



KARYA TULIS AKHIR

HUBUNGAN BMI TERHADAP DERAJAT KEPARAHAN LESI

KORONER PADA PASIEN ANGIOGRAFI KORONER TAHUN 2022 DI

RSU UMM

Oleh :

Jordan Ramanda Putra

NIM:202010330311105

FAKULTAS KEDOKTERAN

UNIVERSITAS MUHAMMADIYAH MALANG

2024

MALANG



KARYA TULISA AKHIR

HUBUNGAN BMI TERHADAP DERAJAT KEPARAHAAN LESI KORONER
PADA PASIEN ANGIOGRAFI KORONER TAHUN 2022 DI RSU UMM

Oleh :

Jordan Ramanda Putra

202010330311105

FAKULTAS KEDOKTERAN

UNIVERSITAS MUHAMMADIYAH MALANG

2024

PRASYARAT GELAR
HASIL PENELITIAN

**HUBUNGAN BMI TERHADAP DERAJAT KEPARAHAN LESI KORONER
PADA PASIEN ANGIOGRAFI KORONER TAHUN 2022 DI RSU UMM**

KARYA TULIS AKHIR

Diajukan kepada

Universitas Muhammadiyah Malang

Untuk Memenuhi Salah Satu Persyaratan

Dalam Menyelesaikan Program Sarjana

Fakultas Kedokteran

Oleh :

Jordan Ramanda Putra

202010330311105

FAKULTAS KEDOKTERAN

UNIVERSITAS MUHAMMADIYAH MALANG

2024

LEMBAR PENGESAHAN

LAPORAN HASIL PENELITIAN

Telah disetujui sebagai hasil penelitian untuk memenuhi persyaratan

Pendidikan Sarjana Fakultas Kedokteran

Universitas Muhammadiyah Malang

Tanggal : 19 Juni 2024

Pembimbing I


Dr Indra Wahyu Sahputra Sp.JP(K) FIHA

NIP.180728021983

Pembimbing II

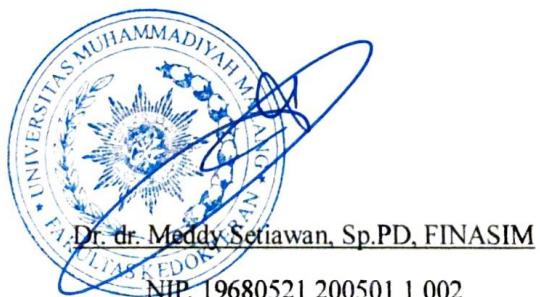

dr Suharto Sp.Rad

NIP.160310041967

Mengetahui ,

Fakultas Kedokteran

Dekan ,



LEMBAR PERNYATAAN ORISINALITAS

Saya yang bertanda tangan dibawah ini ,

Nama : Jordan Ramanda Putra

NIM : 202010330311105

Program Studi : S1 Pendidikan Dokter

Menyatakan bahwa karya tulis akhir yang saya tulis ini adalah karya saya sendiri dan sumber yang dikutip maupun dirujuk telah saya nyatakan benar adanya.

