Volume 07, Issue 02 (March-April 2024), PP 01-08 **www.ijmsdr.org**
ISSN: 2581-902X

International Journal of Medical Science and Dental Research

Characteristics of Heart Patients Undergoing Stent Placement at RSUP Dr. Wahidin Sudirohusodo Makassar

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Abstract : Coronary stent, a breakthrough in the treatment of coronary artery disease (CAD), marks the evolution of cardiovascular disease (CVD) management that has revolutionized how we understand and treat the condition. The coronary stent aims to stabilize the results of balloon angioplasty by reducing the risk of complications such as restenosis and acute vessel closure. In Indonesia, data shows an increase in cases of coronary heart disease and hypertension, emphasizing the need for continuous research and development in the treatment and prevention of heart and vascular diseases. The research utilized a cross-sectional design, analyzing data from 85 medical records of patients diagnosed with cardiovascular disease at RSUP Wahidin Sudirohusodo / Makassar Integrated Heart Center in 2021. The majority of patients fell within the age range of 46-55 years (45.9%), with a predominance of male patients (82.4%). From the patient history, most experienced stage I hypertension (54.1%) without conditions of dyslipidemia (81.2%) or DM (50.6%). Regarding nutritional status, most patients were classified as overweight (49.45%). The conclusion of this study revealed that the characteristics of heart patients undergoing stent placement were predominantly early elderly individuals, predominantly male, with a history of stage I hypertension without dyslipidemia and DM conditions, and overweight nutritional status. It is suggested that there will be further development of broader early screening programs, particularly targeting patients with higher cardiovascular risk factors.

Keywords - *cardiovascular disease, coronary stent, overweight nutritional status*

I. INTRODUCTION

The introduction of the paper should explain the nature of the problem, previous work, purpose, and the contribution of the paper. The contents of each section may be provided to understand easily about the paper. Coronary Stents are small wire mesh tubes used to support arteries during angioplasty. The stent remains in the artery permanently.[1] The stent will also increase blood flow to the heart muscle and will relieve chest pain (angina). Coronary stents, acting as a scaffold in the treated coronary artery, are designed to stabilize the results

of balloon angioplasty. Stent implantation creates an acute increase in luminal diameter and a closed dissection resulting from stand-alone angioplasty. Coronary angioplasty revolutionized the way coronary artery disease is managed. Although this has proven to be a highly effective treatment, results are compromised by high rates of sudden vessel cell closure due to acute arterial recoil and coronary artery dissection in the short term, and restenosis in the long term.[2] Therefore, coronary stents were developed to overcome this problem, by acting as a scaffold within the artery to cover the possibility of flap dissection and prevent late recoil. Percutaneous coronary intervention (PCI) has become the mainstay of treatment for coronary artery disease (CAD). Percutaneous coronary balloon angioplasty (PTCA) is associated with complications such as acute closure and restenosis of the affected vessel.[3]

Coronary stents were first developed in the 1980s and continue to evolve in terms of shape, structure and materials used in them. In the pre-stent era, balloon angioplasty was the mainstay of coronary revascularization in which an inflatable balloon-tipped catheter was inserted percutaneously through an arterial entry site in the extremity and advanced into the coronary artery4. To overcome the limitations of balloon angioplasty, Puel and Sigwart developed the bare-metal stent (BMS) in 1986. BMS reduces the risk of sudden vessel closure due to local dissection. In addition, BMS also eliminates vascular wall elastic recoil and constrictive remodeling.[4] The American College of Cardiologists (ACC) guidelines on the management of patients with ICS recommend dual antiplatelet therapy (DAT) for a minimum of 14 days after balloon angioplasty, 30 days for BMS and 365 days for DEC.[5]

