CHAPTER I
INTRODUCTION

I.1 Background

An increasing prevalence of mortality rate due to Non-Communicable Diseases (NCDs) has become a concern on a national level as well as worldwide. Non-Communicable Diseases are associated with diseases that progress slowly and occur over a long duration. Though NCDs are generally associated with elderly, people from all stages of life are at risk, even before birth. NCDs may develop in younger population such as children and adolescents before the signs and symptoms manifest as they get older (Budreviciute *et al.*, 2020).

The elderly population has the highest risk of suffering from NCDs due to weakened immune system, malnutrition, and complications from other diseases, to name a few. Diabetes mellitus, an NCD commonly found in elderly, is a metabolic disorder caused by an increase in blood glucose level. High blood glucose levels may be the result of insulin deficit or resistance (Chentli, Azzoug and Mahgoun, 2015). International Diabetes Federation (2021) has stated that 537 million adults aged 20-79 years suffer from diabetes. It is predicted that by 2030, the prevalence will rise to 643 million. Southeast Asia has the second highest diabetes prevalence at 90 million, only second to Western Pacific at 206 million (IDF 2021). According to Indonesia's Basic Health Research (Riskesdas), 6.3% of population aged 55-64 years, 6.0% of population aged 65-74 years, and 3.3% of population aged ≥75 years suffer from diabetes (Kemenkes, 2018).

Diabetes mellitus found in elderly are either type 1 diabetes mellitus (T1DM) or type 2 diabetes mellitus (T2DM). Despite being synonymous with age, diabetes mellitus can be caused by various factors. Some of these factors are unchangeable, such as sex, heredity, and comorbidities; while other factors like nutritional status and lifestyle habits are changeable.

Physiological functions are affected by various factors, including sex. Difference in energy and glucose homeostasis regulation is found between males and females (Tramunt *et al.*, 2020). According to the Basic Health Research

published in 2018, women are more likely to suffer from diabetes (1.8%) compared to men (1.2%). A study conducted in Central Lampung, involving 126 diabetic patients, found that 79.1% of the patients were women (Arania, Triwahyuni, Esfandiari, *et al.*, 2021). This is further backed up by a research at Puskesmas Daerah Istimewa Yogyakarta, where 74,8% of diabetes patients are women (Rasdianah *et al.*, 2016).

Nutritional status has been linked to various health statuses. The same can also be said its relation with diabetes. A study conducted in endocrine ward at dr Soetomo Public Hospital, Surabaya, found that 72.9% of the patients are overweight and 61.52% of them have high glucose level with the average fasting blood glucose level of 142.17 mg/dL (Harsari, Fatmaningrum and Prayitno, 2018). Likewise, a study conducted on diabetic patients at dr. Iskak Tulungagung public hospital found that the average BMI was 25.77 kg/m^2 and an average blood glucose level of 213.23 mg / dL, further proving the relation between nutritional status and diabetes (Masruroh, 2018).

Blood glucose levels are also affected by genetic factors like heredity. According to a study conducted in South Denpasar, Indonesia stated that individuals with a family history of diabetes are six times more likely to suffer from type 2 diabetes mellitus (Paramita and Lestari, 2019). Another case control study conducted at puskesmas Panjatan II involving 62 participants found that the group with a family history of diabetes have a higher level of random blood sugar (Nuraisyah, Ruliyandari and Matahari, 2021).

The number of smokers in Indonesia has roughly stayed the same throughout the years, with its prevalence being 23.25% in 2022 (BPS, 2022). In 2020, WHO stated that smoking causes approximately 225,700 deaths in Indonesia annually. Various studies conducted over the years have shown the association between smoking and the incidence of diabetes, with some going far back to the 1990s, in which a cohort study done on Japanese males concluded that the level of consumption and the number of years smoked were positively correlated with the development of type 2 diabetes and also to impaired fasting glucose, which often progresses to type 2 diabetes. An analysis of studies conducted in 2017 concluded that smoking the risk of diabetes as well as diabetic retinopathy (Cai *et al.*, 2018).