Malang 19 Juni 2023



Jordan Ramanda Putra

202010330311105

LEMBAR PENGUJIAN

Karya Tulis Akhir oleh Jordan Ramanda Putra ini

Telah diuji dan dipertahankan di depan tim penguji

Pada tanggal 19 juni 2024

Tim Penguji



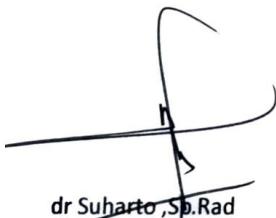
dr Deka Bagus Binarsa , Sp.FM

Ketua



dr Indra Wahyu Sahputra , Sp.JP (K) FIHA

Anggota



dr Suharto ,Sp.Rad

Anggota

ABSTRAK

Pendahuluan: Berdasarkan Riskesdas tahun 2018 penderita PJK sebesar 15 dari 1000 orang. Menurut WHO kurang lebih 17,9 juta terdiagnosis penyakit kardiovaskular dan menyumbang kematian global sebanyak 32%. Beberapa penelitian menunjukkan adanya perbedaan hasil terkait penelitian hubungan BMI terhadap derajat stenosis dan letak lesi pada PJK. **Tujuan:** Untuk mengetahui hubungan BMI terhadap Derajat Keparahan Lesi Koroner pada pasien angiografi koroner berdasarkan Sullivan Stenosis Score pada pasien PJK di RSU UMM pada tahun 2022. **Metode:** Penelitian menggunakan metode analitik observasional, Teknik pengambilan sampel dengan simple random sampling, menggunakan data rekam medis sebanyak 152 sampel. Data dianalisis menggunakan SPSS dengan uji korelasi eta. **Hasil:** Hasil penelitian menunjukkan jumlah pasien PJK dengan BMI kurus sebanyak 2 penderita (1,3%), normal sebanyak 47 penderita (30,9%), *overweight* sebanyak 34 penderita (22,4%) dan obesitas I sebanyak 51 penderita (33,6%) serta obesitas II sebanyak 17 penderita (11,2%). Hasil penelitian menunjukkan terdapat hubungan antara BMI dengan derajat keparahan lesi koroner ($p=0,029$ $r=0,265$ $r^2=0,07$). Pada arteri koroner yang memiliki hubungan dengan BMI hanya RCA dan LCX ($p=0,036$ dan $p=0,049$) dan LM dan LAD tidak memiliki hubungan dengan BMI ($p=0,070$ dan $p=0,416$). **Kesimpulan:** Terdapat hubungan antara BMI dengan derajat keparahan lesi koroner berdasarkan Sullivan stenosis skor tetapi korelasinya lemah.

Kata kunci :PJK,Keparahan PJK,Sullivan Stenosis Score

ABSTRACT

Introduction: Based on Riskesdas in 2018 CHD sufferers were 15 out of 1000 people. According to WHO, approximately 17.9 million were diagnosed with cardiovascular disease and contributed to 32% of global deaths. Several studies have shown differences in results related to research on the relationship between BMI to the degree of stenosis and the location of lesions in CHD. Objective: To determine the relationship of BMI to the Degree of Stenosis and Lesion Location in coronary angiography patients based on the Sullivan Stenosis Score in CHD patients at UMM General Hospital in 2022. Methods: The study used observational analytical methods, sampling techniques with simple random sampling, using medical record data as many as 152 samples. Data were analyzed using SPSS with the eta correlation test. Results: The results showed the number of CHD patients with BMI thin as many as 2 patients (1.3%), normal as many as 47 patients (30.9%), overweight as many as 34 patients (22.4%) and obesity I as many as 51 patients (33.6%) and obesity II as many as 17 patients (11.2%). The results showed there was a relationship between BMI and the degree of stenosis ($p = 0.029$ $r = 0.265$). In the location of lesions that have a relationship with BMI only RCA and LCX ($p=0.036$ and $p=0.049$) and LM and LAD have no relationship with BMI ($p=0.070$ and $p=0.416$). Conclusion: There was an association between BMI and the severity of coronary lesions based on the Sullivan stenosis score but the correlation was weak.

KATA PENGANTAR



Assalamu'alaikum Warahmatullahi Wabarakatuh

Puji syukur saya panjatkan kepada Tuhan Yang Maha Esa karena atas karunia dan rahmat-Nya, penulis mampu menyelesaikan penelitian ini yang berjudul "Hubungan BMI terhadap Derajat keparahan lesi koroner pada pasien angiografi koroner pada tahun 2022 di RSU UMM". Tugas akhir ini diajukan untuk memenuhi persyaratan Pendidikan Sarjana Fakultas Kedokteran Universitas Muhammadiyah Malang.

Penulis menyadari tugas akhir ini masih banyak kekurangan, oleh karena itu penulis mengharapkan adanya saran dan masukan yang membangun untuk penelitian ini. Semoga penelitian ini dapat memberikan informasi dan tambahan wawasan yang bermanfaat bagi semua pihak.