Coronary artery disease (CAD) is a leading cause of death globally, especially for middle- and high-income countries. In 2012, all-cause deaths were estimated at 56 million worldwide with 17.5 million deaths (31%) attributed to cardiovascular disease (CVD). Ischemic heart disease represents 7.4 million (13%) people, while 6.7 million (12%) die from stroke. Globally, PTM causes the number one death each year is cardiovascular disease. The estimated number of coronary heart disease sufferers aged ≥ 15 years (based on doctor's diagnosis/symptoms) in South Sulawesi province was 166,429 people (2.9%). Meanwhile, based on doctors' diagnoses, there were 34,434 people (0.6%).8 Latest data from the Ministry of Health's data and information center, The number of hypertension cases that occurred in South Sulawesi was 31.68.[6] This has increased due to data presented by the Ministry of Health's data center in 2013 in South Sulawesi, the number of hypertension patients was 28.05. According to WHO cardiovascular diseases (CVDs) are the leading cause of death globally, claiming approximately 17.9 million lives each year. CVD is a group of heart and blood vessel disorders and includes coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions. More than four out of five CVD deaths are caused by heart attacks and strokes, and one-third of these deaths occur prematurely in people under 70 years of age.[7]

II. RESEARCH METHODS

This research is a descriptive, retrospective observational study to find out the features or characteristics of stent installation in heart patients at Wahidin Sudirohusodo Hospital / Makassar Integrated Heart Center. The research design used was a cross sectional approach, carried out by collecting medical record data from patient visits at Wahidin Sudirohusodo Hospital / Makassar Integrated Heart Center. In this design, all research variables can be measured once at a time, so it will be easier and the results obtained will be much faster. The type of data used in this research is secondary data. The data comes from patient medical records at RSUP Dr. Wahidin Sudirohusodo/Makaasar Integrated Heart Center. The population in this study were heart patients at Wahidin Sudirohusodo Hospital/Makassar Integrated Heart Center who were >40 years old. Both female and male. The sample method used in this research is medical records of heart patients who use one or more stents at the Wahidin Sudirohusodo Hospital/Makassar Integrated Heart Center in 2021. The data collection method in this research is by collecting secondary data. Secondary data was obtained through patient medical records at Wahidin Sudirohusodo Hospital/Makassar Integrated Heart Center. The data analysis that will be carried out in this research is univariate analysis to see the frequency and percentage distribution of each variable. The variables in this study were the number of patients, patient age, patient gender, and risk factors such as dyslipidemia, diabetes mellitus, obesity, and hypertension.[8]

III. RESEARCH RESULT

Research on the Characteristics of Heart Patients with Stent Installation at Dr. Wahidin Sudirohusodo Hospital / Makassar Integrated Heart Center in 2021. The independent variables studied in this study were gender, age, history of hypertension, history of dyslipidemia, history of DM, nutritional status. Data taken through recording in July – December 2023 at Dr. Wahidin Sudirohusodo Hospital / Integrated Heart Center. Based on the medical record data obtained, there were 257 samples and after screening based on the inclusion criteria, 85 samples were obtained that met the inclusion criteria. The research results are presented Table 1 shows the distribution of samples based on gender, most of the samples were men, namely 70 people (82.40%) and 15 people (17.60%) women. Table 2 shows the distribution of samples based on the reference age of the Ministry of Health (2019), most of the samples were aged 46-55 years (early elderly), namely 39 people (45.90%), then aged 56-65 years (late elderly) as many as 28 people (32.90%), aged 36-45 years (late adulthood) as many as 15 people (17.60%), and aged 26-35 years (early adulthood) as many as 3 people (3.50%). Table 3 shows the distribution of samples based on history of hypertension, most of the samples had grade 1 hypertension, 46 people (54.10%), 19 people (22.40%), 19 people (22.40%), 15 people (17.60%) with grade 2 hypertension. %), and normal as many as 5 people (5.90%). Table 4 shows the distribution of samples based on history of dyslipidemia, as many as 69 people (81.20%) had no history of dyslipidemia and as many as 16 people (18.80%) had dyslipidemia. Table 5 shows the distribution of samples based on history of DM, as many as 43 people (50.60%) had no history of DM and as many as 42 people (49.40%) had a history of DM. Table 6 shows the distribution of samples based on nutritional status, most of the samples were overweight, 42 people (49.40%), 31 people (46.50%) had normal nutritional status, 11 people (12.90%) were obese and as many as 1 person (1.20%) was obese.

