Chapter 1

Introduction

1.1 Background

Obesity, a chronic disease characterized by the presence of excess fat, is a rising major global health crisis and is often the focus in the pathogenesis of various diseases linked to numerous health conditions including type 2 diabetes, cardiovascular diseases (CVDs), metabolic syndromes, and cancers (Lin & Li., 2021). As mentioned by Tham et al. (2023), the prevalence of obesity is predicted to double between 2010 and 2030 in South and Southeast Asia, posing serious consequences for one's quality of life. This includes Indonesia, in which as stated by UNICEF in 2018, the occurrence of obesity has grown across all age groups over the past decades.

Despite it affecting all age groups, obesity in the elderly presents a serious concern as both aging and obesity are conditions that increase the risk of health problems, diseases, and death (Jura & Kozak, 2016). Aging, an inevitable phenomenon, is associated with the accumulation of changes in a person's physiology over time, including the redistribution of fat to visceral organs and the abdominal area (Ponti et al., 2020). This leads to a gradual increase in body fat, linking aging and abdominal obesity. Furthermore, aging also affects the psychological well-being of older adults, leading to an increased risk of depression or anxiety (Kang & Kim, 2022). These psychological vulnerabilities may predispose individuals to obesity, as food is often used as a coping mechanism for managing stress (Segal & Gunturu, 2024). This statement is supported by a study conducted by Wang et al. (2023), who identified worse eating behaviors among older adults who suffer more depression symptoms.

With Indonesia currently in the phase of an aging population, the proportion of older adults in Indonesia, which refers to residents who are 60 years of age or older, has been steadily rising since 2013. With this ongoing increase in life expectancy, the prevalence of obesity continues to increase among the older age groups. In fact, Ayuningtyas et al. in 2022 have reported a 14.8% prevalence of

obesity in Indonesia's older adults. Specifically in older adults, additional consequences of obesity include a greater risk of falls and fractures, cognitive decline, disabilities, and a lower quality of life (Roderka et al., 2020). This implies the urgency to implement management strategies to prevent obesity among older adults, such as modifying one's dietary patterns and habits (Orringer et al., 2020).

Chrononutrition is a field of research that highlights the alignment of food intake with the body's natural circadian rhythm, investigating three dimensions of feeding behavior: meal regularity, frequency, and timing (Mentzelou et al., 2024). Numerous studies have proven that chrono-nutritive-based strategies may promote metabolic benefits and have a promising role in weight control or weight reduction interventions (Mazri et al., 2023). These strategies may include restricting the eating window at specific hours or adjusting the load of macronutrients at specific times of day, such as consuming most carbohydrates at lunch time or early in the afternoon (Franzago et al., 2023). On the contrary, unhealthy eating behavior that desynchronizes the circadian clock, such as late-night eating habits or delayed meal consumption, is proven to be associated with abdominal obesity and metabolic disorders. (da Cunha et al., 2023; Peters et al., 2024).

As of today, studies investigating obesity and dietary behavior among Indonesia's older adult population remain limited. Recent studies on the dietary quality of older adults have primarily focused on its association with malnutrition, as demonstrated by the work of Dewiasty et al. (2022) and Susetyowati et al. (2025). Additionally, the concept of chrononutrition is a largely unexplored field within Indonesian research, resulting in a lack of comprehensive data on the population's chrononutritive habits. The only identified study on chrononutrition was conducted by Taslim et al. (2023), which examined the interlink between chrononutrition and stunting. Given the promising advantages of chrono-nutritive-based approaches in mitigating obesity and the evident gap in the

literature, there is an urgency to investigate the chrononutrition behavior of Indonesian older adults with obesity indicators.

1.2 Objective

This study aims to investigate the association between the chrononutrition behavior (breakfast consumption, largest meal, evening eating, meal latency, night eating, and eating window) and macronutrient load (protein, fat, and carbohydrates) by time of day (morning, afternoon, and night) to obesity indicators (BMI and waist circumference) of older adults aged 60 to 79 in Jakarta, Indonesia.

1.3 Hypothesis

1.3.1 Chrononutrition behavior

H_0: Chrononutrition behavior does not affect obesity indicators of older adults in Jakarta, Indonesia.

H_1: Chrononutrition behavior significantly affects obesity indicators of older adults in Jakarta, Indonesia.

1.3.2 Macronutrient load

H_0: Macronutrient load by time of day does not affect obesity indicators of older adults in Jakarta, Indonesia.

H_1: Macronutrient load by time of day significantly affects obesity indicators of older adults in Jakarta, Indonesia.