Journal of Bionursing
2025, VOL.7, NO. 3, 180-187

Case Study on the Effect of Complementary Therapy: A Combination of ROM Therapy and Otago Exercise (ROTAGO) to Reduce the Risk of Falls in the Elderly

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ABSTRACT

Background: The elderly are an advanced stage of the human life process that undergoes various anatomical and physiological changes in the body. One of them is neuromuscular changes that have an impact on decreasing muscle strength and balance disorders that result in the elderly becoming easily falling. Management to overcome the risk of falls can be carried out non-pharmacological with complementary therapy combined with ROM therapy and otago exercise (ROTAGO). Objective: This study was to determine the effect of combination therapy of ROM and otago exercise (ROTAGO) to reduce the risk of falls in the elderly. Methodology: The research method used is the case study method. This intervention was given to 3 elderly people at risk of falling, the intervention was carried out for 3 meetings with a duration of ± 40-50 minutes per day. The instrument uses TUGT. The data analysis used in this study is by using the paired t test. Study Results: The overview of the risk of falling after being given ROTAGO therapy for 1 week was that there was an average decrease in the risk of pre and post falls by 3.36 seconds. The results of the paired t test showed a significant effect of ROTAGO therapy on reducing the risk of falling in the elderly with a value of 0.009. Conclusions: There is a significant effect of combination therapy with ROM therapy and otago exercise (ROTAGO) to reduce the risk of falls in the elderly.

KEYWORDS
Elderly; otago exercise; fall risk; ROM therapy

INTRODUCTION

The elderly or the elderly is someone who has reached the age of 60 years and above (Ministry of Health of the Republic of Indonesia, 2020). The elderly is the final stage in the human life journey which is characterized by various physical and physiological changes in the body. One of these changes occurs in the neuromuscular system, which causes a decrease in muscle strength and balance disorders, thereby increasing the likelihood of falls in the elderly (Adliah et al. 2022).

Falling in the elderly can affect health well-being in the long term. Elderly people who experience falls tend to face limitations in carrying out daily activities Activity Daily Living (ADL), disability, loss of mobility, decreased quality of life, and are at high risk of experiencing repeated falls.

The elderly are the largest group for fall cases that are the cause of death worldwide. It is estimated that every year there are around 37.3 million cases of falls and cause injuries that are serious enough to require medical attention (WHO 2018 in Pashar et al., 2022). According to data from the World Health Organization (WHO) in 2023, around 28-35% of the elderly aged ≥ 65 years experience falls every year. This figure increases to 32-42% in the elderly who are ≥ 70 years old. Based on the Indonesian Family Life Survey (IFLS) survey, the prevalence of fall risk in the elderly increases with age. In the elderly over 65 years old, the risk of falling reaches 30%, and this figure continues to increase in the elderly aged 80 years and above (BKKBN 2020). According to the 2018 Central Java Provincial Health Profile, the elderly population over 60 years old reached 13.03% of the total

population, which is around 4,490,000 people. This increase in the number of elderly can trigger health problems, including physiological changes in the musculoskeletal system that result in a decrease in muscle strength, especially in the lower extremities (Saraswati, Fasya & Santoso 2022).

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The factors that cause falls in the elderly are divided into internal and external factors. Internal factors include disorders of the brain as the center of the nervous system, dementia or senility, sensory-motor system disorders, cardiovascular disorders, metabolic disorders, gait pattern problems, and disorders of muscles and joints. Meanwhile, external factors include environmental conditions, daily activities, and drug use (Rudi & Setyanto 2019). Anatomical and physiological changes in the elderly have a significant impact on the risk of falls, making falls one of the health problems, especially in the elderly. Although it is often thought to be the result of decreased function due to the aging process, falls are actually not normal from the aging process. Therefore, preventive efforts are needed to reduce the risk of falls in order to improve the quality of life of the elderly. Various treatments, both pharmacological and non-pharmacological have been developed to reduce the risk of falls. One non-pharmacological approach is physical exercise, which can help increase muscle strength in the elderly (Muladi 2022).