IV. TABLE RESULT

Table 1. Characteristics of Heart Patients by Gender

Gender	Frequency (n)	Percentage (%)
Male	70	82,40
Female	15	17,60
Total	**85**	**100**

Table 2. Characteristics of Heart Patients by Age

Age	Frequency (n)	Percentage (%)
26 - 35 yo	3	3,50
36 - 45 yo	15	17,60
46 - 55 yo	39	45,90
56 - 65 yo	28	32,90
Total	**85**	**100**

Table 3. Characteristics of Heart Patients based on Blood Pressure

Blood Presure	Frequentcy (n)	Percentage (%)
Normal	5	5,90
Pra Hypertension	19	22,40
Hypertension grade 1	46	54,10
Hypertension grade 2	15	17,60

Total	**85**	**100**

Table 4. Characteristics of Heart Patients based on history of Dyslipidemia

Dyslipidemia	Frequency (n)	Percentage (%)
Yes	16	18,80
No	69	81,20
Total	**85**	**100**

Table 5. Characteristics of Heart Patients based on history of DM

DM	Frequency (n)	Percentage (%)
Yes	42	49,40
No	43	50,60
Total	**85**	**100**

Table 6. Characteristics of Heart Patients based on Nutritional Status

Nutritional Status	Frequency (n)	Percentage (%)
Normal	31	36,50
Overweight	42	49,40
Obesity 1	11	12,90
Obesity 2	1	1,20
Total	**85**	**100**

V. DISCUSSION

From the research results it was found that the majority of the sample was male, namely 70 people (82.40%). These results are in line with research by Gupta S, et al (2018) regarding "Prognostic Impact of Tissue Prolapse After Stent Implantation in Patients with Non-St Elevation Acute Coronary Syndromes: An Optical Coherence Tomography Study" which found that during the study period, the incidence of stent thrombosis was identified in 3248 patients (1.04%), presented with acute coronary syndrome. The gender distribution is mostly among men is 78%. Based on research results, it shows that the majority of patients are men, as stated by the World Heart Federation, men have a tendency to have a higher risk of developing heart disease than women. This is caused by differences in sex hormones, with men having lower estrogen levels than women. Estrogen is known to have a protective effect on the heart, which can help maintain heart health. Therefore, low estrogen levels in men can increase their risk of heart disease. The physiological mechanisms behind this involve the role of estrogen in regulating cholesterol levels, blood vessel function, and response to inflammation, all of which are factors that contribute to heart health. Thus, differences in estrogen levels between men and women may influence each gender's risk of heart disease.[9]

The distribution of samples based on age in this study showed that most of the samples were aged 46-55 years, namely 39 people (45.90%). “Evaluation of Prevalence and Risk Factors of Obstructive Sleep Apnea in Patients with Acute Coronary Syndrome: A Prospective Observational Study” shows that among 60 samples, 10 patients were aged 36-45 years, 23 patients were aged 46-55 years, 16 patients were aged 56- 65 years old, 11 patients aged 66 years and over. The relationship between cardiac stent installation and age is related to what medical action should be taken to the patient. Patients who are elderly (aged >76 years) will tend to undergo less invasive procedures and use more medication. Meanwhile, more patients aged ≤ 65 years underwent invasive procedures. In this study the age of the sample ranged from 26 to 65 years and only a few samples were found in

the age range of 60 years and above.[10] At the age of 40-50 years, many individuals experience plaque accumulation in the coronary arteries as a result of an unhealthy lifestyle, such as unhealthy eating patterns, lack of physical activity, and smoking habits. This plaque accumulation can cause narrowing of the coronary arteries and decreased blood flow to the heart, which in turn can cause symptoms such as chest pain or even a heart attack. Therefore, at this age, stent placement is one of the procedures frequently performed to improve blood flow to the heart and prevent further complications. On the other hand, at the age of 60 years and over, there are several factors that can influence the decision not to have a stent installed. One of them is the additional risks associated with stent procedures at an advanced age, such as complications related to surgery and other comorbidities.[11] In addition, in some cases, coronary arteries in older adults may experience more severe or more extensive degeneration, making stent placement more difficult or less effective in improving blood flow. Instead, at this age, alternative therapies such as drug treatment or other medical procedures may be preferred.[12]

Then the research results showed that the sample distribution based on history of hypertension, most of the samples had grade 1 hypertension, 46 people (54.10%). These results are in line with research by Giuliano T regarding "Blood Pressure Levels at the Time of Percutaneous Coronary Revascularization and Risk of Coronary In-Stent Restenosis" which found that 355 samples out of 796 total samples had hypertension with a systolic blood pressure range of 140 ± 21.0 mmHg and diastolic blood pressure 77.5 ± 11.4 mmHg.[13]

