

CHAPTER I INTRODUCTION

A. Background

The elderly group is a population that is prone to experiencing a decline in physiological function, including reduced muscle strength, decreased flexibility, and impaired ability to maintain balance (Ivanali et al., 2025). Based on data *World Health Organization* (WHO) in 2024, It is estimated that one in six people in the world will be 60 years old or older by 2030. The number of elderly people is expected to increase from about 1 billion in 2020 to 1.4 billion in 2030, and by 2050 the global population of the elderly is expected to reach 2.1 billion. Meanwhile, the age group of 80 years and above is predicted to triple between 2020 and 2050, reaching around 426 million people. This condition occurs as life expectancy increases, so that more and more people are able to reach the age of 60 years and above. Almost all countries in the world are currently experiencing an increase in the number and proportion of the elderly population in their population (WHO, 2024).

Based on data from the Central Statistics Agency (BPS) in 2024, the number of elderly people (≥ 60 years) is estimated to reach around 33.7 million people or 11.8% of the total population by 2025. This fact confirms that Indonesia has entered a phase *Ageing Population* Since 2021, when the proportion of the elderly population passed 10%. This trend shows the potential for greater social and economic burdens as the number of elderly people increases. In fact, it is estimated that by 2045 around 20% or 65.8 million Indonesia's population will be over 60 years old (BPS, 2024).

The number of elderly people in Bengkulu Province in 2024 will reach around 10.88% of the total population, an increase compared to the previous year which was 10.51%. This increase indicates a change in the demographic composition of the region. The elderly population is also spread across rural and urban areas with different proportions, where the percentage of the elderly in rural areas reaches 11.64%, higher than with around 9.37% in urban areas. In addition, the majority of the elderly in Bengkulu are included in the category of

young elderly with an age range of 60-69 years, which reaches 7.13%. Meanwhile, the middle elderly aged 70-79 years amounted to 2.89%, and the elderly aged 80 years and above were only 0.86%. From this data, it can be concluded that the young elderly group dominates the elderly population in Bengkulu Province (BPS Bengkulu Province, 2024).

Based on data obtained from several health centers in Bengkulu City in 2024, there is information about the number of elderly people who experience balance disorders, namely 221 people at the Anggut Atas Health Center UPTD, 264 people at the Penurunan Health Center UPTD, and 311 people at the Kuala Lempuing Health Center UPTD. This figure shows that many elderly people experience balance disorders in the UPTD area of the Kuala Lempuing Health Center.

Along with the aging process, there are physiological, mental, psychosocial, and spiritual changes in the elderly (Renrusun et al., 2022). Entering the aging process, an elderly person experiences a decline in the function of tissues, organs, and body systems. Body systems that experience problems include the musculoskeletal system, respiratory or respiratory system, nervous system, endocrine system, and cardiovascular system (Fatmawati et al., 2020). One of the problems in the elderly that is often encountered is the problem of balance, which is the ability of individuals to maintain their body position when in various positions (Fauziah et al., 2021). This balance problem is related to a decrease in proprioceptive input ability, the occurrence of degenerative processes in the vestibular system, a slowdown in reflex response, and a decrease in muscle strength which has an important role in maintaining posture (Rohima et al., 2020).

Balance disorders in the elderly can be explained by a decrease in the function of the vestibular system, which plays a role in moving the eyes through *oculomotor nucleus* to the extraocular muscles through *vestibulo-ocular reflex* (VOR). This reflex allows the eyes to move steadily when the head moves, and when its function decreases usually from the age of 30 and deteriorates in the age range of 55-60 years so that balance will be disturbed (Yuliadarwati et al.,

2020). The nervous system works together with the proprioceptive system and the visual system to process information about body position and movement (Melani et al., 2021). Therefore, a decrease in one or more of these systems will have a direct impact on the ability to maintain balance. Decreased balance ability in the elderly increases the potential risk of falls that can result in serious injury and decreases the level of independence of the elderly (Azizah et al., 2025).

Falls are one of the common health problems experienced by the elderly (Setiawati et al., 2025). Falls are a major health problem in the elderly that can cause injury, disability, and even death. Falls can endanger the safety of the elderly and cause various injuries, both physical and psychological. The incidence of falls in Indonesia occurs in around 28-35% of people aged 65 years and above every year, and this figure increases to 32-42% in the elderly over 70 years old. The prevalence of falls in the elderly ranges from 30% to 50%, with the incidence of recurrent falls reaching 40% (Nugraha et al., 2023).

Some of the risk factors for falls in the elderly include advanced age, a history of previous falls, muscle weakness, balance disorders, vision impairments, use of certain medications, and unsafe environmental conditions (Sherrington et al., 2020). The risk of falling in the elderly is influenced by two types of factors, namely intrinsic and extrinsic. Intrinsic factors include various conditions such as disorders of the central nervous system, sensory disorders, problems with the musculoskeletal system, as well as abnormalities in gait patterns. On the other hand, extrinsic factors are related to unsafe environmental aspects, lack of physical activity, as well as the consumption of certain drugs. About 20-30% of elderly people who experience falls with a severe degree of disability have the potential to lose the ability to perform daily activities or *Activities of Daily Living* (ADL), experiencing a decline in quality of life, to the risk of death (Nurjannah & Hartati, 2024).

