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# Prevalence and Risk Factors of Type II Diabetes Mellitus in Indonesia

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**ABSTRACT**

**Background & Objective:** Type II diabetes mellitus is a metabolic disorder caused by impaired insulin secretion or function and has become a global health problem. The number of people with type II diabetes mellitus worldwide is estimated to reach 537 million and is projected to increase to 783 million by 2045. In Indonesia, the prevalence among people aged ≥15 years is around 3 percent, with the main risk factors being obesity, hypertension, low physical activity, and high sugar consumption. This literature review aims to describe the prevalence and risk factors of type II diabetes mellitus in Indonesia. **Method:** This study is a literature review using Google Scholar and PubMed to search for publications from 2015 to 2025. The articles reviewed discuss the prevalence, risk factors, and distribution of type II diabetes mellitus based on sociodemographic characteristics. **Result:** The results of the study show that the prevalence of type II diabetes mellitus increases with age, especially in the >55 age group, ranging from 6.3 to 12.5 percent. The prevalence in women (±9.6 percent) was higher than in men (±6.9 percent). The dominant risk factors included obesity (OR 2.3–2.7), hypertension (OR 1.9–2.0), low physical activity, advanced age, and high sugar consumption. **Conclusion:** The prevalence of type II diabetes mellitus in Indonesia shows an increasing trend during the 2015–2025 period with relatively consistent risk factors. Prevention efforts need to focus on controlling risk factors through the promotion of a healthy lifestyle.

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**Introduction**

According to the American Diabetes Association (ADA), Diabetes Mellitus (DM) is a metabolic disorder characterized by elevated blood glucose levels caused by abnormalities in insulin secretion or the body's response to insulin ElSayed et al. (2023) Type II Diabetes Mellitus is a growing global health problem with an increasing prevalence. Based on the 10th edition of the International Diabetes Federation (IDF) Diabetes Atlas {2021) an estimated 537 million adults aged 20–79 years live with diabetes worldwide, and this number is projected to rise to 783 million by 2045. Indonesia ranks fifth among countries with the highest number of people with diabetes, with approximately 10.7 million cases reported in 2021 (Federation 2021).

In Indonesia, non-communicable diseases, including diabetes, continue to impose a significant public health burden. The Indonesia Health Survey (SKI) 2023 reported a diabetes prevalence of 3 percent among individuals aged ⩾15 years based on professional diagnosis, with higher rates observed among women, older adults, and urban populations. Unhealthy lifestyle factors such as obesity (23.5 percent), hypertension (34.2 percent), low physical activity, and high sugar intake contribute substantially to the risk of developing type II DM (Ministry of Health of the Republic of Indonesia, 2023). The rising prevalence of type II DM has led to increased microvascular and macrovascular complications, reduced quality of life, and higher healthcare costs. Therefore, examining the prevalence and risk factors of type II DM in Indonesia is essential for informing prevention and disease control strategies.

The epidemiology of diabetes in Indonesia shows a continuous upward trend. Projections by Wahidin and colleagues indicate that the prevalence of diabetes increased from 1.1 percent in 2007 to 2 percent in 2018, and is expected to reach 3.5 percent by 2045 if risk factors remain uncontrolled. This increase is closely linked to lifestyle changes in modern society, including rising obesity rates, rapid urbanization, high-calorie diets, and reduced physical activity, all of which serve as major determinants of future diabetes incidence Wahidin (2024)

A similar pattern is seen in younger populations. Pulungan and colleagues reported that the global prevalence of type II diabetes among children and adolescents has continued to rise over the past two decades. In Indonesia, national registry data from 2009–2012 recorded 38 cases of type II diabetes in children and adolescents, although the actual number is likely higher due to limitations in reporting and low awareness among healthcare providers Pulungan, Afifa, and Annisa (2018)Data from the 2013 Basic Health Research Survey also showed that the proportion of diabetes among individuals aged ⩾15 years reached 6.9 percent, suggesting that obesity and metabolic syndrome emerging at a young age may contribute to the onset of type II diabetes later in life.

