Hypertension in Adult Age and Related Risk Factors

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Abstract: Background: Hypertension is one of the significant risk factors for further severe cardiovascular diseases. Furthermore, the incidence of hypertension in adult age population has increased gradually. Thus, assessment of hypertension incidence and their risk factors in adult age people has given the beneficience for treating dan preventing program earlier. Aim: To analyze hypertension incidence in adult age and their risk factors that dominantly effect the occurrence of hypertension. Method: This study was correlational with survey method. Accidental sampling was conducted to 120 respondents who live around Malioboro district. Hypertension was detected from systole and diastole value, while the risk factors of hypertension were age, gender, family disease history, type of activity, the number of cigarette each day, the length of smoking, random blood glucose, and body mass index. Analyzing the data used Pearson correlation if data were normal, or used Spearman correlation if data were not normal. Findings: From 120 participants, mean of systolic pressure was 120.7 mmHg and mean of diastolic pressure was 78.5 mmHg. Age mean was 39 years old, dominantly was woman amount 83 (69.2%), and without family disease history as 66 (55%). Mostly they had moderate physical activity amount 71 (59%). Mean of cigarette consumption was 11 pieces/day, for 23 years. Random blood glucose mean was 131 mg/dL and mean of body mass index was 26 kg/m². Correlation analysis mentioned that body mass index had correlate with systolic and diastolic value significantly \( p < 0.05 \). Conclusion: Systolic and diastolic pressure value in adult age were still normal. Risk factor that correlated significantly with adult age blood pressure was body mass index. Another risk factors such as cholesterol level, blood glucose in fasting condition and two hour post meal, also food consumption were considered that should be included in next study.

Key words: Adult age, cardiovascular, hypertension, risk factors.

1. Introduction

Cardiovascular disease is a disorder of heart and blood vessel function. This can occur due to heart deficiency or blood vessel constriction [1]. Heart disease is the leading cause of death and is predicted continue to increase. Around 80% of deaths from cardiovascular disease occur in low and middle income countries. If this incident is not addressed immediately, then by 2030 an estimated 23.6 million people will die from cardiovascular disease [2]. Risk factors for the emergence of cardiovascular disease include factors that can be modified and cannot be modified. Factors cannot be modified such as age, sex (men more frequent than women, ethnicity (white ethnicity is more risk than other ethnicity), and family history of cardiovascular disease [3]. Whereas modifiable risk factors are high blood pressure, cholesterol level, obesity, tobacco use, lack of physical activity and diabetes mellitus [4].

To reduce the incidence of cardiovascular disease, prevention and treatment is required with multifactorial approaches and carried out continuously [5]. Health workers who have the role of implementing health services are required by the community to be able to cope with cardiovascular disease before they receive definitive treatment [6]. Nurses as one health worker have a promotive, preventive role in the community and curative on clinical services to overcome cardiovascular disease [7]. Cardiovascular disease can be prevented by reducing the risk factors that can be modified through lifestyle changes, especially smoking behavior, unhealthy diet, physical inactivity, and alcohol use [3]. The risk of cardiovascular disease is common in adulthood, but most people are unaware that they have a risk of cardiovascular disease, so they
do not take preventive measures to avoid cardiovascular disease. The aim of this study was to identify risk factors for cardiovascular disease in adulthood.

2. Methodology

This research is a quantitative descriptive research using survey approach. The sample used is 120 adults, using accidental sampling. The research location is in Sosromenduran RT. 8 RW. 14, Gedongtengen, Yogyakarta, Indonesia. This place was choosen because they have amount of adulthood, and facing the risk factors more often.

The inclusion criteria were a person aged 26-45 years, willing to be a respondent, and could read and write, while the exclusion criteria were people with deaf and speech impairment. This research had single variable, risk factor of cardiovascular disease with sub variable in the form of risk factors include systolic and diastolic blood pressure value, smoking habit, diabetes mellitus, physical activity status, obesity, age, and family history. The tool used in this research is sphygmomanometer, body scales, height measurement, and glucometer which have been tested calibration in meteorology unit, and glucometer tool has been done feasibility test at RS PKU Muhammadiyah Unit II.

