

Prevalence of risk factors associated with hypertension at Sanglah General Hospital, Bali



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ABSTRACT

Background: High blood pressure, also called “hypertension,” is a serious medical condition. It happens when the force of the blood pumping through the arteries is too strong. The World Health Organization rates hypertension as one of the most important causes of premature death worldwide, and the problem is growing. This study aimed to determine the risk factors affecting Hypertension at Sanglah general hospital.

Methods: This study was a descriptive study with a cross-sectional approach. The data used in this study is a secondary data collected from medical record of the patients with Hypertension at Sanglah general hospital, Denpasar, Bali in the year of 2015 until 2016. The data was categorized based on Body Mass Index (BMI), gender, age, alcohol consumption, and history of cardiovascular diseases.

Results: There are 73(60.83%) males and 47(39.17%) females, the majority of patients were in the age group of 18 – 70 years of age with the age group of 40 - 50 carrying a rather large quantity of 45.8% among the male gender and for the female gender the age group of

51 – 60 showed the highest percentage of 38.2%, the sample consists of 60.83% of males and 39.17 of females from the total 120 samples taken from Sanglah general hospital. As for Body Mass Index (BMI), 25 – 29.9 has the most significant value of 49 (40.83%) when compared to the other nutritional statuses present. The patients with the cardiovascular disease showed a very substantial amount of 69 (57.5%) among males and 41 (34.17%) among females. Patients with a history of alcohol consumption for the male gender had a value of 34 (28.30%), and for the female gender group, it carried an amount of 2 (1.70%).

Conclusions: This study succeeded in identifying 120 samples of patients with hypertension and their contributing risk factors. The majority of the Samples were with body mass index (BMI) 25 – 29.9 (40.83%). The samples with a history of cardiovascular disease showed a value of 69 (57.5%) among males and 41 (34.17%) among females. Patients with a history of alcohol consumption for the male gender had a value of 34 (28.30%), and for the female gender group, it carried an amount of 2 (1.70%)

Keywords: hypertension, body mass index, risk factor

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INTRODUCTION

Blood pressure is determined both by the amount of blood your heart pumps and the amount of resistance to blood flow in the arteries. The more blood the heart pumps and the narrower the arteries, the higher your blood pressure. High blood pressure, also called “hypertension,” is a serious medical condition. It happens when the force of the blood pumping through the arteries is too strong. A study by Markus McGill for the Medical News Today stated that Hypertension is having a blood pressure higher than 140 over 90 mmHg, a definition shared by all the medical guidelines. It means the systolic reading (the pressure as the heart pumps blood around the body) is over 140 mmHg (millimetres of mercury) or the diastolic reading (as the heart relaxes and refills with blood) is over 90 mmHg. The number of people living with hypertension (high blood pressure) is predicted to be 1.56 billion worldwide by the year 2025. In the US, around 75 million people have hypertension, with more people dying of hypertension-related cardiovascular disease than

from the next three deadliest diseases combined.¹ According to the Singapore National Health Survey (1998), 27.3% of Singaporeans between the ages of 30 and 69 years, suffer from hypertension. A study by WHO stated that in the Philippines, it had a total death of 38.20% due to hypertension in the World Ranking Calculations.²

According to the latest WHO data published in May 2014, Hypertension Deaths in Indonesia reached 42,226 or 3.02% of total deaths. The age-adjusted Death Rate is 25.26 per 100,000 of population ranks Indonesia number in the world with increasing counts.³ Hypertension to this date falls at the 9th place of the 50 causes of death in Indonesia.² As an exertion to that, this study is done to know the significance of Hypertension in the nation. Several risk factors are, therefore associated in this study to introduce and serve as a guideline in preventing hypertension in the upcoming years and generations. Among the risk factors discussed are age, body mass index (BMI), gender, alcohol

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consumption, and cardiovascular diseases. The risk factor of age will be deduced by the highest age group prone to hypertension. Body mass index (BMI) will be calculated by the formula of kg/m^2 , whereby kilogram (kg) will represent the weight of the sample and meters squared will be the height of the sample. At the same time, the gender risk factor will be discerned into both sexes male and female. Besides that, alcohol consumption, which is another prospect to hypertension, will be seen on how the frequency and volume of alcohol ingested, brings ramification towards hypertension. In the higher-income countries, about 330 million people have hypertension, as do around 640 million in the developing world. Cardiovascular disease also places a significant role as a risk factor towards hypertension. There are at least 970 million people worldwide who have elevated blood pressure. In the developed world, about 330 million people have hypertension, as do around 640 million in the developing world with a 50% rate of it induced by cardiovascular diseases. The World Health Organization rates hypertension as one of the most important causes of premature death worldwide, and the problem is growing. In 2025 it is estimated there will be 1.56 billion adults living with high blood pressure with risk to ischemic and hemorrhagic strokes.² Hypertension is generally accepted as one of the key modifiable risk factors for the development of cardiovascular diseases and cerebrovascular events.³