Wassalamu'alaikum Warahmatullahi Wabarakatuh

Malang, 19 Juni 2024

Penulis

DAFTAR ISI

SAMPUL DALAM.....	i
PRASYARAT GELAR.....	iv
LEMBAR PENGESAHAN.....	vii
LEMBAR ORISINALITAS	ix
LEMBAR PENGUJIAN.....	v
KATA PENGANTAR.....	vi
UCAPAN TERIMAKASIH.....	vii
ABSTRAK.....	viii
DAFTAR ISI.....	ix
DAFTAR TABEL	xii
DAFTAR GAMBAR.....	xiii
DAFTAR SINGKATAN.....	xiv
DAFTAR LAMPIRAN	xv
BAB 1 PENDAHULUAN	1
1.1 Latar Belakang	1
1.2 Rumusan Masalah	3
1.3 Tujuan Penelitian.....	3
1.3.1 Tujuan Umum.....	3
1.3.2 Tujuan Khusus	3
1.4 Manfaat	3
1.4.1 Manfaat Akademis	3
1.4.2 Manfaat Klinis	4
1.4.3 Manfaat Masyarakat	4
BAB 2 TINJAUAN PUSTAKA	5
2.1 Penyakit Jantung Koroner	5
2.1.1 Definisi Penyakit Jantung Koroner.....	5
2.1.2 Faktor Risiko Penyakit Jantung Koroner.....	5
2.1.3 Patofisiologi.....	14
2.1.4 Anatomi Arteri Koroner	19
2.1.4 Klasifikasi.....	19
2.1.5 Evaluasi Pasien	21
2.2 BMI(Body Massa Index)	27
2.3 Hubungan BMI dengan keparahan lesi koroner.....	28

2.4 Skor Untuk Menilai Keparahan Penyakit Jantung Koroner	29
BAB 3 KERANGKA KONSEPTUAL DAN HIPOTESIS PENELITIAN	32
3.1 Kerangka Konseptual.....	32
3.2 Hipotesis Penelitian.....	34
BAB 4 METODE PENELITIAN.....	34
4.1 Rancang Bangun Penelitian	34
4.2 Lokasi dan Waktu Penelitian.....	34
4.3 Populasi dan Sampel.....	34
4.3.1 Populasi	34
4.3.2 Sampel.....	35
4.3.3 Besar Sampel	35
4.3.4 Karakteristik Sampel Penelitian.....	35
4.3.5 Teknik Pengambilan Sampel	36
4.3.6 Variabel Penelitian	36
4.3.7 Definisi Operasional.....	36
4.4 Alat dan Bahan Penelitian.....	37
4.5 Prosedur Penelitian.....	37
4.6 Alur Penelitian.....	38
4.7 Analisis Data	39
4.7.1 Analisis Univariat	39
4.7.2 Analisis Bivariat.....	39
BAB 5 HASIL PENELITIAN	41
5.1 Distribusi BMI pada Pasien PJK di RSUMM	41
5.2 Hubungan BMI terhadap Derajat keparahan lesi koroner berdasarkan Stenosis Sulivan Score	41
Tabel 5.2 Uji signifikan BMI Terhadap Derajat Keparahan lesi koroner	41
5.3 Hubungan BMI terhadap Letak lesi	42
BAB 6 PEMBAHASAN	46
6.1.Hubungan BMI terhadap Derajat keparahan lesi koroner berdasarkan Sullivan stenosis skor pada pasien angiografi koroner.....	46
6.2 Hubungan BMI terhadap cabang arteri yang mengalami stenosis	48
6.2.1 Hubungan BMI dengan lesi di LMCA	48
6.2.2 Hubungan BMI dengan lesi di LAD	49
6.2.3 Hubungan BMI dengan lesi di LCX	50
6.2.4 Hubungan BMI dengan lesi di RCA	51

BAB 7 KESIMPULAN DAN SARAN.....	53
7.1 Kesimpulan	53
7.2 Saran	53
DAFTAR PUSTAKA.....	54
Lampiran	62



DAFTAR TABEL

Nomor	Judul Tabel	Halama n
Tabel 2.2	BMI WHO Asia	28
Tabel 4.1	Definisi Operasional	37
Tabel 5.1	Distribusi BMI dengan Pasien PJIK di RSUMM	41
Tabel 5.2	Uji signifikansi BMI terhadap Derajat Keparahan lesi koroner	42
Tabel 5.3	Hubungan BMI terhadap LM	43
Tabel 5.4	Hubungan BMI terhadap LAD	44
Tabel 5.5	Hubungan BMI terhadap LCX	45
Tabel 5.6	Hubungan BMI terhadap RCA	46

DAFTAR GAMBAR

No Gambar	Judul Gambar	Halaman
Gambar 2.1	Role Nitrit oksida	17
Gambar 5.1	Grafik korelasi positif	43
Gambar 6.1	LMCA	48
Gambar 6.2	LAD	49
Gambar 6.3	LCX	50
Gambar 6.4	RCA	51