Assessment of risk factor identification of cardiovascular disease was done sequentially by the researcher included measurement of body height and weight, asking history of family disease, physical activity, smoking habit, and then checked blood pressure and random blood glucose. Prior to the measurement, researchers had asked respondents to remove their hats, jackets, shoes, socks or accessories used by respondents. The final stage of data retrieval, the researcher looked back at the observation sheet that has been filled by the research assistant, if there are incomplete data the researcher asking back or doing the measurement back to the respondent.

Data were analyzed by Pearson correlation test if data were normal, or used Spearman correlation if data were not normal.

3. Result

| Table 1  Hypertension risk factors distribution (n = 120). |
|----------------|----------------|
| Variable       | n   | Percentage (%) |
| Gender         |     |                |
| Man            | 37  | 30.8           |
| Woman          | 83  | 69.2           |
| No             | 66  | 55             |
| Hypertension   | 14  | 11.67          |
| DM (diabetes mellitus) | 14 | 11.67 |
| Heart disease  | 4   | 3.33           |
| Hypertension and DM | 13 | 10.83 |
| Hypertension and heart disease | 6 | 4 |
| Heart disease and DM | 3 | 2.5 |
| Physical activity |     |                |
| Mild           | 36  | 30.0           |
| Moderate       | 71  | 59.2           |
| Severe         | 13  | 10.8           |
| Smoking        |     |                |
| Yes            | 20  | 16.7           |
| No             | 10  | 83.3           |

| Variable | Mean | Min | Max  | Std. deviation |
|----------|------|-----|------|----------------|
| Blood pressure |  |      |      |                |
| Systole  | 120.7 mmHg | 85 mmHg | 180 mmHg | 19.26097 |
| Diastole | 78.5 mmHg  | 40 mmHg  | 110 mmHg  | 13.00614 |
| Age      | 38.94 years old | 26 years old | 45 years old | 6.62 years old |
| Smoking  | In one day | 10.5 pieces | 1 pieces | 4.62592 |
| Length   | 22.8 years | 1 year | 31 years | 9.28412 |
| Random blood sugar | 131.18 mg/dL | 60 mg/dL | 447 mg/dL | 61.80601 |
| Body mass index | 25.99 kg/m² | 15.2 kg/m² | 45.2 kg/m² | 5.30879 |
Table 3  Pearson correlation analysis between body mass index and diastole and systole value.

| BMI   | n    | r     | p value |
|-------|------|-------|---------|
| Systole | 120  | 0.381 | 0.000   |
| Diastole | 120  | 0.363 | 0.000   |

4. Discussion

4.1 Blood Pressure

The mean systolic blood pressure was 120.7 mmHg, whereas the diastolic was 78.5 mmHg. The systolic lowest score was 85 mmHg, whereas in diastolic was 40 mmHg. The highest value of systolic was 180 mmHg and in diastolic was 110 mmHg. Hypertension can trigger the process of atherosclerosis. This is due to the high pressure of pushing Low Density Lipoprotein more easily into the intima. Hypertension causes increased vascular reactivity and triggers structural changes until hypertrophy occurs [8].

Hypertension occurs due to the interaction between hereditary factors and environmental factors. Factors that can cause a person to develop hypertension include age, sex, heredity, physical and occupational stress, excessive amounts of salt intake, excessive alcohol and coffee consumption, obesity, low physical activity [9].

4.2 Age

The average age of adult respondents was 39 years old. The youngest was 26 years old, while the oldest was 45 years. Most of the death from cardiovascular disease occur at 35-44 years old and more often with increasing age [10].