METHODS

This study was a descriptive study with a cross-sectional approach. This study aimed to determine the risk factors affecting Hypertension at Sanglah general hospital. The data used in this study is a secondary data collected from medical record of the patients with Hypertension at Sanglah general hospital, Denpasar, Bali in the year of 2015 until 2016. One hundred twenty samples were included in this study. The data was categorized based on Body Mass Index (BMI), gender, age, alcohol consumption, and history of cardiovascular diseases. The BMI criteria used in this study is Asian criteria BMI cut (Underweight: <18.5 ; Normal: $18.5 - 22.9$; overweight: $23 - 24.9$; Pre-obese: $25 - 29.9$; Obese: ≤ 30 ; Obese type 1: $30 - 40$; Obese type 2: $40.1 - 50$; Obese type 3: >50). The data were analyzed descriptively.

RESULT

The characteristic of patients with hypertension at Sanglah general hospital was showed in [table 1](#). The majority of patients were in the age group of 18 – 70 years of age with the age group of 40 - 50

carrying a rather large quantity of 45.8% among the male gender and for the female gender the age group of 51 – 60 showed the highest percentage of 38.2%. In the context of gender distribution, the sample consists of 60.83% of males and 39.17 of females from the total 120 samples taken from sanglah hospital. Hypertension was most commonly found among males in the age group of between 40 to 50 years of age. Though females showed a significantly lower amount compared to males, the highest number of females with hypertension was found in the age group 51 – 60 with an amount of about 38.2% the age group of 51 – 60 is the second-highest for the male population with a percentage of 30.0%, and as for females the age group of 40 – 50 is second highest with a percentage of 35.2%. Age group 61 – 70 has a dispersal of 10.1% for males and 18.2% for females. The age group with the least number of hypertension patients are 18 – 28, with a percentage of 3.8% respectively for both male and female.

The characteristic of Body mass index (BMI) patients with hypertension at Sanglah general hospital based on Asian criteria was showed in [table 2](#). According to the table, the overweight nutritional status which carries the body mass index (BMI) of 25 – 29.9 has the most significant value of 49 (40.83%) when compared to the other nutritional statuses present. The normal category nutritional status showed a fair amount of 42 (35%) among the 120 samples. It is also shown in the table that the pre-obese category of the nutritional status carries a staggering amount of 24 (20%) and the obesity category showed the least amount of 5 (4.16%). For the underweight, obese type 1, obese type 2 and obese type 3 categories, it all showed null percentage respectively.

The patients present with the cardiovascular disease showed a very significant value of 69 (57.5%) among males and 41 (34.17%) among females as compared to the patients without cardiovascular diseases whereby in the male population the value was rather declined, carrying an amount of 4 (3.33%) among the male patients and 6 (5%) among the female patients. It is rather evidential that cardiovascular diseases are a significant factor in contributing to Hypertension ([table 3](#)). The history of alcohol consumption of patients was shown in [table 4](#).

DISCUSSION

In comparison to a journal by American Hypertension Society, researched by Brian Gribbin et al., which studied the effects of age and High Blood Pressure, which was conducted on 61 samples, 31 males and 20 females, in regards

Table 1 The characteristic of patients with hypertension at Sanglah general hospital

Age Group (years)	Male (%)	Female (%)	Total (n=120)
18-28	3.8	3.8	4
29-39	10.3	4.6	22
40-50	45.8	35.2	42
51-60	30.0	38.2	37
61-70	10.1	18	15

Table 2 Body Mass Index (BMI) patients with hypertension at Sanglah general hospital Based on Asian Criteria

Age Group (years)	Asian Criteria BMI cut	Total (%)
Underweight	<18.5	0
Normal	18.5 – 22.9	42 (35%)
Overweight	23 – 24.9	49 (40.83%)
Pre-Obese	25 – 29.9	24 (20)
Obese	≤30	5 (3.16)
Obese type 1	30 – 40	0
Obese type 2	40.1 – 50	0
Obese type 3	>50	0

Table 3 Patients with a history of cardiovascular diseases

Cardiovascular Disease	Gender	Total
With Cardiovascular disease	Male	69 (57.5%)
	Female	41 (34.17%)
Without Cardiovascular disease	Male	4 (3.33%)
	Female	6 (5%)