DAFTAR SINGKATAN

SMC : Smooth Muscle Cell

PJK : Penyakit Jantung Koroner

AHA : American Heart Asosiation

WHO :World Health Organisation

BMI :Body Massa Indeks

LMCA:Left Main Coronary Artery

LAD : Left Anterior Descending

LCX :Left Circumflex

RCA : Right Coronary Artery

eNOS: endotel nitrit oksida sintase

NO :Nitrit oksida

TNF- α : Tumor Nekrosis Faktor alfa

IL -6 : Interleukin 6

IL-1 : Interleukin 1

Daftar Lampiran

Nomor	Judul Lampiran	Halaman
1	DATA mentah	61
2	Hasil SPSS	67
3	Etik	73
4	Ijin Penelitian	74
5	Kartu Konsultasi	75

DAFTAR PUSTAKA

- Al Rahmad, Agus. (2021). KORELASI IMT DENGAN PENINGKATAN PROFIL LIPID DARAH PADA PASIEN JANTUNG KORONER. *Jurnal Vokasi Kesehatan*. 6. 94. 10.30602/jvk.v6i2.563.
- Amin R, Bari MA, Parvin T, Aditya G, Rahman MS, Thakur AK, Kamal AM, Ahmed SM. Association of Body Mass Index with Angiographic Severity of Coronary Artery disease in patients with Acute Coronary Syndrome. *Mymensingh Med J*. 2022 Apr;31(2):326-332. PMID: 35383745.
- Askin L, Uzel KE, Tanrıverdi O, Kavalcı V, Yavcin O, Turkmen S. The relationship between coronary artery disease and depression and anxiety scores. *North Clin Istanb*. 2020 Aug 5;7(5):523-526. doi: 10.14744/nci.2020.72602. PMID: 33163893; PMCID: PMC7603855.
- Azhari Z, Ismail MD, Zuhdi ASM, et al. Association between body mass index and outcomes after percutaneous coronary intervention in multiethnic South East Asian population: a retrospective analysis of the Malaysian National Cardiovascular Disease Database—Percutaneous Coronary Intervention (NCVDPCI) registry. *BMJ Open* 2017;0:e017794. doi:10.1136/bmjopen-2017-017794
- Braunwald's. et al ,2022 , Braunwald's heart disease: A textbook of cardiovascular medicine. *Perfusion*. 2022;37(7):758-758. doi:10.1177/02676591221117347
- Choi S , Kim K , Kim SM, dkk. Hubungan Obesitas atau Perubahan Berat Badan dengan Penyakit Jantung Koroner pada Dewasa Muda di Korea Selatan. *Med Magang JAMA*. 2018;178(8):1060–1068. doi:10.1001/jaminternmed.2018.2310
- Dewi, Luthfia Puspita (2021) *HUBUNGAN BODY MASS INDEX DENGAN DERAJAT STENOSIS BERDASARKAN SKOR GENSIKI (Studi Observasional pada Pasien Penyakit Jantung Koroner di RSI Sultan Agung Semarang)*. Undergraduate thesis, Universitas Islam Sultan Agung.
- Izzi AF,2021 , HUBUNGAN BODY MASS INDEX DENGAN DERAJAT STENOSIS BERDASARKAN SIGNIFIKAN DAN NON SIGNIFIKAN Studi Observasional Pada Pasien Penyakit Jantung Koroner di Rumah Sakit Islam Sultan Agung Semarang, <http://repository.unissula.ac.id/21467/>
- Friesinger GC, Page EE, Ross RS. Prognostic significance of coronary arteriography. *Trans Assoc Am Physicians*. 1970;83:78-92. PMID: 5505398.
- Geng T, Smith CE, Li C, Huang T. Childhood BMI and Adult Type 2 Diabetes, Coronary Artery Diseases, Chronic Kidney Disease, and Cardiometabolic Traits: A Mendelian Randomization Analysis. *Diabetes Care*. 2018 May;41(5):1089-1096. doi: 10.2337/dc17-2141. Epub 2018 Feb 26. PMID: 29483184.

