Makassar City

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**Abstract:**

Falling is one thing that cannot be avoided by everyone, especially the elderly who are affected by a decrease in muscle strength which is one of the factors for falling. The purpose of this study is to early detect the risk of falling in the elderly using the BBS (Berg Balance Scale) questionnaire and find out the age group of the elderly who are prone to experiencing high falling risks. The method used in this study is descriptive research with sampling techniques using purposive. The risk of falling is measured using a BBS (Berg Balance Scale) observation sheet. The results showed that respondents aged 60-74 years with a total of 77 people included in the low fall risk category, there were 64 elderly (83.1%), medium fall risk 12 elderly (15.6%) and respondents with a high risk of falling 1 elderly (1.3%). The conclusion of this study is that as you get older, especially 66 years old and above, the risk of falling will also increase, so it takes awareness of yourself and your family to pay attention to each other to be able to avoid falling.

**Keywords:** Berg Balance Scale; Elderly; Fall Risk

## Introduction

The increase in life expectancy is directly proportional to the increase in the population of the elderly population, and every human being will experience aging in his lifetime, this happens because the elderly experience physiological and biocomia declines, so it will affect the overall function and ability [1]. According to the World Health Organization (2014), the proportion of the population over 60 years old in the world from 2000 to 2050 will double from about 11 percent to 22 percent, or in absolute terms increase from 605 million to 2 billion elderly people [2]. At this time, indonesia's elderly population has doubled (1971-2020) to 99.92 percent (26 million). The increasing elderly population in Indonesia is unavoidable. In 2020 there are six provinces that have an elderly population where the elderly population has reached 10 percent, namely Yogyakarta (14.71 percent), Central Java (13.81 percent), East Java (13.38 percent), Bali (11.58 percent), North Sulawesi (11.51 percent), and West Sumatra (10.07 percent) [3].

Falling is one of the geriatric giants, often occurs in the elderly, the most frequent causes include from within themselves (sensory, cognitive, central nervous system disorders) which causes a decrease in balance, muscle strength, and decreased muscle flexibility, dangerous state of the home environment (old / unstable household appliances, slippery and uneven floors, and others) [4]. The incidence of falls in the elderly can result in injuries to soft tissues and fractures and even death. Falling can also be another problem, namely pain, physical limitations and a slow healing process and can have an impact on the condition of the elderly, especially those who experience activity dependence. Every elderly person needs to be examined to find any risk factors for falling. The dangerous state of the house and can cause a fall, the lighting of the house should be sufficient and not create glare on the vision, the floor of the house is ensured not to be slippery [2].

## Research Method

In this study, the researcher uses a quantitative approach so that it can guide the researcher to be able to obtain answers to research questions. The quantitative approach used is descriptive research to early detect the risk of falling in the elderly using the BBS (Berg Balance Scale) questionnaire.

These questionnaires are used to measure static and dynamic capabilities. This BBS consists of 14 points of participation with points 0 - 4 with 0 indicating the lowest level and 4 indicating the highest level. The number of scores = 56 with an interpretation of 41 - 56 is a low risk of falling. 21 - 40 Medium fall risk and 0 - 20 High risk of fall.

The determination of the sample size in this study uses the Purposive Sample technique, which is a sampling technique by determining certain criteria that are considered to be the most representative of the population. The inclusion criteria in this study are :

1. Elderly between 60-74 years
2. Not currently experiencing paralysis in extremity
3. Not experiencing severe visual impairment

Exclusion Criteria in this study are :

1. Not willing to be a respondent
2. Unable to communicate.

The sample amount using the Slovin calculation formula so that the results of the number of samples were obtained by 77 samples.

## Results

A study was conducted with a total sample of 77 people, by conducting a fall risk assessment using the Berg Balance Scale (BBS). The purpose of this study was to identify the age groups of the elderly who were most susceptible to falling and from what age susceptibility to falling could occur. The characteristics in the study can be seen in table 1:

**Table 1** Characteristic Respondent (n = 77)

| Category | | n | % |
|---|---|---|---|
| Age | 60-65 | 32 | 41,6 |
| | 66-70 | 20 | 26,0 |
| | 71-74 | 25 | 32,5 |
| Gender | Male | 19 | 24,7 |
| | Female | 58 | 75,3 |
| Last Education | Primary School | 52 | 67,5 |
| | Junior High School | 6 | 7,8 |
| | Senior High School | 3 | 3,9 |
| | College | 4 | 5,2 |
| | No Education | 12 | 15,6 |
| Job | Housewife | 54 | 70,1 |
| | Laborer | 2 | 2,6 |
| | Seller | 1 | 1,3 |
| | Farmer | 5 | 6,5 |
| | Self employed | 7 | 9,1 |
| | Not Working | 8 | 10,4 |

Based on table 1, it can be seen that the majority of elderly age is vulnerable 60-65 (41.6%). The majority of the elderly were female 58 (75.3%) The majority of the last educated graduates of junior school 52 (67.5%) and the majority of the elderly were housewife 54 (70.1).

**Table 2** Risk Fall Score (n = 77)

| Category of Fall | n | % |
|---|---|---|
| High Risk of Falling (0-20) | 1 | 1,3 |
| Intermediate Fall Risk (21-40) | 12 | 15,6 |
| Low Fall Risk (41-56) | 64 | 83,1 |

Based on table 2 shows that the highest score value is 41-56 or falls into the low fall risk category of 64 (83.1%) and the lowest score value is 0-20 or falls into the category of high fall risk 1 (1.3%).

