

BAB 7

SIMPULAN DAN SARAN

7.1 Simpulan

Terdapat perbedaan derajat keparahan osteoarthritis sendi lutut antara pasien hipertensi dan normotensi di Rumah Sakit PHC Surabaya. Derajat keparahan osteoarthritis yang diderita oleh pasien OA sendi lutut dengan hipertensi lebih parah dibandingkan dengan pasien normotensi.

7.2 Saran

Saran untuk penelitian serupa selanjutnya adalah:

1. Penelitian dilakukan dengan menambahkan kriteria inklusi, yaitu obat antihipertensi yang digunakan oleh pasien.
2. Penelitian dilakukan dengan memperluas area penelitian agar diperoleh sampel yang lebih bervariasi sehingga dapat memberikan hasil yang lebih reliabel.

3. Penelitian selanjutnya dapat membandingkan antara jenis obat antihipertensi yang dikonsumsi oleh pasien hipertensi dengan derajat keparahan osteoarthritis sendi lutut yang diderita.

DAFTAR PUSTAKA

1. Ching K, Houard X, Berenbaum F, Wen C. Hypertension meets osteoarthritis — revisiting the vascular aetiology hypothesis. *Nat Rev Rheumatol* [Internet]. 2021 Sep 27;17(9):533–49. Available from: <http://dx.doi.org/10.1038/s41584-021-00650-x>
2. Etc MCS, Das C, Lucia MS HK and TJ. 乳鼠心肌提取 HHS Public Access. *Physiol Behav.* 2019;176(3):139–48.
3. Long H, Liu Q, Yin H, Wang K, Diao N, Zhang Y, et al. Prevalence Trends of Site-Specific Osteoarthritis From 1990 to 2019: Findings From the Global Burden of Disease Study 2019. *Arthritis Rheumatol* [Internet]. 2022;74(7):1172–83. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9543105/>
4. Bortoluzzi A, Furini F, Scirè CA. Osteoarthritis and its management - Epidemiology, nutritional aspects and environmental factors. *Autoimmun Rev* [Internet]. 2018;17(11):1097–104. Available from: <https://doi.org/10.1016/j.autrev.2018.06.002>
5. Kemenkes RI. Laporan Riskesdas 2018 Kementrian Kesehatan Republik Indonesia [Internet]. Vol. 53, Laporan Nasional Riskesdas 2018. 2018. p. 154–65. Available from: <http://www.yankes.kemkes.go.id/assets/downloads/PMK.No.57.Tahun.2013.tentang.PTRM.pdf>
6. Palazzo C, Nguyen C, Lefevre-Colau MM, Rannou F, Poiraudau S. Risk factors and burden of osteoarthritis. *Ann Phys Rehabil Med.* 2016;59(3):134–8.

7. Tan Q, Jiang A, Li W, Song C, Leng H. Metabolic syndrome and osteoarthritis: Possible mechanisms and management strategies. *Med Nov Technol Devices* [Internet]. 2021;9(October 2020):100052. Available from: <https://doi.org/10.1016/j.medntd.2020.100052>
8. Berenbaum F, Wallace IJ, Lieberman DE, Felson DT. Modern-day environmental factors in the pathogenesis of osteoarthritis. *Nat Rev Rheumatol* [Internet]. 2018;14(11):674–81. Available from: <http://dx.doi.org/10.1038/s41584-018-0073-x>
9. Zhou B, Carrillo-Larco RM, Danaei G, Riley LM, Paciorek CJ, Stevens GA, et al. Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants. *Lancet*. 2021;398(10304):957–80.
10. Shi X, Schlenk EA. Association of Hypertension with Knee Pain Severity Among People with Knee Osteoarthritis. *Pain Manag Nurs* [Internet]. 2022;23(2):135–41. Available from: <https://doi.org/10.1016/j.pmn.2021.08.002>
11. Yasuda E, Nakamura R, Matsugi R, Goto S, Ikenaga Y, Kuroda K, et al. Association between the severity of symptomatic knee osteoarthritis and cumulative metabolic factors. *Aging Clin Exp Res*. 2018;30(5):481–8.
12. Funck-Brentano T, Nethander M, Movérare-Skrtic S, Richette P, Ohlsson C. Causal Factors for Knee, Hip, and Hand Osteoarthritis: A Mendelian Randomization Study in the UK Biobank. *Arthritis Rheumatol*. 2019;71(10):1634–41.
13. Xie Y, Zhou W, Zhong Z, Zhao Z, Yu H, Huang Y,