Supporting this observation, research by Tarigan and colleagues identified several major risk factors in the Indonesian population, including age ⩾45 years, high body mass index, hypertension, family history of diabetes, and low education levels. These findings highlight that soci demographic and lifestyle factors, in addition to biological factors, play a substantial role in the development of diabetes in Indonesia. Thus, prevention efforts must extend beyond medical interventions to include social and educational approaches Tarigan et al. (2024)

The upward trend in diabetes prevalence is further supported by an analysis of the Indonesia Family Life Survey (IFLS) conducted by Indrahadi and colleagues. Among 30.497 respondents aged ⩾15 years, 684 individuals or approximately 2.24

percent were identified as having diabetes. The prevalence was higher among older adults, particularly those aged ⩾55 years, and more common in individuals with hypertension. Urban residents showed a higher prevalence than rural populations, and socioeconomic conditions such as low education levels and unemployment were strongly associated with increased diabetes incidence Indrahadi, Wardana, and Pierewan (2021).

Overall, these studies demonstrate that the epidemiology of type II diabetes in Indonesia shows a steady increase over time, with most risk factors being modifiable. These findings emphasize the need for comprehensive disease prevention and control strategies through lifestyle modification, improved health education, and strengthened public policies focused on prevention.

**Objective**

The general objective of this review is to describe the prevalence and risk factors of Type II Diabetes Mellitus in Indonesia based on published scientific literature. The specific objectives include examining the prevalence of Type II Diabetes Mellitus in Indonesia through epidemiological studies and national reports, identifying the risk factors associated with the occurrence of Type II Diabetes Mellitus in the Indonesian population, and outlining the distribution of its prevalence according to sociodemographic characteristics such as age, sex, and lifestyle.

**Method**

Literature Review Design

This study employs a literature review approach, a research method that focuses on the critical analysis of existing knowledge, concepts, and findings found in books, scientific journals, encyclopedias, theses, and dissertations, allowing the formulation of theoretical and methodological contributions.

Search Databases

This literature review compiles summaries from various studies relevant to the predetermined theme. The selected literature was published between 2015 and 2025. The data used derive from previous research, both primary and secondary, with credible national and international journal articles serving as the main references. Literature searches were conducted using the Google Scholar and PubMed databases.

Selection Criteria

The strategy for identifying relevant articles followed the PICO framework, consisting of:

- Population/Problem, referring to the Indonesian population examined in relation to Type II Diabetes Mellitus.
- Intervention, referring to risk factors associated with Type II Diabetes Mellitus, such as obesity, hypertension, family history, low physical activity, and unhealthy dietary patterns.
- Comparison, referring to comparisons between groups within the population based on characteristics such as age, sex, or lifestyle.

Outcome, referring to findings from previous studies relevant to the research theme, including the prevalence of Type II Diabetes Mellitus in Indonesia and its associated risk factors.

**TABLE 1.** PICO

| Population/Problem | Intervention | Comparison | Outcome |
|---|---|---|---|
| Indonesian residents aged ≥15 years who represent the study population related to Type II Diabetes Mellitus | Risk factors associated with Type II Diabetes Mellitus such as obesity, hypertension, low physical activity, unhealthy diet, and family history | Comparison of prevalence characteristics and risk factors based on age, sex, and lifestyle | Prevalence of Type II Diabetes Mellitus in Indonesia and the relationship between risk factors and its occurrence |

Inclusion Criteria

- Studies reporting the prevalence and/or risk factors of Type 2 Diabetes Mellitus (T2DM).
- Research conducted on populations in Indonesia (national, provincial, or district/city level) or multicenter studies that include Indonesian population samples.
- Published between 2015 and 2025.
- Articles written in Indonesian or English.
- Full-text articles available from the databases used as literature sources.