Harrington DH, Stueben F, Lenahan CM. ST-Elevation Myocardial Infarction and Non-ST-Elevation Myocardial Infarction: Medical and Surgical Interventions. Crit Care Nurs Clin North Am. 2019 Mar;31(1):49-64. doi: 10.1016/j.cnc.2018.10.002. Epub 2018 Dec 21. PMID: 30736935.

https://www.who.int/health-topics/obesity#tab=tab_1

<https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>

J. B. Ashraf Ali M.D , R. Mohan M.D , T. Dinesh M.D Association between Coronary Artery Disease and Body Mass Index" (2024) *Indian Journal of Public Health Research & Development*, 15(1), pp. 392–397. [doi:10.37506/thgxrpx49](https://doi.org/10.37506/thgxrpx49).

Jebari-Benslaiman S, Galicia-García U, Larrea-Sebal A, Olaetxea JR, Alloza I, Vandenbroeck K, Benito-Vicente A, Martín C. Pathophysiology of Atherosclerosis. Int J Mol Sci. 2022 Mar 20;23(6):3346. doi: 10.3390/ijms23063346. PMID: 35328769; PMCID: PMC8954705.

Kim DW, Her SH, Park HW, Park MW, Chang K, Chung WS, Seung KB, Ahn TH, Jeong MH, Rha SW, Kim HS, Gwon HC, Seong IW, Hwang KK, Chae SC, Kim KB, Kim YJ, Cha KS, Oh SK, Chae JK; KAMIR-NIH registry investigators. Association between body mass index and 1-year outcome after acute myocardial infarction. PLoS One. 2019 Jun 14;14(6):e0217525. doi: 10.1371/journal.pone.0217525. PMID: 31199840; PMCID: PMC6570024.

Laukkanen JA, Kunutsor SK, Hernesniemi J, et al. Underweight and obesity are related to higher mortality in patients undergoing coronary angiography: the KARDIO invasive cardiology register study. Catheter Cardiovasc Interv. 2022; 100: 1242-1251. [doi:10.1002/ccd.30463](https://doi.org/10.1002/ccd.30463)

Lily ,L S , 2016 , Pathophysiology of Heart Disease: A Collaborative Project of Medical Students and Faculty , ed 6 , Wolters Kluwer

Llewellyn A, Simmonds M, Owen CG, Woolacott N. Childhood obesity as a predictor of morbidity in adulthood: a systematic review and meta-analysis. Obes Rev. 2016 Jan;17(1):56-67. doi: 10.1111/obr.12316. Epub 2015 Oct 6. PMID: 26440472.

Manoharan MP, Raja R, Jamil A, Csendes D, Gutlapalli SD, Prakash K, Swarnakari KM, Bai M, Desai DM, Desai A, Penumetcha SS. Obesity and Coronary Artery Disease: An Updated Systematic Review 2022. Cureus. 2022 Sep 23;14(9):e29480. doi: 10.7759/cureus.29480. PMID: 36299943; PMCID: PMC9588166.

Nabati M, Moosazadeh M, Soroosh E, Shiraj H, Gholami M, Ghaemian A. Correlation between overweightness and the extent of coronary atherosclerosis among the South Caspian population. BMC Cardiovasc Disord. 2020 May 29;20(1):257. doi: 10.1186/s12872-020-01534-w. PMID: 32471420; PMCID: PMC7257130.

Naomi, W., Picauly, I., & Toy, S. (2021). Faktor Risiko Kejadian Penyakit Jantung Koroner. *Media Kesehatan Masyarakat*, 3(1), 99-107. <https://doi.org/10.35508/mkm.v3i1.3622>

Nelson AJ, Ardissono M, Psaltis PJ. Pendekatan terkini terhadap diagnosis penyakit arteri koroner aterosklerotik: lebih banyak pertanyaan daripada jawaban. Kemajuan Terapi dalam Penyakit Kronis . 2019;10. doi: 10.1177/2040622319884819

Powell-Wiley TM, Poirier P, Burke LE, Després JP, Gordon-Larsen P, Lavie CJ, Lear SA, Ndumele CE, Neeland IJ, Sanders P, St-Onge MP; American Heart Association Council on Lifestyle and Cardiometabolic Health; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; Council on Epidemiology and Prevention; and Stroke Council. Obesity and Cardiovascular Disease: A Scientific Statement From the American Heart Association. *Circulation*. 2021 May 25;143(21):e984-e1010. doi: 10.1161/CIR.0000000000000973. Epub 2021 Apr 22. PMID: 33882682; PMCID: PMC8493650.

