Dietary Pattern and Physical Activity Related to Hypertension in Indonesia

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Abstract

The prevalence of hypertension shows an increasingly high trend these days. The aim study at analyzing ecologically the factors related to the prevalence of hypertension in Indonesia. The ecological analysis conducted using secondary data from the 2018 Indonesia Basic Health Survey. The study takes all provinces as samples. Apart from the prevalence of hypertension, seven other variables analyzed as independent variables were physical activity, alcohol consumption, smoking behavior, fruits/vegetable consumption, salty food consumption, obesity, and central obesity. Data were analyzed using a scatter plot. The results show that the higher the population with sufficient physical activity, the lower the prevalence of hypertension. The higher the population proportion who smoke every day and the population proportion that does not consume fruits/vegetables every day, the higher the prevalence of hypertension. Moreover, the more increased the population proportion consuming salty food ≥1 time per day, the majority of the adult population (age>18 years old) who are obese, the more high the prevalence of hypertension. Finally, the more heightened the people prevalence aged>15 years old who have central obesity, the more elevated the prevalence of hypertension. The authors concluded that six variables were proven ecologically related to the majority of hypertension in Indonesia.The author recommends policymakers use the study results for related health programs to improve and prevent them.

Keywords: *hypertension, ecological analysis, health behavior, obesity.*

Introduction

Hypertensionis an excessive rise in blood pressure in the arteries over a while. Hypertension is when a person has high blood pressure, which is higher than 140/90 mmHg after repeated tests. The optimal blood pressure is in the range of 120 mmHg/70 mmHg[1]. Hypertension is a silent killer where the symptoms vary widely in each individual; therefore, it is necessary to have regular blood pressure checks, especially for the elderly. If a severe headache appears accompanied by a nosebleed, this is a sign and symptom of a hypertensive crisis, an emergency condition that we must treated immediately[1].

There are two types of hypertension based on the cause, namely primary and secondary hypertension. Primary or essential hypertension generally occurs due to heredity or an unhealthy lifestyle, such as smoking, consuming too much sodium (salt), stress, laziness to move, excessive alcohol consumption, and obesity—for example, smoking habits. Smoking just one stick can cause an immediate spike in blood pressure and can raise systolic blood pressure levels by as much as four mmHg. The nicotine in tobacco products stimulates the nervous system to release chemicals that can constrict blood vessels and contribute to high blood pressure. Too many salty foods that contain sodium (processed foods, canned foods, fast food) can raise cholesterol and high blood pressure—likewise, the consumption of food or drinks that have artificial sweeteners[2,3].

Second, there is also what is called secondary hypertension. Hypertension typically occurs due to other medical conditions that accompany it. Several medical conditions that can cause high blood pressure include sleep apnea, kidney problems, tumors of the

adrenal glands, thyroid problems, or diabetes. High blood pressure can also appear as a side effect of kidney failure medications and heart disease treatments. Birth control pills or cold medicines that are sold in drug stores can also cause high blood pressure. Women who are pregnant or who are taking hormone replacement therapy may also experience high blood pressure[2].

The prevalence of hypertension in Indonesia is relatively high. The 2018 Indonesia Basic Health Survey noted that 34.1% of Indonesia's population has hypertension4. Previous studies revealed several cases of people in Indonesia who consume salty foods, coconut milk, and high fat. The studies estimated that this consumption pattern has contributed to increasing the prevalence of hypertension sufferers[4,5].

In Indonesia, in 10 years, from 2009-2019, the risk factor that caused the highest disease burden was hypertension, with an increase of 13.62%. This situation resulted in 4,719 years lost due to premature death and disability (DALYs) per 100,000. Meanwhile, the risk factors in the 5th highest rank of disease burden are smoking, diet, high fasting blood sugar, and increased body mass index[6]. Based on the background description, the aim study analyzes the factors related to the prevalence of hypertension in Indonesia.