High blood pressure (BP) is associated with a significantly increased risk of coronary artery disease and major cardiovascular events. This increased risk is often enhanced by the presence of additional cardiovascular risk factors, organ damage, and other comorbidities. Hypertension or high blood pressure can significantly increase the risk of coronary artery disease requiring heart stent installation. Hypertension causes blood pressure to increase and can damage artery walls, increasing the risk of atherosclerotic plaque forming in the coronary arteries.[14] This plaque can cause narrowing of the coronary arteries, which reduces blood flow to the heart and increases the risk of ischemic heart disease such as angina or even a heart attack. Over time, if hypertension is not well controlled, atherosclerotic plaques can become increasingly large and stable, or can even rupture, causing the formation of blood clots that can completely block the coronary arteries. Heart stent placement is often necessary in these cases to expand narrowed arteries and restore normal blood flow to the heart.[15]

The research results also showed that most of the samples had a history of dyslipidemia, as many as 69 people (81.20%) with overweight nutritional status (49.40%). These results are in line with research from Biswas, et al (2019) regarding "Association of Body Mass Index and Extreme Obesity with Long-Term Outcomes Following Percutaneous Coronary Intervention" where this cohort study involved 25,413 patients who underwent PCI between January 1 2005 and June 30 2017, which was prospectively registered in the Melbourne Interventional Group registry. Patients were grouped based on BMI categories determined by the World Health Organization, and there were 7,081 samples (66.9%) of patients with dyslipidemia with nutritional status at a BMI of 25 kg/m2.[16]

Many paradoxical mechanisms between nutritional status and cardiovascular disease have been identified. Previous data showed a linear relationship between body mass index (BMI) and the prevalence of comorbidities such as hypertension and dyslipidemia. However, patients with a higher BMI tend to undergo earlier screening and more aggressive treatment of these cardiovascular risk factors. This may result in a better long-term prognosis despite obesity.[17] Additionally, patients who are overweight or mild to moderately obese have a lower risk of experiencing cardiogenic shock and cardiac arrest following hospitalization, conditions that are typically associated with poorer outcomes.[18] People with normal nutritional status may have the same risk for heart stent placement as people with nutritional problems. This is due to the fact that the risk of cardiovascular disease, which may require cardiac stent placement, is influenced not only by nutritional factors, but also by other factors such as family medical history, lifestyle and genetic factors. Although poor nutrition can increase the risk of cardiovascular disease through its influence on risk factors such as hypertension and dyslipidemia, people with normal nutrition can still develop conditions requiring intervention such as cardiac stent placement due to these factors, along with other factors that may be unrelated directly related to nutritional status.[19] And from the sample distribution based on DM history, it was found that there was no significant difference between patients who had a history of DM (49.40%) and those who did not have a history of DM

(50.6%).[20] These results are in line with research from Koningstein, et al (2018) regarding "Outcomes Among Diabetic Patients Undergoing Percutaneous Coronary Intervention with Contemporary Drug-Eluting Stents" which found that the overall prevalence of DM was 29.1% (559 out of 1,919). DM patients had a higher body mass index, a higher prevalence of hyperlipidemia and hypertension, and a smaller reference blood vessel diameter.[21]

The typical pattern of diabetic coronary artery disease is characterized by a greater burden of atherosclerosis and disseminated disease, with smaller reference vessel diameters and poor collateral formation compared with nondiabetic patients.[22] Therefore, the results of coronary revascularization in diabetic patients are lower compared with nondiabetic patients. Specifically, PCI in diabetic patients is associated with increased rates of restenosis, repeat revascularization, ST, and death.[23] Higher rates of repeat revascularization and mortality after PCI in diabetic patients are due to stent failure, especially instance restenosis, and disease progression. In diabetic patients, the main cause of restenosis is marked and accelerated intimal hyperplasia combined with more vascular inflammation, endothelial dysfunction, and direct growth of insulin factor-like effects on vascular smooth muscle and neointimal cells.[24]