Previous studies have shown that non-pharmacological therapies are effective in improving balance in the elderly, such as *Gaze Stability Exercise*, *Ankle Exercise*, and *square stepping exercise* (Jehaman et al., 2021). One of the effective exercise methods to improve balance is *Cawthorne-Cooksey Exercises*,

that is, a type of vestibular exercise that is not only intended for individuals with balance disorders, but can also be applied to the elderly without balance complaints as a preventive measure (Jehaman et al., 2025). According to Sumarsih (2023), *Cawthorne-Cooksey Exercises* It is an exercise that involves changing the position of the body with the aim of improving balance, harmonizing muscle and eye movements, and improving walking patterns, so that overall it can reduce the risk of falling. *Cawthorne-Cooksey exercises* It aims to gradually strengthen the integration of various sensory inputs, so that it becomes an effective method in relieving symptoms due to disorders in the vestibular system. In addition, this exercise also helps to encourage the adaptation and compensation process that occurs at the central nervous system level so that it can improve balance (Jehaman et al., 2025).

In addition to *Cawthorne-Cooksey Exercises*, as for *proprioceptive exercises* which is also effective in improving balance, especially in the elderly. *Proprioceptive exercises* It is a form of exercise aimed at improving body balance by improving the body's proprioception ability to sense joint position, movement, and muscle strength through the activation of somatosensory receptors (Xu et al., 2022). According to Risydianto, et al (2024), *proprioceptive exercises* It provides feedback on the precision of movement and muscle reflex response, which plays an important role in building dynamic stability in the joints. Proprioception is the ability to be aware of the position and movement of the body in space, which plays a role in providing perception, both consciously and unconsciously, of the location and movement of limbs and other parts of the body (Valdes et al., 2024). The researchers divide proprioception into two types, namely static and dynamic proprioception. Static proprioception is defined as the ability to sense body position, while dynamic proprioception is defined as the ability to feel movement. The ability to sense movement and know the position of joints based on proprioceptive stimuli received by the central nervous system is called kinesthesia (Shoxrux, 2024).

Based on research conducted by Khatri, et al (2025), in Bikaner, India, with a total of 34 respondents aged 60-70 years given *Cawthorne-Cooksey*

Exercises show significant improvement ($p < 0.0001$). This study was conducted 3 times per week for 2 weeks. In addition, research conducted by Antunez, et al. (2020), in Extremadura, Spain, with a total of 42 elderly respondents who were given intervention *proprioceptive exercises* shows that there is an increase in balance in the elderly ($p < 0.0001$). This study was conducted 3 times per week for 2 weeks.

According to a preliminary study completed by researchers in the Kuala Lempuing Health Center area, Bengkulu City, on August 19, 2025, of the 10 elderly people (aged 60-70 years) who were measured for fall risk with the BBS instrument, 5 people were found to be in the category of moderate fall risk and 5 people in the low fall risk category. Therefore, it is necessary to apply *cawthorne-cooksey exercises* and *proprioceptive exercises*. The results of interviews with 10 elderly people surveyed, all of whom said they did not know about *Cawthorne-Cooksey exercises* therapy and *proprioceptive exercises*, but after being explained by the researcher, the respondents understood the therapy that would be given. The results of interviews with health workers in charge of the elderly at the Kuala Lempuing Health Center said that they did not know and had never applied *cawthorne-cooksey exercises* and *proprioceptive exercises* to improve balance in the elderly, the Health Center also held Posbindu activities once a month and elderly gymnastics every week on Fridays. However, there are currently no special actions focused on improving the balance of the elderly.

Looking at the problems that have been identified, the researcher is interested in further researching the effect of *cawthorne-cooksey exercises* and *proprioceptive exercises* on the balance of the elderly who are at risk of falling at the Kuala Lempuing Health Center, Bengkulu City.

B. Research Problem

The risk of falls is related to balance problems caused by disorders in the vestibular system, muscle weakness, visual impairment, or unfavorable environmental conditions. The prevalence of fall risk in Indonesia among the elderly has increased from around 25% at the age of 70 to 35% at the age of 75. Around 30% of the elderly aged 65 years and older who live in community areas

experience falls, some of which experience repeated falls. As well as the unknown effect of *cawthorne-cooksey exercises* and *proprioceptive exercises* on balance in the elderly at risk of falling at the Kuala Lempuing Health Center, Bengkulu City. Thus, the formulation of the problem that will be studied in this study is "Is There an Effect of *Cawthorne-Cooksey Exercises* and *Proprioceptive Exercises* on Balance in the Elderly at Risk of Falls at the Kuala Lempuing Health Center, Bengkulu City?"

C. Research Objectives

1. General Objective

To determine the effect of *cawthorne-cooksey exercises* and *proprioceptive exercises* on balance in the elderly at risk of falls at the Kuala Lempuing Health Center, Bengkulu City.

2. Specific Objectives

- a. To determine the characteristics of the elderly, including age, gender, and physical activity, in the Kuala Lempuing Community Health Center area, Bengkulu City.
- b. To determine the distribution of average balance scores among older adults at risk of falling before and after the intervention in the intervention and control group in the Kuala Lempuing Community Health Center area, Bengkulu City.
- c. To determine the difference in average balance scores before and after intervention in the intervention and control groups among the elderly in the Kuala Lempuing Community Health Center area, Bengkulu City.
- d. The study identified the average difference in balance scores before and after intervention between the intervention and control groups among older adults in the Kuala Lempuing Community Health Center area, Bengkulu City.

D. Significance of the Research

1. Theoretical Significance

a. For Educational Institutions

The results of this study can be used as *evidence-based nursing* in designing interventions to improve the balance in the elderly at risk of falling and can be used as a reference for reading in overcoming the risk of falls in the elderly.

b. For the Next Researcher

The benefit of this research for future researchers is that it can be a reference, source of information and reference material for further research so that it can be further developed.

2. Practical Significance

a. For the Elderly at Risk of Falling

The results of this study are expected to be able to find out how to improve balance by using *Cawthorne-Cooksey exercises* and *proprioceptive exercises*.

b. For Nurses

The results of this study can be used as input in the management or treatment of non-pharmacology as an alternative to improve balance in the elderly at risk of falling.