



Prevalence of Metabolic Disease among Adults in Indonesia: A Cross-Sectional Population-Based Survey

Meliya Husnatul Fatimah^{1*}, Aem Ismail²

¹Faculty of Pharmacy, Universitas Muhammadiyah Purwokerto, Jawa Tengah, Indonesia

²Masters Program in Public Health, Sebelas Maret University, Surakarta, Indonesia 57126

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*Corresponding author:

husnatulfatimahmeliya@gmail.com

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Abstract

Introduction: Metabolic diseases were the leading cause of morbidity and mortality in the world. The World Health Organization, the effective delivery of public health messages has become increasingly complicated due to CKD as a complication of cardiovascular disease and diabetes. Studies have prevalence of metabolic disease among adults in Indonesia. These study aims were to determine the prevalence of kidney, cardiovascular, diabetes.

Method: This study uses a cross-sectional study design used from Indonesia Family Life Survey Wave 5 (IFLS-5) organized by Rand Corporation conducted in 2014-2015. A statistical analysis is a descriptive observational study. The total number of respondents on this study was 27,718.

Result: Respondents with adult criteria in Indonesia were 52.67% women aged 38.20(±13.64), 78.48% married, 32.94% elementary, and 59.89% urban residents. The prevalence of chronic kidney disease among adults in Indonesia was 1.43% (95% CI: 0.01 – 0.02). The prevalence of cardiovascular disease among adults in Indonesia was 1.64% (95% CI: 0.01 – 0.02). The prevalence of diabetes among adults in Indonesia was 2.33% (95% CI: 0.02 – 0.03).

Conclusion: The prevalence of chronic kidney disease, cardiovascular disease, and diabetes in Indonesia is strongly by age and show a relationship between sufferers of these three diseases.

Keywords: adult, cardiovascular, diabetes, kidney, prevalence

Introduction

Metabolic disease is a condition with a disturbance or abnormality in the metabolic process in the body. The leading cause of morbidity and mortality in the world and is included in the metabolic disease is chronic kidney disease (CKD), cardiovascular disease, diabetes, and several other diseases included in non-communicable diseases^{1,2}. According to the World Health Organization, effective public health messaging is becoming increasingly complicated due to CKD as a complication of cardiovascular disease and diabetes³.

According to the Kidney Disease Outcomes Quality Initiative (K/DOQI) guidelines, chronic kidney disease (CKD) is kidney damage characterized by abnormalities or decreased kidney function (below the GFR threshold estimated from serum creatinine concentration) or proteinuria (generally using the albumin to creatinine ratio, ACR) that lasts more than three months^{4,5}. In Indonesia, there is an increasing prevalence of chronic kidney disease (CKD). As of 2018, based on the 2018 National Basic Health Research Survey (Riskesdas), the prevalence of CKD was 0.5%. The survey included primarily young adults aged 18-59 years (83.1%) with a mean age (SD) of 44.3 (15.1) years. The increase was seen from reports regarding CKD (eGFR<60 ml/min/1.73 m²)

prevalence in 2013 was 2.0 per mile (‰) to 3.8 per mile (‰) in 2018⁶.

One of the complications of chronic kidney disease (CKD) is cardiovascular disease. Cardiovascular disease (CVD) is a disease that is considered an independent risk factor for CVD events and an accelerator of CVD risk². Over the past two decades, cardiovascular disease (CVD) has gradually increased to become a global burden. The prevalence of CVD in Indonesia is 2.36% (95% CI: 2.07 – 2.70)⁷. Even though the number of CVD-related deaths has undoubtedly increased, with 17.9 million deaths attributed to them in 2015, between 2005 and 2015, there was a 12.5% increase in CVD deaths, with ischemic heart disease (IHD) and stroke, which causes almost 85% of these deaths⁸. The World Health Organization (WHO) predicts that this trend will continue, with an increase of 6 million deaths from cardiovascular disease by 2030⁹.