Table 4 Patients with a Previous History of Alcohol Consumption

History of Alcohol Consumption	Gender	Total
With a history of alcohol consumption	Male	69 (57.5%)
	Female	41 (34.17%)
Without a history of alcohol consumption	Male	4 (3.33%)
	Female	6 (5%)

to showing how different age groups affect the chances of acquiring Hypertension, it is shown that the risk of hypertension increases with age. In the study, a baroreflex was used to measure and regulate blood pressure at the slight elevation of pressure, with that, it is seen that the need for regulation elevated alongside age groups. Similarly, when compared to the result of the discussion, it is understood that for the male category the highest data was seen in the age group of 40 – 50 which can most commonly be expressed as the productive age for men. Hypertension could have been caused by the stress and workload carried along with the male

category at that group of age.⁴ In another study conducted by the Americal Health Association, led by Ramachandran S. Vasanth et al., entitled, Residual Lifetime Risk of Developing Hypertension in Middle-Aged male and female, it is shown that during the two years, 1298 participants (598 men and 709 females) provided 8469-person-years observation. The residual lifetime risk for developing hypertension was similar for men and woman. It did not differ between participants aged 55 and 75 years of age (hazards ratio) [HR] for woman vs men aged 55 years, 0.91 [95% CI, 0.80-1.04]; for those aged 65 years, 0.88 [95% CI 0.76-1.04]) More the half of the 55-year-old participants and about two-thirds of the 50 -55-year-old populations developed hypertension within ten years. Though this slightly varied from the results obtained at the Sanglah Hospital, it carries a significance that the age group of 50 to 65 is very prone to Hypertension and should be cared for.⁵

In another journal by the International Epidemiology Journal, conducted by Anne Fagot Campagna, bearing the title, High free fatty acid concentration: an independent risk factor for hypertension in the Paris Prospective Study, by means that 2968 non-hypertensive and non-diabetic Caucasian men were followed for three years.⁶ Hypertension incidence was defined as systolic blood pressure (SBP) ≥ 160 mmHg or diastolic blood pressure (DBP) ≥ 95 mmHg or drug treatment for hypertension. Results obtained were, Free fatty acid elevation was a highly significant risk factor for hypertension when controlled for age, family history of hypertension, alcohol consumption, body mass index, iliac circumference, and weight change. Further controlling for SBP, heart rate and fasting insulin and glucose did not decrease its predictive power (hazard rate ratio [RR] = 1.58, 95% confidence interval [CI]: 1.30-1.91 comparing the 90th to the 10th percentiles at fasting; RR = 1.54, 95% CI: 1.33-1.79 at two h). In a forward stepwise model controlled for age, family history of hypertension, alcohol consumption and SBP, the selected variables explaining the occurrence of hypertension were, in order, weight change, 2-h free fatty acids, iliac circumference and fasting free fatty acids, whereas body mass index, heart rate, insulin, glucose, and other lipids did not enter into the model. Free fatty acids elevation is a risk factor for hypertension.⁶

Another study by the Hypha Organization conducted by Gung Ho Noel et al., entitled Relationship of Physical Activity and Body Mass Index to the Risk of Hypertension: A Prospective Study in Finland it is reflected that results showed that prospective studies on physical activity about

the risk for hypertension are scant, particularly in women.⁷ This study was finding out whether regular physical activity can reduce the risk of hypertension in both men and women, and in subjects with and without overweight. The study prospectively followed 8302 Finnish men and 9139 women aged 25 to 64 years without a history of antihypertensive drug use, coronary heart disease, stroke, and heart failure at baseline. Both single and joint associations of physical activity and body mass index with the risk of hypertension were examined using Cox proportional hazard models. During a mean follow-up of 11 years, there were 1600 incident cases of drug-treated hypertension. Multivariate-adjusted hazards ratios of hypertension associated with light, moderate, and high physical activity were 1.00, 0.63, and 0.59 in men (Ptrend_{0.001}), and 1.00, 0.82, and 0.71 in women (Ptrend_{0.005}), respectively. This association persisted both in subjects who were overweight and in those who were not. Multivariate-adjusted hazards ratios of hypertension based at different levels of body mass index (₂₅, 25 to 29.9, and ₃₀) were 1.00, 1.18, and 1.66 for men (Ptrend_{0.001}), and 1.00, 1.24, and 1.32 for women (Ptrend_{0.007}), respectively. Further adjustment for baseline systolic blood pressure did not affect the protective effect associated with physical activity, but it weakened the association between body mass index and hypertension markedly. Regular physical activity and weight control can reduce the risk of hypertension.⁷ Study conducted by Bhargah using a quasi-experimental model with pre-test and post-test group design involving 28 elderly performed aerobic exercise through a healthy heart gymnastics exercise with a duration of 45 minutes. There was a decrease in systolic blood pressure of 19 mmHg (post-exercise (121.96±1.43 mmHg) compared with baseline (141.35 ± 8.76) (p<0.001)), diastolic as much as 11 mmHg (post-exercise (121.96 ±1.43 mmHg) compared with baseline (91.75 ± 1.48) (p<0.001)), and MAP of 14 mmHg (post-exercise (93.89 ± 1.15 mmHg) compared with baseline (108.39±1.34) (p<0.001)) in condition before and after 60 minutes of aerobic exercise.⁸