Materials and Methods

Study Design

The study conducted using ecological analysis. The ecological analysis uses an approach that focuses on comparisons between groups, not individuals. In this study, the analysis is the aggregate data at the provincial level. The purpose of the ecological research in this study is to make ecological conclusions about the effects on groups (provinces)[7,8].

Data Source

The study conducted using secondary data from the 2018 Indonesia Basic Health Survey report. This report is the official report of the Ministry of Health of the Republic of Indonesia. The unit of analysis in this study is the province. The authors include all provinces in Indonesia in the analysis (34 regions).

Data Analysis

The dependent variable in this study is the prevalence of hypertension. In this study,hypertension was diagnosed by a doctor. Meanwhile, there are seven independent variables analyzed in this study. The seven variables consist of: the proportion of the population with sufficient physical activity, the proportion of the population who smoke every day, the proportion of the population that does not consume fruits/vegetables every day, the proportion of population consuming salty food ≥1 time per day, the prevalence of the adult population (age>18 years) who are obese, and prevalence of people aged>15 years who have central obesity.

Data were analyzed by univariate and bivariate. The study carries out bivariate analysis using a scatter plot. The review uses the linear fit line to determine the relationship between hypertension prevalence and the independent variable. The entire analysis process utilizes SPSS 21 software.

Results

According to descriptive statistic analysis, there is a very high variation between provinces. The lowest prevalence of hypertension was 4.39% (Papua Province), while the highest prevalence was 13.21% (North Sulawesi Province).

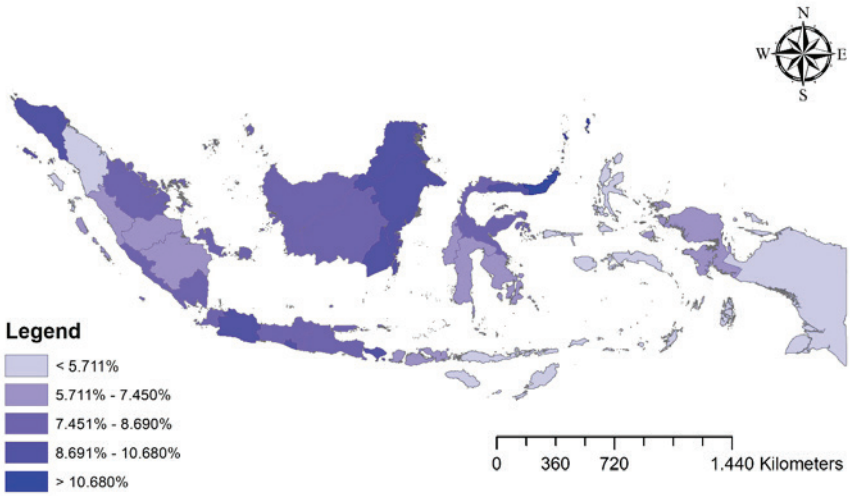

Figure 1. Map of the prevalence of hypertensionby the province in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey

Figure 1 shows a map of the prevalence of hypertension by the province in Indonesia. Based on this spatial information, the map shows the majority of hypertension tends to be higher in western and central Indonesia. Meanwhile, eastern Indonesia shows a lower trend.

Figure 2 is a scatter plot between the population's proportion with sufficient physical activity and the prevalence of the people diagnosed by a doctor with hypertension in Indonesia. The relationship between the two variables shows a negative tendency. The tendencyindicates that the higher the number of people with sufficient physical activity in a province, the lower the population diagnosed by a doctor with hypertension. A study conducted in rural southwest China also reports similar findings. The study found that physical inactivity increases the risk for suffering from hypertension[9,10].