Age was as a risk of cardiovascular disease. This is because age causes changes in the heart and blood vessels. The effect of a lifestyle that lacks physical activity and smoking can accelerate heart damage. Blood pressure increases with the age of a person, as the arteries slowly lose their elasticity.

4.3 Gender

The prevalence of cardiovascular disease in men is similar to that of women, but women are better protected from cardiovascular disease before menopause. This is because women are protected by the estrogen that plays a role in increasing levels of HDL (High Density Lipoprotein). High HDL levels are a protective factor in preventing atherosclerosis or plaque buildup in blood vessel walls [11].

Men are at greater risk and earlier than women for cardiovascular disease. Morbidity of cardiovascular disease in men is twice as large as women. Men can develop cardiovascular disease 10 years earlier than women. Endogenous estrogens are protective in women, but after menopause the incidence of cardiovascular disease in women increases rapidly, but not as great as the incidence of cardiovascular disease in men [12].

4.4 Family History

Cardiovascular disease sometimes results from the manifestation of specific single gene abnormalities associated with the mechanism of atherosclerotic occurrence. If both parents of a person suffer from cardiovascular disease at a young age, then the child of the parent is at high risk for cardiovascular disease [12].

A family history of cardiovascular disease also heightens the risk of cardiovascular disease. Genetic factors are also influenced by environmental factors which then cause a person suffering from cardiovascular disease. Genetic factors also related to the metabolism of salt regulation and cell membrane renin [8].

4.5 Smoking

The average number of cigarettes smoked by respondents was 11 cigarettes/day, while the average length of smoking behavior was for 23 years. Smoking with large amounts of sticks and long periods of time can cause chemicals in cigarettes, such as nicotine and
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carbon monoxide damage the endothelial vessels of the arteries, increase blood pressure, and damage the cardiovascular system. Nicotine causes narrowing of blood pressure so that raises blood pressure and arterial blood vessels easily become torn due to narrowing. This result in increased platelet production caused the blood to freeze easily, while carbon monoxide caused the loss of oxygen carried by the blood, moreover it caused an oxygen imbalance in the blood. Smoking also causes lower HDL levels in the blood [13].

4.6 Random Blood Sugar

High levels of GDS have a negative impact on body tissues in the form of atherosclerosis in various blood vessels [12]. A person with a high blood glucose value of more than 200 mg/dL is said to have DM disease [15]. DM causes lipoprotein disorders. This is the cause of major complications of DM in the form of atherosclerosis that appear earlier. The diabetic process of DM can damage the myocardium that causes cardiomyopathy. Hypertension and obesity tend to support and accelerate the process of atherosclerosis [8].

4.7 BMI (Body Mass Index)

Based on study, the average value of BMI on the respondents is 26 kg/m² or categorized as overweight. BMI more than normal are associated with increased cholesterol and trygliserida levels, lowering HDL levels and increasing LDL levels.

Increasing a person’s BMI from normal will increase the risk of cardiovascular disease by 8% [16]. Obesity causes the heart to work bigger to pump blood throughout the body and can cause an increasing in blood pressure [9]. The risk of cardiovascular disease may increase if a person’s body weight exceeds 20% of the ideal body weight.

4.8 Physical Activity

Based on research data, moderate physical activity is being done more by respondents and the data are influenced by the work of the majority of Malioboro community that is as traders and housewives.

Active physical activity criteria are individuals who engage in moderate or severe physical activity or both, whereas the less active criterion is an individual who does not engage in moderate or severe physical activity. Mild physical activity is a risky behavior against one of the occurrence of cardiovascular disease and even affects the life expectancy [1].

Good physical activity such as regular exercise can make changes to the cardiovascular system, like increased cardiac output and redistribution of blood flow from less active organs to the active organ and also decreases the risk of cardiovascular disease. Regular exercise also lowers systolic blood pressure, decreases circulating catecholamine, cholesterol level and blood fats, increases HDL lipoprotein levels, improves coronary circulation and improves confidentiality [14].