Level of education impacts an individual's exposure to knowledge. The National Basic Health Research found that prevalence of diabetes mellitus in different categories of educational level are not the same (Kemenkes, 2018). According to their educational groups, 2.8% of university graduates, 1.6% of high school graduates, 1.4% of middle school graduates, 1.8% of elementary school graduates, 1.4% of people who did not complete elementary education, and 1.6% of who have never received formal education suffer from diabetes mellitus (Kemenkes, 2018). But these numbers, when grouped into high education group (high school and university graduate) and low education group (middle school graduate or lower), shows that more individuals from low education group (6.2%) develop diabetes compared to those from high education group (4.4%). This was also seen in Ghana, where 75.4% of people with diabetes mellitus hail from low education group (Gatimu, Milimo and Sebastian, 2016).

Occupational history of an individual plays a part in determining the amount of physical activity performed during productive age. Lesser physical activity during productive years increases the risk of developing diabetes mellitus (Morikawa *et al.*, 2000). In other words, occupational history is related to the incidence of diabetes mellitus (Qi *et al.*, 2019). According to the study conducted in Tolitoli, 93.5% of individuals who were not employed are more likely to suffer from diabetes. This number significantly higher than those who were employed (60%) (RMahmud *et al.*, 2018). A cross-sectional study in South Korea concluded that high sedentary time (≥10.0 h/day) was associated with elevated HOMA-IR (Kim *et al.*, 2018). Homeostasis Model Assessment of Insulin Resistance (HOMA-IR), is a test conducted to determine insulin sensitivity, where elevated HOMA-IR indicates insulin resistance (Wang *et al.*, 2021).

Prevalence of diabetes nationwide has increased, and West Java province is not an exception. A rise in prevalence of diabetes has been reported by Basic Health Research, stating an increase from 1.3% in 2013 to 1.74% in 2018 (Kemenkes, 2018). According to Public Health Office of Depok city (Dinkes Depok), diabetes mellitus is the NCDs with the highest increase in prevalence, with 23,188 new cases in 2020 (Dinkes Depok, 2021). Moreover, 17.45% of outpatients in hospitals suffer from diabetes, making it the most commonly found NCD among outpatients

(Dinkes Depok, 2022). Especially with the elderly population of Cinere subdistrict growing from 5,518 in 2019 to 10,672 in 2021 (Dinkes Depok, 2022), elderly health conditions must not be overlooked. Hence, knowing the factors associated with diabetes mellitus is the point of interest in this research, in order determine the factors that be changed, with the aim of lowering the prevalence of diabetes mellitus, lowering mortality rate due to NCDs, and improving the health conditions of elderly.

I.2 Research Problem

Elderly population is at a higher risk of developing NCDs, including diabetes mellitus. Diabetes is a chronic, metabolic disease characterized by elevated levels of blood glucose (or blood sugar). Various factors play a role in contributing towards the risks of developing diabetes. These factors can be changeable or unchangeable in nature. As diabetes mellitus is a chronic condition, some of the factors affecting the incidence of diabetes mellitus may be caused by certain habits during productive age. Among them are sex, nutritional status, diabetic family history, smoking history, occupational history, and level of education.

Hence, based on the briefly explained background, the question arises, what are the factors associated with diabetes mellitus in elderly in Cinere subdistrict, Depok?

I.3 Research Objective

I.3.1 General Objective

This research focuses on prevalence of diabetes mellitus and the possible factors that contribute to the issue. Hence, this research is conducted with the aim to find the factors associated with prevalence of type 2 diabetes mellitus in elderly in Cinere subdistrict, Depok, Indonesia.

I.3.2 Specific Objective

Specific purposes of this research are as follow:

a. To identify the number diabetic elderly in Cinere subdistrict.
b. To identify respondents' characteristics in Cinere subdistrict.

c. To identify and analyse the factors associated with diabetes mellitus in elderly residing in Cinere subdistrict.

I.4 Research Benefits

I.4.1 For Participants

A research must not only provide benefits for the researcher, but for the participants as well. While conducting this research, respondents were given information regarding diabetes mellitus; blood sugar levels, cause of diabetes, its impact on health, how to prevent it, and what to do to reduce harm if the respondent is already diagnosed, as well the importance of regular check-ups.

I.4.2 For Institution

As a source of information to know the factors associated with diabetes mellitus in elderly. It is hoped that the knowledge may be used on day-to-day basis.

I.4.3 For Science

This research is conducted as a means to gain insight and knowledge regarding associated with diabetes mellitus in elderly. This research may also be used as a reference for further studies.