Besides cardiovascular disease, diabetes is also a complication of chronic kidney disease. The world health organization describes diabetes as a long-term condition marked by increased blood glucose (also known as blood sugar) levels that, over time, seriously harm the heart, blood vessels, eyes, kidneys, and nerves. The most prevalent type of diabetes is type 2, which often affects adults, and develops when the

body stops producing enough insulin or does not make enough insulin¹⁰. The crude total prevalence of the estimated self-report of diabetes in Indonesia is 2.3% and increases with age¹¹. The International Diabetes Federation (IDF) states that the Age-adjusted comparative prevalence of diabetes in Indonesia is projected to increase yearly. Seen in 2011, the prevalence of diabetes was 5.1%, with 7,291.9 people with diabetes, to 10.6%, with 19,465.1 people with diabetes in 2021. The IDF predicts that this trend will continue with an estimated increase in the prevalence of diabetes to 11.7%, with a total of 23,328 sufferers¹². These study aims were to determine the prevalence of kidney, cardiovascular, diabetes.

Methods

Study Design and Sampling

The data represented in this study used data from the Indonesia Family Life Survey Wave 5 (IFLS-5) organized by Rand Corporation. The IFLS-5 was conducted in 2014-2015, with 16,204 households and 50,148 individuals interviewed. This data represents all of Indonesia using stratified random sampling to select respondents from the provincial to residence level. This study uses a cross-sectional design with inclusion criteria: people 18 or older. Exclusion criteria: people who do not have complete data or unknown data. The total number of respondents in this study was 27,718.

Measurement

The outcome of this study was chronic kidney disease, cardiovascular, and diabetes. Chronic kidney disease (CKD) refers to a person with kidney disease (except for tumor or cancer) diagnosed by a doctor/paramedic/nurse/midwife. Cardiovascular disease refers to a person diagnosed with cardiovascular disease by a doctor/paramedic/nurse/midwife. Diabetes refers to a person who has diabetes diagnosed by a doctor/paramedic/nurse/midwife.

Sociodemographic factors include age, marital status, education, sex, and residence.

Statistical Analysis

This research is a descriptive observational study. Descriptive research is used to determine the characteristics of this study and the prevalence of chronic kidney disease, cardiovascular, diabetes.

Result

In this study, a total of 27,718 respondents in Indonesia met the inclusion and exclusion criteria with an average age of 38.20 (± 13.64) with married

status of 78.48% and Elementary education level, female gender 52.67%, and living in urban areas 59.89% (Table 1).

Table 1. Baseline Characteristic of Metabolic Disease (N = 27,718)

Characteristics	Number	%
Age		
Mean (\pm SD)	38.20 (± 13.64)	
Median (min : max)	36 (18 : 101)	
Marital Status		
Married	21,754	78.48
Single	5,964	21.52
Education		
University	4,339	15.65
Senior High School	8,825	31.84
Junior High School	5,423	19.56
Elementary	9,131	32.94
Sex		
Male	13,120	47.33
Female	14,598	52.67
Residence		
Urban	16,601	59.89
Rural	11,117	40.11

The prevalence of chronic kidney disease (CKD) among adults in Indonesia was 1.43% (95% CI: 0.01–0.02). There were 27,321 of the respondents who did not have CKD (98.57%, 95% CI: 0.98 – 0.99) (Table 2).

Table 2. Prevalence of Chronic Kidney Disease

Characteristic	Number	%	95% CI
No	27,321	98.57	0.98 – 0.99
Yes	397	1.43	0.01 – 0.02

The prevalence of cardiovascular disease (CVD) among adults in Indonesia was 1.64% (95% CI: 0.01–0.02). There were 27,263 of the respondents who did not have CVD (98.36%, 95% CI: 0.98 – 0.99) (Table 3).

Table 3. Prevalence of Cardiovascular Disease

Characteristic	Number	%	95% CI
No	27,263	98.36	0.98 – 0.99
Yes	455	1.64	0.01 – 0.02

The prevalence of diabetes among adults in Indonesia was 2.33% (95% CI: 0.02–0.03). There were 27,072 of the respondents who did not have diabetes (97.67,95% CI: 0.97–0.98) (Table 4).

Table 4. Prevalence of Diabetes

Characteristic	Number	%	95% CI
No	27,072	97.67	0.97 – 0.98
Yes	646	2.33	0.02 – 0.03

Discussion

In this study, 27,718 respondents in Indonesia met the inclusion and exclusion criteria with an

average age of 38.20 (± 13.64) with married status of 78.48% and elementary school education level, female gender 52.67%, and living in urban areas 59.89%. Those with chronic kidney disease, cardiovascular disease, and diabetes were 1.43%, 1.64%, and 2.33%, respectively. This is different from previous research, which stated that the prevalence of CKD among adults in Indonesia was 0.5%. This difference is likely to occur because, in previous studies, it was stated that most of the subject has a proportion of obesity of 25.4% and have significant comorbidities such as hypertension at 40.8%⁶. The difference was also seen in the prevalence of previous research results on cardiovascular disease, which stated that the prevalence was 2.36%; this difference might have occurred due to the comorbid factors mentioned in the previous study⁷. Seven different from the prevalence of diabetes, which is almost the same as previous studies, which mention the prevalence of diabetes in Indonesia is 2.3%. This is due to the similarity of sociodemographic characteristics¹¹.