VI. CONCLUSION

From the results and discussion in this study, it can be concluded, among other things, that the majority of coronary heart patients who underwent stent installation were male with an age range of 46 to 55 years at RSUP Dr. Wahidin Sudirohusodo/Makassar Integrated Heart Center. It was found that the majority of heart patients who underwent stent installation experienced grade 1 hypertension at Dr. RSUP. Wahidin Sudirohusodo/ Makassar Integrated Heart Center. It was found that the majority of heart patients who underwent stent installation experienced dyslipidemia at Dr. RSUP. Wahidin Sudirohusodo/ Makassar Integrated Heart Center. It was found that there was no difference between heart patients who underwent stent installation who experienced Diabetes Mellitus and those who did not experience Diabetes Mellitus at RSUP Dr. Wahidin Sudirohusodo/ Makassar Integrated Heart Center. It was found that the majority of heart patients who underwent stent installation were overweight at Dr. RSUP. Wahidin Sudirohusodo/ Makassar Integrated Heart Center.

Acknowledgements

I would like to thank my parents who have provided full support in completing my studies and all the supervisors from the medical faculty at the Indonesian Muslim University who have taken the time to guide me to complete my written work to the publication stage.

REFERENCES

[1] S. E. C. Bafei *et al.*, "Interactive effect of increased high sensitive C-reactive protein and dyslipidemia on cardiovascular diseases: a 12-year prospective cohort study," *Lipids Health Dis.*, vol. 22, no. 1, pp. 1–11, 2023, doi: 10.1186/s12944-023-01894-0.

[2] E. Araki *et al.*, *Diagnosis, prevention, and treatment of cardiovascular diseases in people with type 2 diabetes and prediabetes: a consensus statement jointly from the Japanese Circulation Society and the Japan Diabetes Society*. 2020.

[3] K. C. Ueng *et al.*, *2023 Guidelines of the Taiwan Society of Cardiology on the Diagnosis and Management of Chronic Coronary Syndrome*, vol. 39, no. 1. 2023.

[4] Q. Cheng *et al.*, "Sex-specific risk factors of carotid atherosclerosis progression in a high-risk population of cardiovascular disease," *Clin. Cardiol.*, vol. 46, no. 1, pp. 22–31, 2023, doi: 10.1002/clc.23931.

[5] T. Münzel *et al.*, "Environmental risk factors and cardiovascular diseases: a comprehensive expert review," *Cardiovasc. Res.*, vol. 118, no. 14, pp. 2880–2902, 2022, doi: 10.1093/cvr/cvab316.

[6] F. Kronenberg *et al.*, "Lipoprotein(a) in atherosclerotic cardiovascular disease and aortic stenosis: A European Atherosclerosis Society consensus statement," *Eur. Heart J.*, vol. 43, no. 39, pp. 3925–3946, 2022, doi: 10.1093/eurheartj/ehac361.

[7] M. Casian, C. Jurcut, A. Dima, A. Mihai, S. Stanciu, and R. Jurcut, "Cardiovascular Disease in Primary Sjögren's Syndrome: Raising Clinicians' Awareness," *Front. Immunol.*, vol. 13, no. June, pp. 1–12, 2022, doi: 10.3389/fimmu.2022.865373.

[8] E. Tay, S. C. A. Chen, W. Green, R. Lopez, and C. L. Halliday, "Development of a Real-Time PCR Assay to Identify and Distinguish between Cryptococcus neoformans and Cryptococcus gattii Species Complexes," *J. Fungi*, vol. 8, no. 5, pp. 6799–6800, 2022, doi: 10.3390/jof8050462.

[9] A. Daiber *et al.*, "New therapeutic implications of endothelial nitric oxide synthase (eNOS) function/dysfunction in cardiovascular disease," *Int. J. Mol. Sci.*, vol. 20, no. 1, pp. 1–34, 2019, doi: 10.3390/ijms20010187.

[10] D. Y. Kim *et al.*, "Development and validation of a risk score model for predicting the cardiovascular outcomes after breast cancer therapy: The chemo-radiat score," *J. Am. Heart Assoc.*, vol. 10, no. 16, 2021, doi: 10.1161/JAHA.121.021931.

[11] H. E. Bays *et al.*, "Ten things to know about ten cardiovascular disease risk factors," *Am. J. Prev. Cardiol.*, vol. 5, no. November 2020, p. 100149, 2021, doi: 10.1016/j.ajpc.2021.100149.

