

BAB 7

SIMPULAN DAN SARAN

7.1 Simpulan

Berdasarkan hasil penelitian yang telah dilakukan didapatkan kesimpulan yaitu:

Terdapat hubungan dengan kekuatan korelasi yang lemah antara IMT dengan derajat keparahan OSA pada pasien mendengkur yang melakukan pemeriksaan polisomnografi di RS PHC Surabaya.

7.2 Saran

- a. Melakukan kegiatan edukasi kepada masyarakat agar dapat mengenali faktor risiko OSA, gejala OSA, tanda OSA dan terhindar dari dampak yang ditimbulkan akibat OSA. Kegiatan penyuluhan yang dilakukan juga dapat membantu melakukan deteksi dini dan dapat dilakukan penanganan segera.
- b. Bagi penelitian selanjutnya diupayakan agar dapat mempertimbangkan faktor-faktor OSA lainnya seperti kelainan hidung, tenggorok, faring, laring dan kraniofasial pada penelitian lebih lanjut.

DAFTAR PUSTAKA

1. Dhingra P, Dhingra S. Disease of ear, nose, and throat & head and neck surgery. 7th ed. New Delhi: Elsevier; 2018. 313–314 p.
2. Kapur VK, Auckley DH, Chowdhuri S, Kuhlmann DC, Mehra R, Ramar K, et al. Clinical practice guideline for diagnostic testing for adult obstructive sleep apnea: an american academy of sleep medicine clinical practice guideline. *Journal of Clinical Sleep Medicine* [Internet]. 2017 Mar 15 [cited 2022 Feb 25];13(03):479–504. Available from: <https://pubmed.ncbi.nlm.nih.gov/28162150/>
3. Dong Z, Xu X, Wang C, Cartledge S, Maddison R, Shariful Islam SM. Association of overweight and obesity with obstructive sleep apnoea: A systematic review and meta-analysis. *Obes Med* [Internet]. 2020 Mar [cited 2022 Feb 25];17:100185. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S2451847620300051>
4. Rundo JV. Obstructive Sleep Apnea Basics. *Cleve Clin J Med* [Internet]. 2019 Sep [cited 2022 Mar 7];86(9 suppl 1):2–9. Available from: <https://europepmc.org/article/med/31509498>
5. Benjafield A v, Ayas NT, Eastwood PR, Heinzer R, Ip MSM, Morrell MJ, et al. Estimation of the global prevalence and burden of obstructive sleep apnoea: a literature-based analysis. *Lancet Respir Med* [Internet]. 2019 Aug [cited 2022 Mar 29];7(8):687–98. Available from: <https://pubmed.ncbi.nlm.nih.gov/31300334/>
6. Al-Qattan H, Al-Omairah H, Al-Hashash K, Al-Mutairi F, Al-Mutairat M, Al-Ajmi M, et al. Prevalence, risk factors, and comorbidities of obstructive sleep apnea risk among a working population in Kuwait: A Cross-Sectional Study. *Front Neurol* [Internet]. 2021 Apr 6 [cited 2022 Mar 9];12:620799. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8056027/>
7. Fietze I, Laharnar N, Obst A, Ewert R, Felix SB, Garcia C, et al. Prevalence and association analysis of obstructive sleep apnea with gender and age differences - Results of SHIP-Trend. *J Sleep Res* [Internet]. 2019 Oct [cited 2022 Feb 25];28(5):e12770. Available from: <https://pubmed.ncbi.nlm.nih.gov/30272383/>
8. Choudhury A, Routray D, Swain S, Das AK. Prevalence and risk factors of people at-risk of obstructive sleep apnea in a rural community of Odisha, India: a community based cross-sectional study. *Sleep Med* [Internet]. 2019 Jun [cited 2022 Sep 26];58:42–7. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S138994571830501X>
9. Zhou X, Lu Q, Li S, Pu Z, Gao F, Zhou B. Risk factors associated with the severity of obstructive sleep apnea syndrome among adults. *Sci Rep* [Internet]. 2020 Dec 11 [cited 2022 Sep 26];10(1):13508. Available from: <https://www.nature.com/articles/s41598-020-70286-6>
10. Udholt N, Rex CE, Fuglsang M, Lundbye-Christensen S, Bille J, Udholt S. Obstructive sleep apnea and road traffic accidents: a Danish nationwide