A study by Howard D. Senso for the AHA Journals, titled Alcohol Consumption and the Risk of Hypertension in Women and Men, subjects reported current alcohol intake by responding to a question on how often they consumed alcoholic beverages, without regard to the amount of alcohol consumption for each episode and these responses were interpreted as the number of drinks consumed in the specified period, converting seven response categories (rarely or never, 1 to 3 per month, 1 per week, 2 to 4 per week, 5 to 6 per week,

daily, and 2 per day) to the number of alcoholic drinks consumed weekly (0.0, 0.5, 1.0, 3.0, 5.5, 7.0, and 18.0 drinks per week, respectively). Results obtained were in women, total alcohol intake was summed from liquor, red wine, white wine, and beer; men reported total alcohol intake from a single combined question.⁹ During 10.9 and 21.8 years of follow-up, 8680 women and 6012 men developed hypertension (defined as new physician diagnosis, antihypertensive treatment, reported systolic blood pressure ₁₄₀ mm Hg, or diastolic blood pressure ₉₀ mm Hg). In women, we found a J-shaped association between alcohol intake and hypertension in age- and lifestyle-adjusted models. In men, alcohol intake was positively and significantly associated with the risk of hypertension and persisted after multivariate adjustment. Models stratified by baseline systolic blood pressure (120 versus ₁₂₀ mm Hg) or diastolic blood pressure (₇₅ versus ₇₅ mm Hg) did not alter the relative risks in women and men. In conclusion, the threshold above which alcohol became deleterious for hypertension risk emerged at ₄ drinks per day in women versus a moderate level of ₁ drink per day in men.⁹

A study for the Journal of Cardiovascular Pharmacology, by William B Kennel, showed that the chief hazards atherosclerosis and coronary disease.⁹ The risk of hypertension is concentrated with a high total/high-density lipoprotein (HDL)-cholesterol ration, impaired glucose tolerance, high fibrinogen, and electrocardiographic (ECG) abnormalities. Among suggested measured were a close watch to blood lipids, left ventricular hypertrophy, stroke, peripheral arterial disease, cardiac failure, or any other cardiovascular event. As compared to the study, cardiovascular disease was a significant contributor to the occurrence of Hypertension and should be closely watched in the prevention of Hypertension in the coming years.¹⁰

LIMITATION

The limitations that were sustained during this study was a lack in the medical record at Sanglah general hospital, which was a secondary data in this study. Thus, there was a little insufficiency in previous record history.

CONCLUSION

This study succeeded in identifying 120 samples of patients with hypertension and their contributing risk factors. Among the risk factors discussed are age, body mass index (BMI), gender, alcohol

consumption, and cardiovascular diseases. The age group of 40 - 50 carrying a rather large quantity of 45.8% among the male gender and for the female gender the age group of 51 - 60 showed the highest percentage of 38.2%. As for body mass index (BMI), 25 - 29.9 has the most significant value of 49 (40.83%). The patients present with the cardiovascular disease showed a very substantial amount of 69 (57.5%) among males and 41 (34.17%) among females. Patients with a history of alcohol consumption for the male gender had a value of 34 (28.30%), and for the female gender group, it carried an amount of 2 (1.70%).

ETHICAL CLEARANCE NUMBER

This study has been obtained the ethics approval from the Faculty of Medicine, Udayana University, Sanglah General Hospital, Bali, Indonesia.

CONFLICT OF INTEREST

The author states that there is no conflict of interest regarding the publication of this article.

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AUTHOR CONTRIBUTION

Research concept: Mahen Isaac Pannir Chelvam, I Wayan Sugiritama, I Gusti Nyoman Kamasan Arijana. Data collection, data input, and data processing: Mahen Isaac Pannir Chelvam. Preparation of Research manuscript: Mahen Isaac Pannir Chelvam.

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