Rahmani, A., Toloueitabar, Y., Mohsenzadeh, Y. dkk. Hubungan rasio leptin/adiponektin plasma dengan luas dan tingkat keparahan penyakit arteri koroner. *Gangguan Kardiovaskular BMC* 20 , 474 (2020). <https://doi.org/10.1186/s12872-020-01723-7>

Rajeev Gupta, Krishna Kumar Sharma, Raghbir Singh Khedar, Sanjeev Kumar Sharma, Jitender Singh Makkar, Ajeet Bana, Vishnu Natani, Shilpa Bharati, Sumit Kumar, Vishal Hadiya, Sailesh Lodha, Samin Kumar Sharma, Low body mass index is associated with adverse cardiovascular outcomes following PCI in India: ACC-NCDR registry, International Journal of Cardiology Cardiovascular Risk and Prevention, Volume 20, 2024, 200230, ISSN 27724875, <https://doi.org/10.1016/j.ijcrp.2023.200230>. (<https://www.sciencedirect.com/science/article/pii/S2772487523000636>)

Rodgers JL, Jones J, Bolleddu SI, Vanthenapalli S, Rodgers LE, Shah K, Karia K, Panguluri SK. Cardiovascular Risks Associated with Gender and Aging. *J Cardiovasc Dev Dis*. 2019 Apr 27;6(2):19. doi: 10.3390/jcdd6020019. PMID: 31035613; PMCID: PMC6616540.

Salehi N, Janjani P, Tadbiri H, Rozbahani M, Jalilian M. Effect of cigarette smoking on coronary arteries and pattern and severity of coronary artery disease: a review. *J Int Med Res*. 2021 Dec;49(12):3000605211059893. doi: 10.1177/03000605211059893. PMID: 34855538; PMCID: PMC8647272.

Shahjehan RD, Bhutta BS. Coronary Artery Disease. [Updated 2023 Aug 17]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK564304>

Simindokht Moshar, Mahsa Rezasoltani, Mohammad Javad Namazi. Angiographic examination in patients with Myocardial Infarction with and without ST segment elevation. *J Adv Pharm Edu Res* 2020; 10(S2):83-91.

Sinjini Biswas and Nick Andrianopoulos and Diem Dinh and Stephen J. Duffy and Jeffrey Lefkovits and Angela Brennan and Samer Noaman and Andrew Ajani and David J. Clark and Melanie Freeman and Ernesto Oqueli and Chin Hiew and Christopher M. Reid and Dion Stub and William Chan, 2019, Association of Body Mass Index and Extreme Obesity With Long-Term Outcomes Following Percutaneous Coronary Intervention, Journal of the American Heart Association, vol 8,no 21 doi10.1161/JAHA.119.012860.

<https://www.ahajournals.org/doi/abs/10.1161/JAHA.119.012860>

Sotoudehnia Korani S, Behrooj S, Farshidi H, Khorrami F, Rezazadeh Roudkoli A. Determining the factors associated with the pattern and severity of coronary artery involvement in patients with acute coronary syndrome. J Prev Epidemiol. 2022;7(1):exx. doi: 10.34172/jpe.2022.

The association between body mass index, hypertension, and lifestyle on cardiovascular disease in Indonesian elderly. Udayana In. Med. [Internet]. 2022 Dec. 30 [cited 2024 May 15];6(2):45-9. Available from: <https://www.jpdunud.org/index.php/JPD/article/view/180>

**Thorsten Kessler MD dan
Heribert Schunkert MD,2021 ,
Coronary Artery Disease Genetics
Enlightened by Genome-Wide
Association Studies, JACC: Basic to
Translational Science,**

Tiffany, et al , 2021 , Obesity and Cardiovascular Disease: A Scientific Statement From the American Heart Association, <https://doi.org/10.1161/CIR.0000000000000973> Volume 6, Issue 7,

Wang M, Wei X, Zhao M. Association of body mass index with clinical outcomes in patients with acute coronary syndrome: A systematic review and meta-analysis. Turk Gogus Kalp Damar Cerrahisi Derg. 2024 Jan 10;32(1):1-8. doi: 10.5606/tgkdc.dergisi.2024.24405. PMID: 38545361; PMCID: PMC10964294.

Winzer EB, Woitek F, Linke A. Physical Activity in the Prevention and Treatment of Coronary Artery Disease. J Am Heart Assoc. 2018 Feb 8;7(4):e007725. doi: 10.1161/JAHA.117.007725. PMID: 29437600; PMCID: PMC5850195.