Efforts to prevent a decrease in muscle strength and increase joint flexibility in the elderly can be done with Range of Motion (ROM) exercises. ROM exercises aim to maintain or improve joint mobility, while also helping to increase muscle mass and muscle tone strength (Dwilianti & Umrana 2017). ROM exercises can prevent muscle damage, muscle atrophy, improve blood circulation, and reduce the risk of vascular paralysis, so that comfort for the elderly increases. This exercise can be adjusted to the ability of the elderly so as not to cause pain in the joints that are moved. If the elderly have difficulty doing ROM exercises, the exercises can be done passively on the affected extremities (Ezalina et al. 2024). The results of a study conducted by Nindawi, Susilawati & Iszakiyah (2021) showed the effect of ROM training on the range of motion of the leg joints and muscle

strength in the elderly. If the exercise is done correctly and consistently, it will have a positive impact on muscle strength and joint range of motion in the elderly.

In addition, there is a training that can reduce the risk of falls in the elderly, namely the Otago Exercise. Otago Exercise is a series of exercises designed to prevent the risk of falls in the elderly, with a focus on muscle strengthening and balance exercises. Otago Exercise has been shown to be effective in reducing the incidence of falls in the elderly by improving muscle strength and balance, as well as a safe, effective, practical and low-cost exercise program (Mahendra et al. 2022). The results of research conducted by Segita, Febriani & Adenikheir (2021) are influential in improving dynamic balance because this exercise has components consisting of muscle strengthening, balance enhancement and walking exercises.

The results of the assessment on 3 elderly people in the work area of the Sumbang I Health Center, one of which is in Banteran Village, obtained the results of the examination of the elderly, namely by using the Time Up Go Test (TUGT) measurement, obtained values of 14.71, 14.05 and 14.11 seconds, respectively (≤ values of 14 seconds = low risk of falling and ≥ 14 seconds = high risk of falling). The higher the TUGT value, the higher the risk of falling on the elderly. Based on these problems, the researcher wanted to determine the effect of complementary therapy combined with ROM therapy and otago exercise (ROTAGO) to reduce the risk of falls in the elderly.

RESEARCH METHODS

The research method used is a case study approach on three elderly people at risk of falling. Respondents were given therapy for 3 times within 1 week. Data collection was carried out by providing intervention for 3 meetings by conducting a pre-test before being given the intervention and post-test after being given therapy on the last day. The data analysis that will be used is a paired t test using computer software.

The type of research used, namely case studies, uses descriptive methods to describe the nursing process and focuses on the elderly with nursing problems, risk of falls and chronic pain. The subjects used were 3 elderly people with a high risk of falling. The incubation criteria for this case study were elderly people with a high risk of falling and willing to be respondents, while the exclusion criteria were elderly people with cardiovascular disorders, low risk of falling and not willing to be respondents.

The research was conducted in Banteran Village, Sumbang District, Banyumas Regency, Central Java. on October 22-27, 2024. The focus of this study is to conduct an analysis of nursing care in the elderly with a high risk of falls with nursing problems, namely the risk of falls and chronic pain using a combination therapy intervention of ROM and otago exercise (ROTAGO). The instrument used is the time up go test (TUGT) to measure the balance of the risk of falling. The next stage is the implementation of EBN on patients for 7 days from December 11 to 17, 2023. Therapy is given once a day, namely in the morning, then on the seventh day, blood pressure monitoring is carried out as an evaluation.

CASE DESCRIPTION

Elderly 1 mother K (65 years old) said that she

had a history of falling ± 2 years, in the last 6 months more than 3 times she fell in the bathroom and had also fallen in the yard while taking care of her grandchildren. The client said he felt shaking, tingling and pain in both legs. P: pain during activity Q: stabbing pain R: pain in both legs S: 5 scale T: pain disappears and will increase when active. The results of the TUGT assessment with a score of 14.17 seconds are that it has a high risk of falling.

Elderly 2 Mrs. W (70 years old) said she had a history of falling 30 years ago, falling off a bicycle which caused her right leg bone to appear to be enlarged. Client Client said he felt pain in both legs especially in the knees. P: pain felt when tired of activity Q: pain felt R: pain in both legs, especially knees S: 5 T: pain disappears and will increase when doing strenuous activities. The results of the TUGT assessment with a score of 14.05 seconds are that it has a high risk of falling.