**Results**

A comprehensive search of national and international databases identified multiple studies that met the inclusion criteria and were eligible for review. These studies collectively provide a detailed epidemiological overview of Type 2 Diabetes Mellitus (T2DM) in Indonesia, particularly concerning age-specific prevalence patterns. The literature consistently demonstrates that the prevalence of T2DM increases significantly with advancing age. This pattern is visible across national surveys, cohort studies, and community-based research, indicating that biological aging plays a crucial role in the pathogenesis of T2DM.

The review of five major studies shows that individuals aged above 55–60 years consistently exhibit the highest prevalence. National health surveys such as RISKESDAS 2018 report prevalence figures peaking at 8.0 percent among those aged over 65 years, while population-based studies using Indonesian Family Life Survey (IFLS) data report even higher estimates up to 12.5 percent. These findings strongly support the hypothesis that age-related physiological decline—including reduced insulin sensitivity, increased adiposity, and reduced β-cell function—contributes to the increased risk of T2DM among older populations Sumiyati (2023).

Furthermore, the consistency of findings across different study designs strengthens the validity of this trend. Cross-sectional studies show stable patterns across diverse geographic areas, while cohort studies provide stronger evidence of the progressive increase in diabetes risk over time. The convergence of these results confirms that age remains one of the most influential factors in the distribution of T2DM in Indonesia.

To illustrate these findings more systematically, the summary of the literature related to age-specific prevalence is presented in the expanded table below.

**TABLE 2.** Distribution of Type 2 Diabetes Mellitus Prevalence by Age Group in Indonesia

| No. | Authors (Year) | Title / Source | Study Design / Location | Sample / Population | Key Findings on Age-Specific Prevalence |
|---|---|---|---|---|---|
| 1. | Tanoey and Becher (2021) | *Diabetes prevalence and risk factors of early-onset adult diabetes: Results from the Indonesian Family Life Survey* | Cross-sectional, national IFLS dataset | n = 12,000 adults aged 18–>60 years | Prevalence rises with age; highest in >60 years (8.4%). Early-onset T2DM also observed in younger adults, but prevalence remains highest among older adults. |
| 2. | Ministry of Health RI – RISKESDAS (2018) | National Report of Basic Health Research | National cross-sectional survey | Indonesian population ≥15 years; n ≈ 1,017,290 | Highest prevalence in >65 years group (8.0%) based on fasting glucose testing. Demonstrates significant increase from middle age to older adulthood. |
| 3. | Soeatmadji et al. (2023) | *Clinicodemographic Profile and Outcomes of Type 2 Diabetes Mellitus in the Indonesian Cohort of DISCOVER* | Prospective cohort (summarizing national RISKESDAS dataset) | Adults ≥15 years; n ≈ 1,017,290 | Prevalence peaks in >65 years group (8.9%). Age identified as dominant predictor of T2DM progression. |
| 4. | Tarigan et al. (2024) | *Identifying Diabetes Risks Among Indonesians: A Cross-Sectional Study in a Community Setting* | Cross-sectional, community-based | Indonesian adults ≥15 years; ~2,500 respondents | Highest prevalence reported in 55–64 years group (6.3%). Early risk escalation detectable from age >45. |
| 5. | Kurniawan et al. (2024) | *Lifestyle and Clinical Risk Factors related to Diabetes Prevalence in Indonesian Urban and Rural Populations* | Cross-sectional IFLS 2014 analysis | Adults nationwide, n ≈ 33,000 | Highest prevalence in >60 years (12.5%). Strong linear increase with age across all geographic regions studied. |

Summary of Findings

These five major studies collectively confirm a robust, consistent trend: the likelihood of developing Type 2 Diabetes Mellitus in Indonesia increases significantly with advancing age. Across datasets, geographic locations, and methodological

approaches, older adults—particularly those aged above 55–60 years—demonstrate the highest prevalence, ranging from 6.3% to 12.5%.

This upward trend is aligned with known biological mechanisms of aging, such as declining pancreatic β-cell capacity, increased visceral fat accumulation, and chronic inflammatory processes that contribute to insulin resistance. The convergence of evidence suggests that targeted interventions for older adults are crucial for mitigating the growing burden of T2DM in Indonesia.