World Obesity Atlas 2023 , <https://www.worldobesity.org/resources/resource-library/world-obesity-atlas> 2023

Ya'. Qu, Ji'. Yang, F. Zhang, C. Li, Y. Dai, H. Yang, Y. Gao, Y. Pan, K. Yao, D. Huang, H. Lu, J. Ma, J. Qian, J. Ge, Relationship between body mass index and outcomes of coronary artery disease in Asian population: Insight from the FOCUS registry, International Journal of Cardiology (2019), doi: <https://doi.org/10.1016/j.ijcard.2019.10.025>.

Lind L, Markstad H, Ahlström H, Angerås O, Brandberg J, Brunström M, Engström G, Engvall

JE, Eriksson MJ, Eriksson M, Gottsäter A, Hagström E, Krachler B, Lampa E, Mannila M, Nilsson PM, Nyström FH, Persson A, Redfors B, Sandström A, Themudo R, Völz S, Ärnlöv J, Östgren CJ, Bergström G. Obesity is associated with coronary artery stenosis independently of metabolic risk factors: The population-based SCAPIS study. *Atherosclerosis*. 2022 Dec;362:1-10. doi: 10.1016/j.atherosclerosis.2022.10.007. Epub 2022 Oct 31. PMID: 36356325.

Lowenstein A, Ng N, Takagi H, Rymer JA, Kowek LM, Douglas PS, Duran JM, Rabbat M, Pontone G, Fairbairn T, Chinnaiyan K, Berman DS, De Bruyne B, Bax JJ, Akasaka T, Amano T, Nieman K, Rogers C, Kitabata H, Sand NPR, Kawasaki T, Mullen S, Matsuo H, Norgaard BL, Patel MR, Leipsic J, Daubert MA. Influence of Obesity on Coronary Artery Disease and Clinical Outcomes in the ADVANCE Registry. *Circ Cardiovasc Imaging*. 2023 May;16(5):e014850. doi: 10.1161/CIRCIMAGING.122.014850. Epub 2023 May 16. PMID: 37192296.

Gillen C, Goyal A. Stable Angina. [Updated 2022 Dec 19]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559016/>

Robert A Byrne, Xavier Rossello, JJ Coughlan, Emanuele Barbato, Colin Berry, Alaide Chieffo, Marc J Claeys, Gheorghe-Andrei Dan, Marc R Dweck, Mary Galbraith, Martine Gilard, Lynne Hinterbuchner, Ewa A Jankowska, Peter Jüni, Takeshi Kimura, Vijay Kunadian, Margret Leosdottir, Roberto Lorusso, Roberto FE Pedretti, Angelos G Rigopoulos, Maria Rubini Gimenez, Holger Thiele, Pascal Vranckx, Sven Wassmann, Nanette Kass Wenger, Borja Ibanez, Grup Dokumen Ilmiah ESC, Pedoman ESC 2023 untuk pengelolaan sindrom koroner akut: Dikembangkan oleh gugus tugas pengelolaan sindrom koroner akut dari European Society of Cardiology (ESC), *European Heart Journal*, Volume 44, Edisi 38, 7 Oktober 2023, Halaman 3720–3826, <https://doi.org/10.1093/eurheartj/ehad191>

Weir CB, Jan A. Persentil Klasifikasi BMI dan Titik Potong. [Diperbarui 26 Juni 2023]. Di: StatPearls [Internet]. Pulau Harta Karun (FL): Penerbitan StatPearls; 2024 Januari-. Tersedia dari: <https://www.ncbi.nlm.nih.gov/books/NBK541070/>

Jang JJ, Bhapkar M, Coles A, Vemulapalli S, Fordyce CB, Lee KL, Udelson JE, Hoffmann U, Tardif JC, Jones WS, Mark DB, Sorrell VL, Espinoza A, Douglas PS, Patel MR; PROMISE Investigators. Predictive Model for High-Risk Coronary Artery Disease. *Circ Cardiovasc Imaging*. 2019 Feb;12(2):e007940. doi: 10.1161/CIRCIMAGING.118.007940. PMID: 30712364; PMCID: PMC6368397.