- et al. Metabolic syndrome, hypertension, and hyperglycemia were positively associated with knee osteoarthritis, while dyslipidemia showed no association with knee osteoarthritis. *Clin Rheumatol*. 2021;40(2):711–24.
14. Malanga G, Niazi F, Kidd VD, Lau E, Kurtz SM, Ong KL, et al. Knee Osteoarthritis Treatment Costs in the Medicare Patient Population. *Am Heal Drug Benefits*. 2020;13(4):144–53.
 15. Basrowi RW, Rahayu EM, Khoe LC, Wasito E, Sundjaya T. The Road to Healthy Ageing: What Has Indonesia Achieved So Far? *Nutrients* [Internet]. 2021 Sep 28;13(10):3441. Available from: <https://www.mdpi.com/2072-6643/13/10/3441>
 16. Harrison R. *Harrison'S Principles of Internal Medicine*. 2022;15164.
 17. Abramoff B, Caldera FE. Osteoarthritis: Pathology, Diagnosis, and Treatment Options. *Med Clin North Am*. 2020;104(2):293–311.
 18. Siddik M, Haryadi RD. The risk factors effect of knee osteoarthritis towards postural lateral sway. *Indian J Forensic Med Toxicol*. 2020;14(2):1787–92.
 19. Barbour KE, Helmick CG, Boring M, Brady TJ. Vital Signs: Prevalence of Doctor-Diagnosed Arthritis and Arthritis-Attributable Activity Limitation — United States, 2013–2015. *MMWR Morb Mortal Wkly Rep*. 2017;66(9):246–53.
 20. Zhang YM, Wang J, Liu XG. Association between hypertension and risk of knee osteoarthritis. *Med (United States)*. 2017;96(32):1–7.
 21. Whittaker JL, Losciale JM, Juhl CB, Thorlund JB, Lundberg M, Truong LK, et al. Risk factors for

- knee osteoarthritis after traumatic knee injury: A systematic review and meta-analysis of randomised controlled trials and cohort studies for the OPTIKNEE Consensus. *Br J Sports Med*. 2022;56(24):1406–21.
22. Migliorini F, Maffulli N, Pintore A, Ernst J, Eschweiler J, Hildebrand F, et al. Osteoarthritis Risks and Sports: An Evidence-based Systematic Review. *Sports Med Arthrosc* [Internet]. 2022 Sep;30(3):118–40. Available from: <https://journals.lww.com/10.1097/JSA.00000000000000351>
 23. Migliorini F, Vecchio G, Pintore A, Oliva F, Maffulli N. The Influence of Athletes' Age in the Onset of Osteoarthritis: A Systematic Review. *Sports Med Arthrosc* [Internet]. 2022 Jun;30(2):97–101. Available from: <https://journals.lww.com/10.1097/JSA.00000000000000345>
 24. Seok H, Choi SJ, Yoon JH, Song GG, Won JU, Kim JH, et al. The association between osteoarthritis and occupational clusters in the Korean population: A nationwide study. *PLoS One*. 2017;12(1):1–10.
 25. Øiestad BE, Juhl CB, Culvenor AG, Berg B, Thorlund JB. Knee extensor muscle weakness is a risk factor for the development of knee osteoarthritis: an updated systematic review and meta-analysis including 46 819 men and women. *Br J Sports Med* [Internet]. 2022 Mar;56(6):349–55. Available from: <https://bjsm.bmj.com/lookup/doi/10.1136/bjsports-2021-104861>
 26. Bleß HH, Kip M. White paper on joint replacement: Status of hip and knee arthroplasty care in