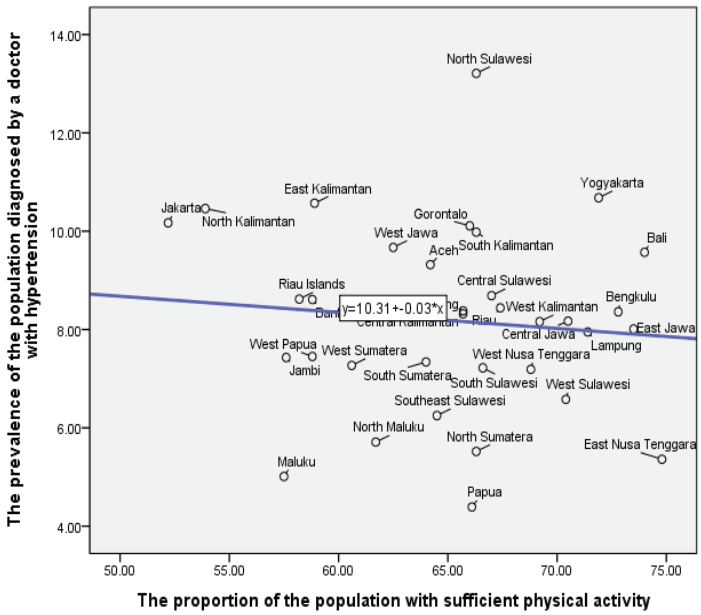

Figure 2. Scatter plot of the population proportion with sufficient physical activity and the prevalence of the population diagnosed by a doctor with hypertensionin Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey

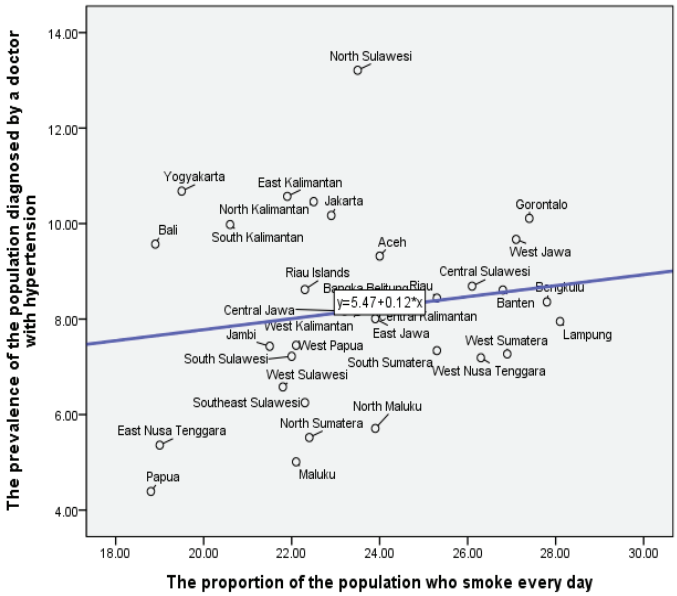

Figure 3. Scatter plot of the population proportion who smoke every dayand the prevalence of the population diagnosed by a doctor with hypertension in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey

Figure 3 is a scatter plot between the population proportion who smoke every day and the prevalence of the population diagnosed by a doctor with hypertension in Indonesia. The tendency of these two variables shows a positive relationship. The relationship informs that the higher the population proportion who smoke every day in a province, the higher the population diagnosed by a doctor with hypertension. A previous study conducted in Ethiopia found cigarette smokers were 16.511 times more likely to be hypertensive than non-cigarette smokers[11]. Smoking behavior, in general, has been identified as a decisive risk factor for hypertension[12–14].A smoker with inadequate physical activity is the perfect combination to increase the risk of developing hypertension[15].