5. Conclusion

The mean systolic blood pressure in the respondents was 120.7 mmHg, and the diastolic was 78.5 mmHg. It was still in normal range. The average age of adult respondents was 39 years old, the majorities were female, no family illness history, the number of smoked cigarettes was 11 cigarettes/day, and the average duration of smoking was 23 years. The mean random blood sugar was 131 mg/dL, they have moderate physical activity category, with an average BMI score was 26 kg/m².

From the several risk factors that have been studied, only BMI values have a significant relationship with the systole and diastole values.

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References

[1] Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan Republik Indonesia. 2013. *Riset Kesehatan Dasar*. Jakarta.

[2] Mendis, S., Puska P., and Norrving, B. (Eds). 2011. *Global Atlas on Cardiovascular Disease Prevention and Control*. World Health Organization (in collaboration with the World Heart Federation and World Stroke Organization), Geneva.

[3] Wantiyah. 2010. “Analisis Faktor-faktor Yang Mempengaruhi Efikasi Diri Pasien Penyakit Jantung Koroner Dalam Konteks Asuhan Keperawatan Di RSD. Dr. Soebandi Jember.” Thesis, Universitas Indonesia, Depok.

[4] World Heart Federation. *Cardiovascular Disease*. Diakses tanggal 24 Desember 2014. http://www.world-heart-federation.org/press/fact-sheets/cardiovascular-disease-risk-factors/. 2012.

[5] Lewis, Heitkemper, Dirksen, O’Brian, and Bucher. 2007. *Medical Surgical Nursing: Assessment and Management of Clinical Problem*. 2nd. USA: Mosby.

[6] Faridah, V. N. 2009. “Hubungan Pengetahuan Perawat Dan Peran Perawat Sebagai Pelaksana Dalam penanganan Pasien Gawat Darurat Dengan Gangguan Sistem Kardiovaskuler.” *Surya* 2 (IV): 6-10.

[7] Jaji. Peran Keperawatan Komunitas Dalam Peningkatan Derajat Kesehatan Masyarakat Menuju MDGs 2015. Universitas Sribijaya, Indonesia. 2012.

[8] Departemen Kesehatan Republik Indonesia. Pedoman Pengendalian Penyakit Jantung Dan Pembuluh Darah. Jakarta. 2007.

[9] Nastiti, D. 2011. Gambaran Faktor Resiko Kejadian Stroke Pada Pasien Stroke Rawat Inap Di Rumah Sakit Karakatau Medika. Karya Tulis Ilmiah, Universitas Indonesia, Depok.

[10] Djojan, T. B. A. Penyakit Jantung Koroner Dan Hypertensi. Fakultas Kedokteran, Universitas Sumatera Utara, Sumatera Utara. 2004.

[11] Anggraini, A. D., Waren, A., Situmorang, E., Asputra, H., and Siahaan, S. S. 2009. Faktor-faktor Yang Berhubungan Dengan Kejadian Hipertensi Pada Pasien Yang Berobat Di Poliklinik Dewasa Puskesmas Bangkinang Periode Januari Sampai Junu 2008. Karya Tulis Ilmiah Strata satu, Fakultas Kedokteran Universitas Riau, Riau.

[12] Andarmoyo, S., and Nurhayati, T. 2013. Laki-laki dan Riwayat Keluarga Dengan Penyakit Jantung Koroner (PJK) Beresiko Terhadap Kejadian PJK. Fakultas Ilmu Kesehatan, Universitas Muhammadiyah Ponorogo, Ponorogo.

[13] Stroke Association. Converging Risk Factors. 2010. 25 Januari 2015. www.strokeassociation.org.

[14] Supriyono, M. 2008. “Faktor-faktor Risiko Yang Berpengaruh Terhadap Kejadian Penyakit Jantung Koroner Pada Kelompok Usia < 45 Tahun.” Thesis Program Pasca Sarjana, Universitas Diponegoro, Semarang.