**Table 3** Age Distribution and Respondent's Score (n = 77)

| | Score | | | Total |
|---|---|---|---|---|
| Age | High risk of falling (0-20) | Risk of falling intermediate (21-40) | Risk of falling low (41-56) | |
| 60-65 | 0 | 4 | 28 | 32 |
| 66-70 | 0 | 1 | 19 | 20 |
| 71-74 | 1 | 7 | 17 | 25 |
| Total | 1 | 12 | 64 | 77 |

Based on the table of 3 show that respondents aged 60-65 years who are included in the low fall risk category as many as 28 elderly and the medium fall risk there are 4 elderly. Respondents with vulnerable aged 66 – 70 are included in the low fall risk category, there are 19 elderly and there is a medium risk of falling there is 1 elderly. Respondents with vulnerable ages 71 – 74 who fall into the low fall risk category there are 17 elderly, medium fall risk there are 7 elderly and high risk of falling there is 1 elderly.

## Discussion

The number of female respondents in this study was more than that of male respondents. Basically, men have stronger muscles than women. Eliopoulos(2016) (in ([5])), this matter is also supported by a theory that explains that women are more susceptible to osteoporosis due to shrinkage of the hormones estrogen and progesterone. Osteoporosis in the elderly is a risk aspect that causes the elderly to fall [6].

The majority of respondents are IRT, daily activities are one of the parameters to see a person's functional status, especially old age can be observed from his ability or independence in carrying out daily activities. Ability or independence in daily activities has benefits, namely in balance, increasing flexibility, and muscle strength, as well as self-efficacy or independent empowerment [7].

The results showed that early detection of fall risk using BBS (Berg Balance Scale), namely the majority of the elderly are included in the low risk of falling vulnerable aged 60-65 years, where at that age the elderly are still actively carrying out activities. In the elderly who have a lot of activity or who have high physical mobility will increase the control of their physical balance, so the risk of falling is very low [8].

Good mobility can be obtained by practicing useful physical exercises to keep the joints and posture functioning good. Exercises are carried out in stages, adapted to the abilities of the elderly [9]. The results of the study also showed that by using BBS (Berg Balance Scale) there was 1 elderly person included in the high fall risk category, namely the elderly with a vulnerable age of 71 - 74 years. This allows physically that the elderly have a high risk of falling due to the aging process that occurs in the elderly, there are changes in postural control that play an important role in most fall events [10].

The results of a study conducted by Rokhima in 2016 on "Factors related to the risk of falling on the incidence of fall risk in the elderly in the primary care unit of the Medan Johor Health Center" showed that the incidence of fall risk in the elderly obtained results that 46% were at high risk, 36% were low risk and 18% were not at risk of falling.

Changes in biomechanical components including myoelectical letension, reaction time, propioceptive, joint sphere of motion and muscle strength affect the risk of falling. In addition, there are changes in posture, gait, sensory system, and functional mobility [11]. Old age is associated with degenerative processes in the vestibuler system, the positional reflex slows down and the weakening of muscle strength are very important maintaining posture. Balance can also be disturbed due to the presence of diseases and medications. All of these changes can play a role in the occurrence of falls, especially in the ability to prevent falls when slipping or encountering dangerous environmental situations.

## Conclusions

The use of the Berg Balance Scale (BBS) in early detection of fall risk in the elderly obtained results that the majority of the elderly are included in the low fall risk category, namely as many as 64 elderly people. And the elderly experience a high risk of falling at the vulnerable age of 71 – 74 years

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## References

1. Pudjiastuti S., Utomo B. *Fisioterapi Pada Lansia*.; 2003.
2. Ramlis R. Faktor-Faktor Yang Berhubungan Dengan Resiko Jatuh Pada Lansia Di Bpplu Kota Bengkulu Tahun 2017. *J Nurs Public*. Published online 2018.
3. Badan Pusat Statistik. *Statistik Penduduk Lanjut Usia 2020*.; 2020.
4. Purnamadyawati, Bachtiar F. *Deteksi Resiko Jatuh Dan Pendampingan Latihan Keseimbangan Pada Pasien Lanjut Usia Di RS Setia Mitra Jakarta*.; 2020.
5. Azitha M, Aprilia D, Ilhami YR. Artikel Penelitian Hubungan Aktivitas Fisik dengan Kadar Glukosa Darah Puasa pada Pasien Diabetes Melitus yang Datang ke Poli Klinik Penyakit Dalam Rumah Sakit M . Djamil Padang. *J Fk Unand*. 2018;7(3):400-404.
6. Dinda E. *Pengaruh Latihan CAWTHORNE Terhadap Penurunan Resiko Jatuh Pada Lansia*.; 2017.
7. Aria R, Ikhsan I, Nurlaily N. KEMANDIRIAN LANJUT USIA DALAM AKTIFITAS SEHARI-HARI DI WILAYAH KERJA PUSKESMAS NUSA INDAH BENGKULU. *J Vokasi Keperawatan (JVK)*. Published online 2019.
8. Guccione A. *Geriatric Physical Therapy*. 2nd editio. Mosby; 2000.
9. Siburian P. Bagaimana memberdayakan kemampuan fisik lansia? *www.waspada.co.id*. Published online 2006.
10. Darmojo, Martono. *Buku Ajar Geriatri (Ilmu Kesehatan Usia Lanjut)*. FIK UI; 2004.
11. Lueckenotte. *Pengkajian Gerontologi. Ahli Bahasa Oleh: Anik Muryunani*. EGC; 1998.