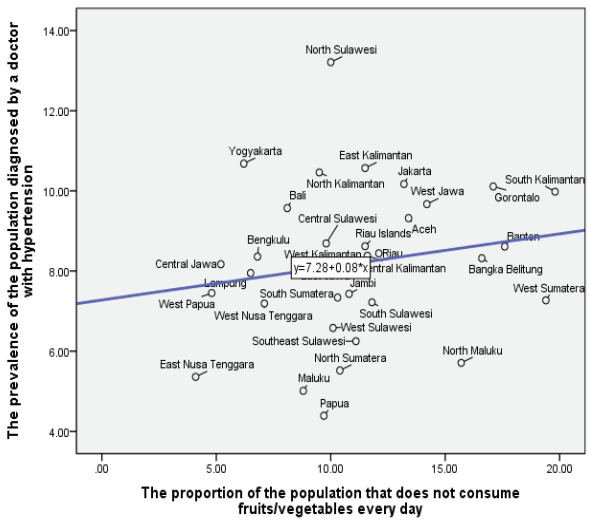

Figure 4. Scatter plot of the proportion of the population that does not consume fruits/vegetables every dayand the population diagnosed by a doctor with hypertension in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey

Figure 4 is a scatter plot between the population that does not consume fruits/vegetables every day and the population diagnosed by a doctor with hypertension in Indonesia. Based on the scatter plot, the two variables show a positive trend. The scatter plot shows that the higher the proportion of the population that does not consume fruits/vegetables every day in a province, the higher a doctor diagnoses the people with hypertension in Indonesia in that province.

Figure 5 is the scatter plot between the proportion of the population consuming salty food ≥1 time per day and the population diagnosed by a doctor with hypertension in Indonesia. Based on the scatter plot, the two variables show a positive trend. This study indicates that the higher the proportion of the population consuming salty food ≥1 time per day in a province, the higher the population diagnosed by a doctor with hypertension in Indonesia in that province.

Several previous studies reported that a dietary pattern could influence the occurrence of hypertension. A diet of low vegetable and fruit or high salty food is a risk factor for hypertension[16,17].

