

CHAPTER 1

INTRODUCTION

1.1 The Background of The Study

According to the World Health Organization (WHO), diabetes is a chronic disease associates with a heightened risk of heart attack, blindness, lower limb amputation and stroke. According to World Health Organization (WHO) the global prevalance of diabetes is projected to rise from 8,4 million to 21.3 million in 2030.¹ The prevalance of diabetes among individuals aged 55-64 in Central Jawa is 5.50%, while in Surakarta City it stands at 4,71% ² These figures underscore the increasing burden of diabetes among the elderly population in Indonesia.

The death rate in Indonesia due to diabetes mellitus is 3,7 million, accounting for 6,7% of total deaths. Indonesia ranks thrid among 10 countries with the highest number of people living with diabetes mellitus.³ This is primarily due to the chronic nature of the disease which can lead to complications in various organs. Mortality rates from diabetes mellitus are highest among patients over 70, with hypoglycemia accounting for 2-4% of deaths. According to the World Health Organization (WHO), the incidence of hypoglycemia in patients with diabetes mellitus has been steadily increasing, with a 25% rise in 2018 compared to the previous year.⁴ The increase is attributed to changes in patient's lifestyle and progression of diabetes-related complications. The risk of severe hypoglycemia is particularly high in individuals aged 65-74, who are considered geriatric and may experience

¹ World Health Organization, *Classification of Diabetes Mellitus* (World Health Organization, 2019)

² Tim Riskesdas 2018, *Laporan Provinsi Jawa Tengah Riskesdas 2018* (Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan, 2019).

³ Tim Riskesdas 2018.

⁴ World Health Organization.

declining organ function decline. As stated in the Quranic verse Al-Qur'an surah Ar-Rum (30):545,⁵ namely

اللَّهُ الَّذِي خَلَقَكُمْ مِنْ ضَعْفٍ ثُمَّ جَعَلَ مِنْ بَعْدِ ضَعْفٍ قُوَّةً ثُمَّ جَعَلَ
مِنْ بَعْدِ قُوَّةٍ ضَعْفًا وَشَيْبَةً يَخْلُقُ مَا يَشَاءُ وَهُوَ الْعَلِيمُ الْقَدِيرُ

“I is Allah Who created you in a state of (helpless) weakness, the gave (you) strength after weakness, then after strength, gave you weakness and a hoary head: He creates as He wills, and it is He who has all knowledge and power”

The surah explains that in old age the body will be weaker. The body experienced some decline in organ function, one of which is the pancreas gland so that it cannot or does not produce enough insulin and causes diabetes. As a result of decreased organ function will affect the sensitivity of the organ function when taking drugs such as antidiabetics. One of the side effects that often occurs in people with diabetes mellitus is hypoglycemia. So it is necessary to do evaluation of the use of antidiabetics from the aspect of the accuracy of the use of pharmacology. This study was conducted by evaluating the use of antidiabetics to reduce blood sugar levels, especially in geriatric patients who experience side effects of hypoglycemia.

1.2 The Research Questions

Based on the background explanation, the research question in this research as follows:

1. What are the treatment characteristics of geriatric patients who receive antidiabetics at Dr. Moewardi Surakarta General Regional Hospital?

⁵ Imam Asy-Syaukani, *Tafsir Fathul Qadhir*, 8th edn (Pustaka Azzam).

2. What is the effectiveness of antidiabetic medications in reducing blood sugar levels among geriatric patients at Dr. Moewardi Surakarta General Regional Hospital?

1.3 The Objective of The Study

1. The study aims to investigate the characteristics of antidiabetic medication use among geriatric patients at Dr. Mowardi General Regional Hospital Surakarta.
2. The study aims to investigate effectiveness of antidiabetic medication in reducing blood sugar levels in geriatric patients at Dr. Moewardi General Regional Hospital Surakarta.

1.4 The Significance of The Study

1.4.1 Theoretical Implications

The findings of this research can serve as a valuable reference for healthcare professionals, including doctors and pharmaceutical personnel, in evaluating the effectiveness of add medications in reducing blood sugar levels.

1.4.2 Practical Implications

The findings of this study are expected to contribute significantly to the existing knowledge and literature in the field of pharmacy, particularly with regard to the effectiveness of antidiabetic medications in reducing blood sugar among geriatric patients.

1.5 Research Authenticity

Several previous studies have investigated the effectiveness of antidiabetic medications in managing blood sugar levels among geriatric patients at Dr. Moewardi Surakarta Regional General Hospital Surakarta as summarized in Table 1 below.

Table 1 Research Authenticity

Research Title	Research Methods	Research Variables	Research Results	Differences in Research
Efficacy and safety of insulin lispro in geriatric patients with type 2 diabetes: a retrospective analysis of seven randomized controlled clinical trials ⁶	Non-Experimental	Independent: geriatrics patients with type 2 diabetes Dependent: Efficacy and safety insulin lispro	Insulin lispro may be considered a safe and efficacious therapeutic option for the management of T2DM in geriatric patients.	Independent: antidiabetic drugs in geriatric patients Dependent: Changes in blood sugar level values in several examination indicators
Clinical Effectiveness of Novolin® 30R Versus Lantus® Combined with Glucobay Treatment In Elderly Patients With Type 2 Diabetes Mellitus Controlled by Oral Hypoglycaemic Agents: A Randomized Study ⁷	Non Eksperimental	Independent: Elderly patients with type 2 diabetes mellitus Dependent: Efficacy Novolin® 30R Versus Lantus® Combined with Glucobay	There was a decrease in FBG, 2-hour postprandial blood glucose, total cholesterol, triglyceride and lipoprotein cholesterol values. Hypoglycaemia was less in the Lantus combined with Glucobay group compared to the Novolin 30R group.	Independent: antidiabetic drugs in geriatric patients Dependent: Changes in blood sugar level values in several examination indicators

⁶ Bradley H. Curtis and others, 'Efficacy and safety of insulin lispro in geriatric patients with type 2 diabetes: a retrospective analysis of seven randomized controlled clinical trials', *Aging Clinical and Experimental Research*, 26.1 (2014), 77–88

⁷ Yixuan Sun and others, 'Clinical Effectiveness of Novolin® 30R versus Lantus® Combined with Glucobay® Treatment in Elderly Patients with Type 2 Diabetes Mellitus Controlled by Oral Hypoglycaemic Agents: A Randomized Study', *Journal of International Medical Research*, 42.4 (2014), 993–1001

Research Title	Research Methods	Research Variables	Research Results	Differences in Research
Comparative efficacy and complications of long-acting and intermediate-acting insulin regimens for adults with type 1 diabetes: an individual patient data network meta-analysis ⁸	Non Eksperimental	Independent: Adults with type 1 diabetes Dependent: Comparative efficacy and complication of long acting and intermediate acting insulin	Long-acting insulin is more helpful in lowering HbA1c than intermediate-acting insulin. Severe hypoglycaemia continues to increase with comorbidities	Independent: antidiabetic drugs in geriatric patients Dependent: Changes in blood sugar level values in the examination indicators

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⁸ Areti Angeliki Veroniki and others, 'Comparative Efficacy and Complications of Long-Acting and Intermediate-Acting Insulin Regimens for Adults with Type 1 Diabetes: An Individual Patient Data Network Meta-Analysis', *BMJ Open*, 12.11 (2022),