**Discussion**

The literature indicates that Type 2 Diabetes Mellitus (T2DM) has become an increasingly significant public health challenge in Indonesia, as reflected in the continuous rise in prevalence over the past decade. The increase in prevalence across age groups is the most consistent pattern observed. Physiological aging leads to reduced insulin sensitivity, loss of muscle mass, increased fat accumulation, and declining pancreatic β-cell function. These biological processes explain why individuals aged over 55 years consistently show the highest prevalence across all reviewed studies.

Findings from national RISKESDAS data and IFLS analyses show that the risk of T2DM is not solely determined by biological factors but is also shaped by lifestyle changes occurring within Indonesian society. The transition from traditional eating patterns to modern diets high in sugar and fat has accelerated the development of T2DM. This lifestyle shift is not limited to urban areas but is increasingly seen in rural populations as access to processed foods and sugary beverages expands.

Gender differences in prevalence are also notable. Women consistently show higher T2DM prevalence than men. Biologically, women have greater subcutaneous fat distribution, and the decline in estrogen levels after menopause contributes to increased insulin resistance. Additionally, Indonesian women tend to have lower levels of physical activity compared with men due to occupational, cultural, and lifestyle factors. This combination of biological, physiological, and social determinants places women at greater risk Nababan, Umbul Wahyuni, and Aguslina Siregar (2023).

Metabolic risk factors such as obesity and hypertension emerge as the strongest predictors of T2DM across numerous studies. The recent increase in obesity prevalence in Indonesia has been a major contributor to rising T2DM rates. Visceral obesity, in particular, promotes insulin resistance and chronic low-grade inflammation. Thus, rising national obesity levels represent a critical indicator directly linked to future T2DM projections.

Other findings, such as low physical activity and high sugar intake, further reflect the shift toward increasingly sedentary lifestyles. The movement toward non-physical occupations, increased reliance on motorized transportation, and higher consumption of processed foods demonstrate that behavioral factors significantly drive the rising T2DM burden. These behaviors influence not only body weight but also blood pressure and overall metabolic health.

From a public health perspective, T2DM is largely preventable through community-based interventions. Strengthening nutrition education, promoting physical activity, enabling early detection, and supporting metabolic monitoring are essential strategies. The literature clearly shows that most T2DM risk factors are modifiable, making preventive efforts a critical priority (Pulungan et al. 2018; Rahmah and Sudirman 2023).

In addition, public policy measures—such as sugar reduction regulations, promotion of healthy food consumption, and the provision of adequate public spaces for physical activity—are urgently needed. Policy interventions like limiting advertisements for high-sugar foods and implementing school-based health education could help reduce the long-term rise in T2DM prevalence.

Overall, T2DM in Indonesia is a chronic health issue shaped by a combination of biological, lifestyle, social, and environmental factors. With increasing prevalence and well-established risk determinants, Indonesia requires a comprehensive approach that integrates medical interventions, community education, and strategic policy measures to effectively manage the growing burden of this disease.

## Conclusion

This literature review indicates that Type 2 Diabetes Mellitus (T2DM) is an increasingly significant public health issue in Indonesia, influenced by a combination of biological, metabolic, lifestyle, and sociodemographic factors. The highest prevalence is consistently observed among older adults, particularly those aged 55 years and above, as reported across national surveys and IFLS-based analyses. Women also show a higher prevalence compared with men, driven by hormonal factors, body fat distribution, and lower levels of physical activity.

The main risk factors associated with T2DM include obesity, hypertension, low physical activity, high sugar or processed food intake, and family history. Most of these determinants are modifiable, providing substantial opportunities for preventive interventions. These findings highlight the need for strengthened promotive and preventive efforts, including nutrition education, increased physical activity, early identification of risk factors, and effective management of metabolic comorbidities.

Overall, controlling T2DM in Indonesia requires an integrated approach that combines community-based interventions, supportive public health policies, and enhanced health awareness. A comprehensive strategy will be essential to reduce the rising prevalence and mitigate the long-term health burden associated with the disease.

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