In previous studies, other countries also stated that the prevalence of CKD in adults in the United States was 15%¹³, in 2018 the prevalence of CKD in Malaysia was 15.48%¹⁴, 17.5% prevalence of CKD in Thailand¹⁵, 17.2% prevalence of CKD in India¹⁶, 15.6% prevalence of CKD in Singapore¹⁷, 10.8% prevalence of CKD in China¹⁸. A more recent study conducted a comprehensive systematic review and meta-analysis of 100 studies comprising 6,908,440 patients and reported a global prevalence of 13.4% for CKD stages 1–5 and 10.6% for CKD stages 3–5.8 Prevalence each stage of CKD was 3.5% (stage 1), 3.9% (stage 2), 7.6% (stage 3), 0.4% (stage 4), and 0.1% (stage 5))¹⁹. Based on studies examining the global prevalence of CKD, the current total number of individuals affected by CKD stages 1–5 worldwide is estimated to be 843.6 million²⁰.

A progressive condition that affects more than eight hundred thousand people, or more than 10% of the general population in the world, is a chronic kidney disease that occurs primarily in older individuals, women, racial minorities, and in people with diabetes mellitus and hypertension¹⁹.

In addition to chronic kidney disease, previous studies stated that other countries stated that the prevalence of CVD was high in adults in Bangladesh and higher in urban areas, which was 8% compared to rural areas, which was 2%. The disease with the highest prevalence was heart disease, reported at 21%, while the lowest was stroke, which was reported at 1%²¹. The life course study in the epidemiology of cardiovascular diseases (LIFECARE) is designed to fill

the knowledge gaps regarding cardiovascular epidemiology in Southeast Asian countries. LIFECARE is a longitudinal study consisting of 4 contributing 'subcohorts.' Four countries were selected based on their high CVD burden: Indonesia, Malaysia, the Philippines, and Thailand. Judging from the 29% proportional mortality due to CVD in Thailand, up to 37% in Indonesia in 2014. and is included in the country with the most population in Southeast Asia²². The essential sociodemographic characteristics used are age, gender, race, education, employment status, marital status, smoking, and alcohol intake²³.

Diabetes is a metabolic disease that involves an increase in blood glucose levels that are inappropriate or inadequate in controlling blood glucose levels²⁴. In the last few decades, the incidence of diabetes in the Asian population has increased, becoming a significant health problem. In Western countries, the leading cause of death in people with diabetes is the presence of significant complications with several cardiovascular diseases. These cardiovascular diseases include coronary heart disease (CHD), cerebral vascular disease, and peripheral arterial disease (PAD). One piece of evidence that CVD is a significant risk factor for death in people with diabetes is Taiwan, which has a 63% higher risk of death than the general population²⁵.

Conclusions

Based on the research, it can be concluded that the prevalence of chronic kidney disease, cardiovascular disease, and diabetes in Indonesia was strongly influenced by age and showed a relationship between people suffering from chronic kidney disease and those with cardiovascular disease and diabetes.

Acknowledgment

The research used the data of the IFLS-5 conducted by RAND (<http://www.rand.org/labor/FLS/IFLS.html>). We would like to express our sincere appreciation for RAND for allowing access to the survey data as well as the study participants who provided the survey data.

Ethical Consideration

The IFLS has been reviewed and approved by Institutional Review Boards, the United States, and Gadjah Mada University, Indonesia.

Author Contribution

MHF designed and studied analysis; AI collected and contributed data; MHF and AI performed the analysis; MHF and AI wrote the paper and approved the final version of the manuscript

Competing Interests

The author declares there was no conflict of interest in this study.

Abbreviation

CKD : Chronic Kidney Disease

CVD : Cardiovascular Diseases

eGFR : Estimated Glomerular Filtration Rate

IFLS : Indonesia Family Life Survey

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