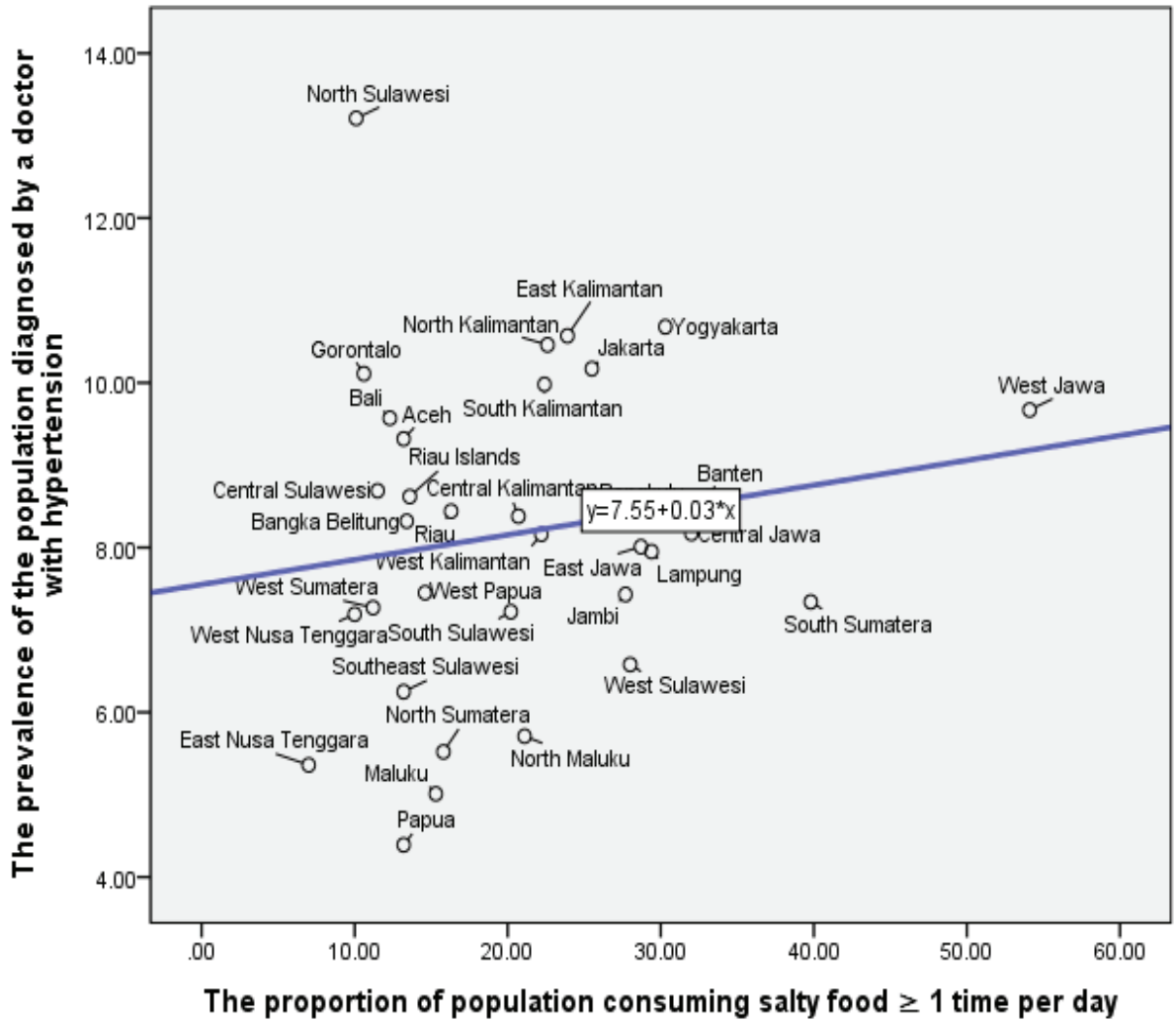

Figure 5. Scatter plot ofthe proportion of population consuming salty food ≥1 time per dayand the population prevalence diagnosed by a doctor with hypertension in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey

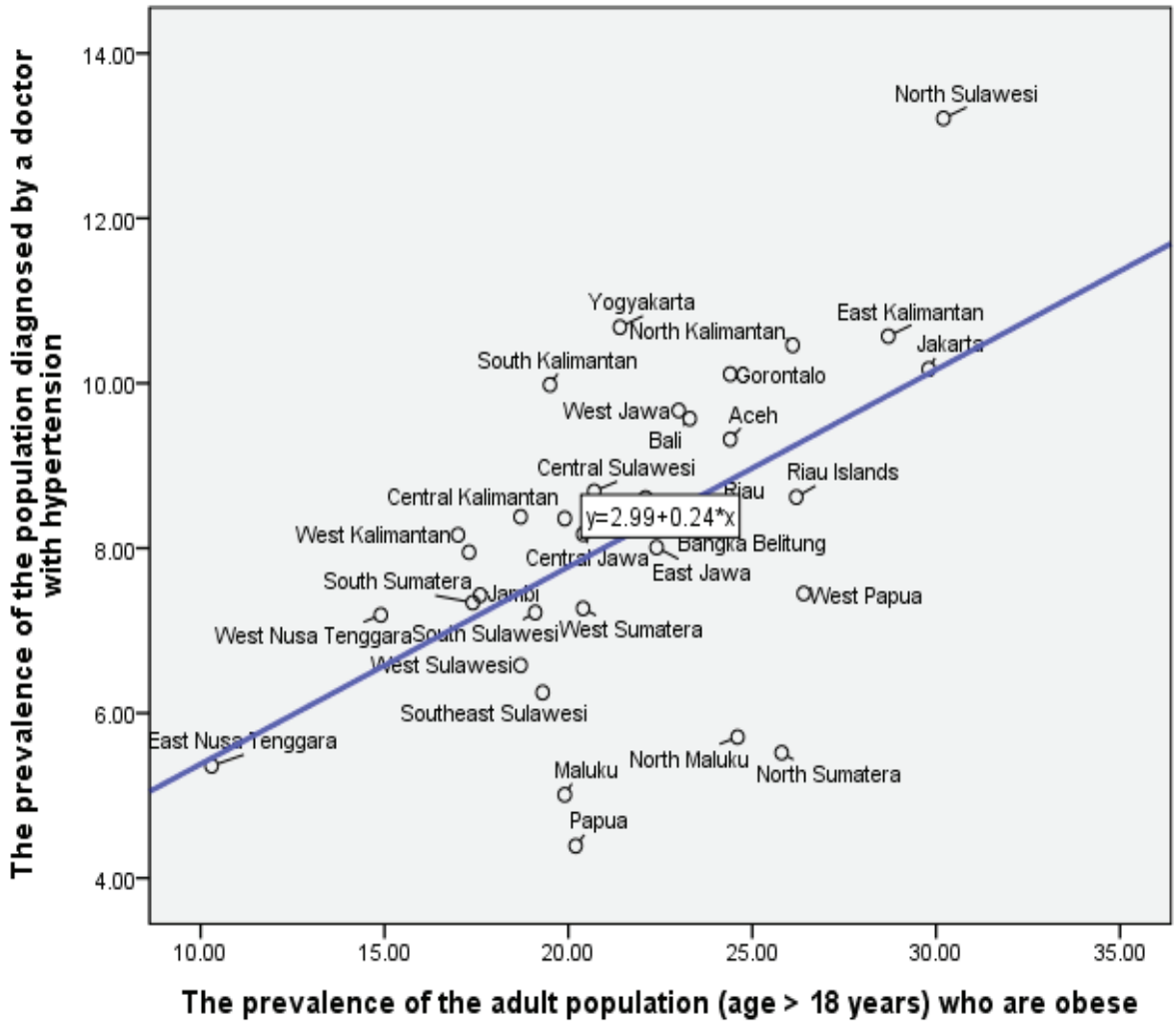

Figure 6.: Scatter plot of the prevalence of the adult population (age > 18 years) who are obeseand the population prevalence diagnosed by a doctor with hypertension in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey

Figure 6 is the scatter plot between the prevalence of the obese adult population and the population diagnosed by a doctor with hypertension in Indonesia. Based on the scatter plot, the two variables show a positive trend. The study interpreted the higher the prevalence of the adult population obese in a province, the higher the population diagnosed by a doctor with hypertension in Indonesia in that province.

Figure 7 is a scatter plot between the proportion of people aged>15 years who have central obesity and the population diagnosed by a doctor with hypertension in Indonesia. Based on the scatter plot, the two variables show a positive trend. This analysis shows that the higher the prevalence of people aged>15 years who have central obesity in a province, the higher the population diagnosed by a doctor with hypertension in Indonesia in that province.