[12] C. A. German *et al.*, "Defining preventive cardiology: A clinical practice statement from the American Society for Preventive Cardiology," *Am. J. Prev. Cardiol.*, vol. 12, no. October, p. 100432, 2022, doi: 10.1016/j.ajpc.2022.100432.

[13] H. E. Bays *et al.*, "Ten things to know about ten cardiovascular disease risk factors – 2022," *Am. J. Prev. Cardiol.*, vol. 10, no. March, p. 100342, 2022, doi: 10.1016/j.ajpc.2022.100342.

[14] N. D. Wong *et al.*, "Atherosclerotic cardiovascular disease risk assessment: An American Society for Preventive Cardiology clinical practice statement," *Am. J. Prev. Cardiol.*, vol. 10, no. February, p. 100335, 2022, doi: 10.1016/j.ajpc.2022.100335.

[15] Y. Huang *et al.*, "Comparison of the Three Most Commonly Used Metabolic Syndrome Definitions in the Chinese Population: A Prospective Study," *Metabolites*, vol. 13, no. 1, 2023, doi: 10.3390/metabo13010012.

[16] X. Lang *et al.*, "Interaction of Depression and Unhealthy Diets on the Risk of Cardiovascular Diseases and All-Cause Mortality in the Chinese Population: A PURE Cohort Substudy," *Nutrients*, vol. 14, no. 23, pp. 1–15, 2022, doi: 10.3390/nu14235172.

[17] H. H. Idrus, B. Modding, and S. Basalamah, "Collective Competence as an Enabler for Service Integration in Health and Social Care Services," *J. Multidiscip. Healthc.*, vol. 15, no. December, pp. 2817–2830, 2022, doi: 10.2147/JMDH.S387719.

[18] R. Lorbeer *et al.*, "Association of antecedent cardiovascular risk factor levels and trajectories with cardiovascular magnetic resonance-derived cardiac function and structure," *J. Cardiovasc. Magn. Reson.*, vol. 23, no. 1, pp. 1–15, 2021, doi: 10.1186/s12968-020-00698-w.

[19] H. H. Idrus, Fitriana, and S. Adiningsih, "Detection of HIV-1 DNA / RNA in Peripheral Blood , Bone Marrow and Femoral Head of Patients with Osteonecrosis of the Femoral Head [Letter]," *Infect. Drug Resist.*, vol. 17, no. February, pp. 683–684, 2024, doi: 10.2147/IDR.S449615.

[20] H. H. Idrus and Sunarno, "Liquiritin Protects Against Cardiac Fibrosis After Myocardial Fibrosis After Myocardial Infarction by Inhibiting CCL5 Expression and the NF-κB Signaling Pathway [Letter]," *Drug Des. Devel. Ther.*, vol. 9, no. February, pp. 4599–4611, 2015, doi: 10.2147/DDDT.S85399.

[21] H. H. Idrus, Sunarno, and S. Rijal, "Detection of Antibiotic Resistance Genes in Pseudomonas aeruginosa by Whole Genome Sequencing," *Infect. Drug Resist.*, vol. 15, pp. 7125–7126, 2022, doi: 10.2147/IDR.S389959.

[22] N. Riaz, S. L. Wolden, D. Y. Gelblum, and J. Eric, "Atherosclerotic Cardiovascular Disease and Heart Failure in Type 2 Diabetes Mellitus, Mechanismt, and Clinical Considerations," *HHS Public Access*, vol. 118, no. 24, pp. 6072–6078, 2022, doi: 10.1161/CIRCULATIONAHA.116.022194.Atherosclerotic.

[23] O. Quesada, G. N. Smith, J. W. Rich-edwards, and D. Vesna, "Pregnancy and Reproductive Risk Factors for Cardiovascular Disease in Women," *HHS Public Access*, vol. 130, no. 4, pp. 652–672, 2023, doi: 10.1161/CIRCRESAHA.121.319895.Pregnancy.

[24] H. H. Idrus, M. Mustamin, and Zulfahmidah, "Evaluation of a Multidisciplinary Extracurricular Event Using Kolb's Experiential Learning Theory: A Qualitative Study [Letter]," *J. Multidiscip. Healthc.*, vol. 16, pp. 39–40, 2023, doi: 10.2147/jmdh.s389932.