- Germany. White Pap Jt Replace Status Hip Knee Arthroplast Care Ger. 2017;1–135.
27. Knipe H, Pai V. Kellgren and Lawrence system for classification of osteoarthritis. In: Radiopaedia.org [Internet]. Radiopaedia.org; 2014. Available from: <http://radiopaedia.org/articles/27111>
 28. Krishnan Y, Grodzinsky AJ. Cartilage diseases. *Matrix Biol.* 2018;71–72:51–69.
 29. Donahue SW. Krogh's principle for musculoskeletal physiology and pathology. *J Musculoskelet Neuronal Interact.* 2018;18(3):284–91.
 30. Ahmed SM, Mstafa RJ. Identifying Severity Grading of Knee Osteoarthritis from X-ray Images Using an Efficient Mixture of Deep Learning and Machine Learning Models. *Diagnostics.* 2022;12(12).
 31. Antony J, McGuinness K, Moran K, O'Connor NE. Automatic Detection of Knee Joints and Quantification of Knee Osteoarthritis Severity Using Convolutional Neural Networks. In 2018. p. 376–90. Available from: http://link.springer.com/10.1007/978-3-319-62416-7_27
 32. Stewart HL, Kawcak CE. The importance of subchondral bone in the pathophysiology of osteoarthritis. *Front Vet Sci.* 2018;5(AUG):1–9.
 33. R. Altman, E. Asch, G. Bole, D. Bloch, D. Borenstein, K. Brandt, et al. Idiopathic OA of the Knee Clinical and laboratory Clinical and radiographic Clinical †. *Arthritis Rheum.* 1986;29:1039–49.
 34. PDHI. Perhimpunan Dokter Hipertensi indonesia. I-HefcardCom [Internet]. 2021;118. Available

from:

http://www.inash.or.id/upload/event/event_Update_konsensus_2019123191.pdf

35. Zipes DP, Libby P, Bonow RO, Mann DL, Tomaselli GF, Braunwald A. Braunwald's Heart Disease 11th Ed. 2019;
36. Kumar V, Abbas AK, Aster JC, Perkins JA. Robbins and Cotran Pathologic Basis of Disease 9th Edition. 2015. 88–111 p.
37. Brouwers S, Sudano I, Kokubo Y, Sulaica EM. Arterial hypertension. *Lancet*. 2021;398(10296):249–61.
38. Li S, Felson DT. What Is the Evidence to Support the Association Between Metabolic Syndrome and Osteoarthritis? A Systematic Review. *Arthritis Care Res (Hoboken)* [Internet]. 2019 Jul 23;71(7):875–84. Available from: <https://onlinelibrary.wiley.com/doi/10.1002/acr.23698>
39. Beverly M, Murray D. Factors affecting intraosseous pressure measurement. *J Orthop Surg Res*. 2018;13(1):4–10.
40. Liu Z, Au M, Wang X, Chan P-MB, Lai P, Sun L, et al. Photoacoustic imaging of synovial tissue hypoxia in experimental post-traumatic osteoarthritis. *Prog Biophys Mol Biol* [Internet]. 2019 Nov;148:12–20. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0079610717302377>
41. Mun SH, Park PSU, Park-Min KH. The M-CSF receptor in osteoclasts and beyond. *Exp Mol Med*. 2020;52(8):1239–54.
42. Zhu S, Zhu J, Zhen G, Hu Y, An S, Li Y, et al. Subchondral bone osteoclasts induce sensory

- innervation and osteoarthritis pain. *J Clin Invest* [Internet]. 2019 Feb 4;129(3):1076–93. Available from: <https://www.jci.org/articles/view/121561>
43. Su W, Liu G, Liu X, Zhou Y, Sun Q, Zhen G, et al. Angiogenesis stimulated by elevated PDGF-BB in subchondral bone contributes to osteoarthritis development. *JCI Insight* [Internet]. 2020 Apr 23;5(8). Available from: <https://insight.jci.org/articles/view/135446>
 44. Lo K, Au M, Ni J, Wen C. Association between hypertension and osteoarthritis: A systematic review and meta-analysis of observational studies. *J Orthop Transl* [Internet]. 2022;32(March 2021):12–20. Available from: <https://doi.org/10.1016/j.jot.2021.05.003>
 45. Yeater TD, Griffith JL, Cruz CJ, Patterson FM, Aldrich JL, Allen KD. Hypertension contributes to exacerbated osteoarthritis pathophysiology in rats in a sex-dependent manner. *Arthritis Res Ther* [Internet]. 2023 Jan 12;25(1):7. Available from: <https://asbmr.onlinelibrary.wiley.com/doi/10.1002/jbmr.3388>
 46. Cameron AC, Lang NN, Touyz RM. Drug Treatment of Hypertension: Focus on Vascular Health. *Drugs*. 2016;76(16):1529–50.