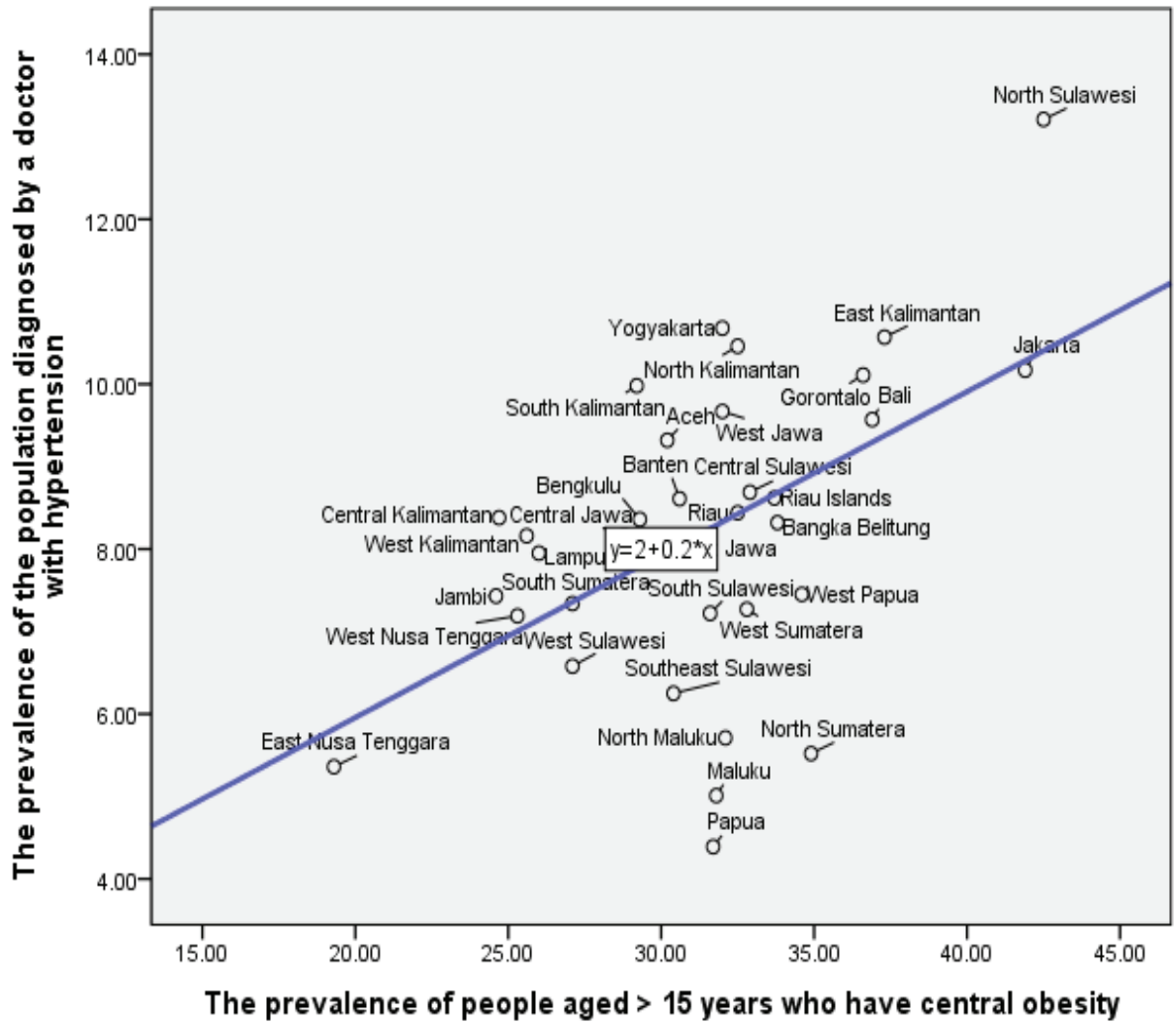

Figure 7. Scatter plot of the prevalence of people aged > 15 years who have central obesityand the population prevalence diagnosed by a doctor with hypertension in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey

Previous studies conducted in South Africa also reported similar findings. Obesity is a risk factor for hypertension[18]. Meanwhile, a study in China recommended that future interventions prevent and control hypertension should increase attention to individuals and focus on managing diabetes and obesity[9].

The research carried out using an approach to ecological analysis has drawbacks in its use as a policy basis since the data used is aggregated data at the provincial level. In order to obtain more reliable information on intervention policy decisions, more research at the person level is required.

Conclusion

Based on the results, the authors concluded six independent variables ecologically analyzed are related to Indonesia's hypertension prevalence. The sixvariables consist of: the proportion of the population with sufficient physical activity, the ratio of the people who smoke every day, the peopleproportion that does not consume fruits/ vegetables every day, the population ratioconsuming salty food ≥1 time per day, the prevalence of the adult population who are obese, and prevalence of people aged>15 years who have central obesity.

Policymakers can use the results of this analysis to improve health-related programs for improvement and

prevention. Policymakers need to pay special attention to provinces that have high cases of hypertension.

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Conflict of Interests: Nil

Ethical Clearance: The study was conducted by utilizing secondary data from published reports. For this reason, the study not required ethical clearance in the implementation of this study.

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