Elderly 3 Mr. S (80 years old) said he had a history of hypertension and had no history of falls. Client The client said he felt pain in both legs, swelling and stiffness in the ankles to the toes. P: pain felt when doing activity Q: stabbing pain R: pain in both legs S: 5 scale T: pain disappears and will increase when doing strenuous activities. The results of the TUGT assessment with a score of 14.11 seconds are that it has a high risk of falling.

RESULT

Based on the results of the assessment, especially in the physical examination, the three elderly have a high risk of falling. All three clients had similar symptoms, namely pain or stiffness in both legs. P: pain felt when doing activity Q: stabbing pain R: pain in both legs S: 5 scale T: pain disappears and will increase when doing strenuous activities. The client has a history of falls and TUGT values of 14.17, 14.05 and 14.11.

Researchers analyzed and found that the emerging nursing diagnosis, namely the risk of falling (D.0143), was related to decreased muscle strength. Chronic pain (D.0078) is associated with a musculoskeletal condition characterized by pain and stiffness in both legs.

The intervention plan to overcome chronic pain problems in accordance with SIKI (2018) is relaxation therapy (I.09326). The plan of action is to identify the decrease in energy levels and check muscle tension. Therapeutic and educational actions that will be carried out are to provide interventions in the form of combination therapy of ROM and otago exercise to reduce the risk of falls in the elderly. The implementation of nursing is carried out every day for 3 meetings in 1 week with a daily duration of 40-50 minutes.

Table 1. Client fall risk monitoring results (n=3)

Name	Fall Risk (TUTG)		Decline
	Pre	Post	Risk of Falling
Mrs. K	14.17	11.15	3.02
Mrs. W	14.05	10.07	3.98
Mr. S	14.11	11.03	3.08
Average downside risk falls 3.36			

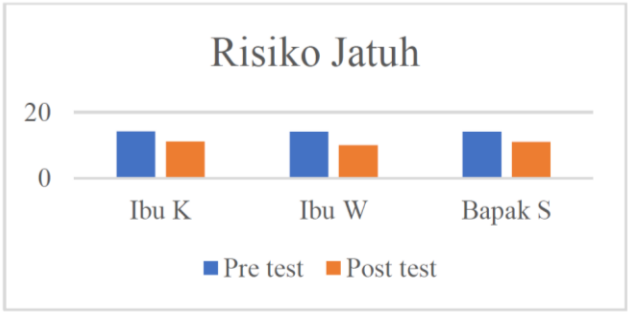

Figure 1. Risk graph falls on the elderly

Based on table 1 and figure 1, there is a difference that shows the average decrease in the risk of falling clients in pre and post, i.e., an average of 3.36 seconds. The average risk fell on the three elderly before the intervention, namely, 14.11 seconds and after the intervention was given 10.74 seconds. This shows that the combination of ROM therapy and otago exercise (ROTAGO) to reduce the risk of falls in the elderly is effective with a therapy administration time of 40 minutes for 3 meetings in 1 week.

Table 2. The effect of a combination of ROM therapy and otago exercise (ROTAGO) to reduce the risk of falls in the elderly

Risk of falling (TUGT)	Mean	Standard devitiation	t	Df	Sig.(2 tailed)
Pre-test	3.36667	54930	10.616	2	0.009
Post-test					

Table 2. showed the results of the analysis using the paired sample t test obtained a Sig.(2-tailed) value of 0.009 where this value <0.05 which means that there is a significant influence on the client's fall risk value between the pre and post results of therapy so that it can be concluded that there is an influence of a combination of ROM therapy and otago exercise (ROTAGO) to reduce the risk of falls in the elderly.