Brown JC, Gerhardt TE, Kwon E. Faktor Risiko Penyakit Arteri Koroner. [Diperbarui 23 Januari 2023]. Di: StatPearls [Internet]. Pulau Harta Karun (FL): Penerbitan StatPearls; 2024

Januari-. Tersedia dari: <https://www.ncbi.nlm.nih.gov/books/NBK554410/>

Ramadhan MH & Husnah , 2022 , Faktor risiko penyakit jantung koroner, Jurnal Kedokteran Syiah Kuala, ISSN: 1412-1026, E-ISSN: 25500112

Sullivan DR, Marwick TH, Freedman SB. A new method of scoring coronary angiograms to reflect extent of coronary atherosclerosis and improve correlation with major risk factors. Am Heart J. 1990 Jun;119(6):1262-7. doi: 10.1016/s0002-8703(05)80173-5. PMID: 1972310.

Lowenstein A, Ng N, Takagi H, Rymer JA, Kowek LM, Douglas PS, Duran JM, Rabbat M, Pontone G, Fairbairn T, Chinnaiyan K, Berman DS, De Bruyne B, Bax JJ, Akasaka T, Amano T, Nieman K, Rogers C, Kitabata H, Sand NPR, Kawasaki T, Mullen S, Matsuo H, Norgaard BL, Patel MR, Leipsic J, Daubert MA. Influence of Obesity on Coronary Artery Disease and Clinical Outcomes in the ADVANCE Registry. Circ Cardiovasc Imaging. 2023 May;16(5):e014850. doi: 10.1161/CIRCIMAGING.122.014850. Epub 2023 May 16. PMID: 37192296.

Abduh S & Rizaldy R , 2023, Analysis of cardiovascular risk factors as predictors for coronary artery disease stenosis severity,Jurnal Kedokteran Syiah Kuala , Vol 23 No 2

Ainunnisa R , 2020 HUBUNGAN ANTARA OBESITAS DENGAN KEPARAHAN LESI ARTERI KORONER PADA PASIEN YANG MENJALANI ANGIOGRAFI KORONER ELEKTIF , Universitas Gajah Mada

Mustafa A. Hegazy, Kamal S. Mansour, Ahmed M. Alzyat, Mohammad A. Mohammad, Abdelmonem A. Hegazy,2022, A systematic review on normal and abnormal anatomy of coronary arteries, European Journal of Anatomy 26(3):355-368, DOI:[10.52083/FDTA2953](https://doi.org/10.52083/FDTA2953)

Raisi-Estabragh Z, Kobo O, Mieres JH, Bullock-Palmer RP, Van Spall HGC, Breathett K, Mamas MA. Racial Disparities in Obesity-Related Cardiovascular Mortality in the United States: Temporal Trends From 1999 to 2020. J Am Heart Assoc. 2023 Sep 19;12(18):e028409. doi: 10.1161/JAHA.122.028409. Epub 2023 Sep 6. PMID: 37671611; PMCID: PMC10547286.



UNIVERSITAS MUHAMMADIYAH MALANG

FAKULTAS KEDOKTERAN

Kampus II : Jl. Bendungan Sutami 188 A Tlp. 0341-552443 Hunting 0341-551149
Fax. 0341-582060 E-mail : webmaster@unix.umm.ac.id Website : www.umm.ac.id

HASIL DETEKSI PLAGIASI

Berikut ini adalah hasil deteksi plagiasi karya ilmiah (naskah proposal / naskah hasil penelitian / naskah publikasi)*

Nama : Jorden P. F
Nim : 202010330211105
Judul : Hubungan BMI terhadap Prevalensi keparahan lesi koroner pada pasien angiografi koroner tahun 2022 di RSU UMM

NO	Bagian	Maksimum Kesamaan	Hasil Deteksi		
			Tgl	Tgl	Tgl
1	Bab 1 (Pendahuluan)	10	5		
2	Bab 2 (Tinjauan Pustaka)	25	0		
3	Bab 3 dan 4 (Kerangka Konsep & Metodologi)	35	22		
4	Bab 5 dan 6 (Hasil dan Pembahasan)	15	0 *13		
5	Bab 7 (Kesimpulan dan Saran)	5	0		
6	Naskah Publikasi	25	0		

Kesimpulan Deteksi Plagiasi : LOLOS / TIDAK LOLOS PLAGIASI

Mengetahui
Pembibing I

dr. Indra Wangsa Sahputra, Sp.JP (k) Fikha



Malang, 25 Juni 2024
Tim Deteksi Plagiasi FKUMM,

Joko Febriantoro