DISCUSSION

Fall incidents in the elderly can cause injuries to soft tissues, fractures, and even risk being life-threatening. This condition triggers various health problems, such as pain, limitations in mobility, and a slow healing process. As a result, the elderly tend to experience dependence in carrying out daily activities (Ramlis 2018). Falls in the elderly are often caused by various factors, both intrinsic and extrinsic. Intrinsic factors include diseases suffered, especially those related to aging, such as internal diseases, digestive disorders, endocrine, vision, disorders of the motor system, disorders of the central nervous system, systemic diseases, and side effects of drugs used. Meanwhile, extrinsic factors are related to the environmental conditions where the elderly live, such as the use of walking aids, the condition of houses with stairs, slippery floors, lack of lighting, toilets far from the room, unergonomic spaces, and beds that are too high or low (Rohima, Rusdi & Karota 2020). Falls in the elderly can have an impact on long-term health well-being, because the elderly who fall often experience limitations in the ability to perform daily activities such as Activity Daily Living (ADL), disability, loss of mobility, decreased quality of life, and increased risk of repeated falls (Sudiartawan, Yanti & Wijaya 2017).

The results of observations from the three elderly were seen grimacing and feeling pain, trembling when walking, experiencing irregularities when walking and swollen legs. The elderly said they felt pain in both legs, especially in the knees, the legs felt tingling, stiff and swollen. One of the elderly said that he had fallen more than three times, both in the bathroom and in the yard. The elderly experience morphological changes in muscles that have an impact on the decline in muscle function. Changes in the elderly include, decreased muscle strength and contraction, as well as reduced elasticity, flexibility, and speed of movement. The impact of this decrease in muscle function and strength is a reduced ability of the body to maintain balance. In addition, the elderly who are at risk of falling are often affected by vision problems, pain in the waist or back, joint pain, imbalance, muscle weakness, fatigue, and

environmental factors such as slippery floors and inadequate lighting (Suryani 2018).

Based on the results of the paired t test, it was found that ROTAGO therapy has an effect on reducing the risk of falling blood pressure in the elderly. This therapy was carried out for 3 meetings in 1 week showing that there was a difference in blood pressure values in the pre and post of therapy. This is evidenced by the value of Sig. (2-tailed) which is 0.009 where the value is <0.05 which means that there is a difference in the value of risk of falling in the pre and post of therapy. This is in line with research conducted by (Nurhasanah et al. 2021) that the application of otago exercise therapy for 3 times in 1 week is able to increase muscle strength and reduce the risk of falls in the elderly.

Based on the results of data analysis, it was found that the risk of falling in the elderly before ROTAGO therapy was carried out had an average of 14.11 seconds. The results of the measurement of fall risk before being given therapy indicate that these three elderly people have a high risk of falling. After intervention for 3 meetings in 1 week, the average risk of falling in the elderly decreased to 10.74 seconds, which means that the risk of falling is low.

When ROTAGO therapy was carried out, the three elderly were cooperative until the therapy was completed, very enthusiastic, cheerful and participated in therapy for three meetings. The client's response to ROTAGO therapy, increased muscle strength, balance gait and limb ability. After each intervention the three clients said pain decreased, both legs were less stiff and felt more relaxed, and said that health science was increasing.

The three clients said that this therapy is easy to practice again independently. The results of observation during this ROTAGO therapy are that the client looks more relaxed and feels that the lower extremities are not stiff. After 1 week of therapy, 3 elderly people felt that the lower extremities of pain decreased, the lower extremities were not stiff and muscle strength increased.

ROTAGO is a combination of two therapies, namely ROM and otago exercise. ROM focuses on maintaining or improving joint mobility, as well as improving balance, muscle mass, and muscle tone (Agusrianto & Rantesigi 2020). Otago exercises are designed to reduce the risk of falls in the elderly with balance, muscle strength, and walking exercises (Segita, Febriani & Adenikheir 2021). ROTAGO is one of the alternatives that can be used to improve mobility, muscle strength, and balance in the elderly, so that it can prevent the risk of falls and maintain independence in the elderly.

CONCLUSION

Based on the results of the study, the overview of the risk of falling after being given ROTAGO therapy for 1 week was that there was an average decrease in the risk of pre and post falls by 3.36 seconds and there was a significant influence of ROTAGO therapy on the reduction of the risk of falling in the elderly with a value of Sig.(2-tailed) <0.05.

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