- cohort study. *Sleep Med* [Internet]. 2022 Aug 1 [cited 2022 Sep 26];96:64–9. Available from: <https://www.sciencedirect.com/science/article/pii/S1389945722001290>
11. World Health Organization, International Association for the Study of Obesity, International Obesity Task Force. The Asia-Pacific Perspective: Redefining Obesity and Its Treatment. *Health Communications* [Internet]. 2000 Feb [cited 2022 Apr 19];18. Available from: https://apps.who.int/iris/bitstream/handle/10665/206936/0957708211_eng.pdf?sequence=1&isAllowed=y
 12. Gizi D, Direktorat M, Kesehatan J, Kementerian M, 2018 K. Hasil pemantauan status gizi (PSG) tahun 2017. 2017 [cited 2022 Mar 27]; Available from: https://kesmas.kemkes.go.id/assets/uploads/contents/others/Buku-Saku-Nasional-PSG-2017_975.pdf
 13. Kementerian Kesehatan Republik Indonesia. Laporan Nasional Riskesdas 2018. Kemenkes RI [Internet]. 2018 [cited 2022 Feb 26];517. Available from: <https://dinkes.kalbarprov.go.id/wp-content/uploads/2019/03/Laporan-Riskesdas-2018-Nasional.pdf>
 14. Veasey SC, Rosen IM. Obstructive sleep apnea in adults. *New England Journal of Medicine* [Internet]. 2019 Apr 11 [cited 2022 Mar 2];380(15):1442–9. Available from: <https://www.nejm.org/doi/full/10.1056/NEJMcp1816152>
 15. Munir N, Clarke R. Ear, Nose and Throat at a Glance. United Kingdom: Wiley-Blackwell; 2013. 63 p.
 16. Sun HH (Brian), Sun S. Diagnosis and management of obstructive sleep apnea. *Surgical Management of Head and Neck Pathologies* [Internet]. 2020 Dec 25 [cited 2022 Mar 11]; Available from: <https://www.intechopen.com/chapters/74581>
 17. Coutinho Costa J, Rebelo-Marques A, Machado JN, Gama JMR, Santos C, Teixeira F, et al. Validation of NoSAS (Neck, Obesity, Snoring, Age, Sex) score as a screening tool for obstructive sleep apnea: Analysis in a sleep clinic. *Pulmonology* [Internet]. 2019 Sep 1 [cited 2022 Mar 18];25(5):263–70. Available from: <https://www.sciencedirect.com/science/article/pii/S2531043719300911>
 18. Leppänen T, Kulkas A, Mervaala E, Töyräs J. Increase in body mass index decreases duration of apneas and hypopneas in obstructive sleep apnea. *Respir Care* [Internet]. 2019 Jan 1 [cited 2022 Mar 2];64(1):77–84. Available from: <http://rc.rcjournal.com/content/64/1/77>
 19. Buffolo F, Li Q, Monticone S, Heinrich DA, Mattei A, Pieroni J, et al. Primary aldosteronism and obstructive sleep apnea. *Hypertension* [Internet]. 2019 Dec [cited 2022 Mar 29];74(6):1532–40. Available from: <https://pubmed.ncbi.nlm.nih.gov/29202496/>
 20. Hall JE. Guyton and hall textbook of medical physiology. 13th ed. Philadelphia: Elsevier; 2016.
 21. World Health Organization. Body mass index - BMI. 2019 [cited 2022 Mar 23]; Available from: <https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi>

22. Kementerian Kesehatan Republik Indonesia. Tabel batas ambang indeks massa tubuh (IMT) [Internet]. KEMENKES RI. 2019 [cited 2022 May 28]. Available from: <http://p2ptm.kemkes.go.id/infographic-p2ptm/obesitas/tabel-batas-ambang-indeks-massa-tubuh-imt>
23. World Health Organization. Body mass index - BMI. [cited 2022 Mar 21]; Available from: <https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi>
24. WHO. Obesity and overweight [Internet]. 2021 [cited 2022 Mar 22]. Available from: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
25. Kementerian Kesehatan Republik Indonesia. Panduan pelaksanaan gerakan nusantara tekan angka obesitas [Internet]. 2017 [cited 2022 Mar 22]. Available from: <http://p2ptm.kemkes.go.id/uploads/2017/11/PedumGentas.pdf>
26. World Health Organization. Obesity and Overweight. World Health Organization [Internet]. 2021 Jun 9 [cited 2022 Feb 26]; Available from: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
27. Afshin A, Forouzanfar MH, Reitsma MB, Sur P, Estep K, Lee A, et al. Health effects of overweight and obesity in 195 countries over 25 years. *N Engl J Med* [Internet]. 2017 Jul 6 [cited 2022 Mar 22];377(1):13–27. Available from: <https://pubmed.ncbi.nlm.nih.gov/28604169/>
28. Kadouh HC, Acosta A. Current paradigms in the etiology of obesity. *Tech Gastrointest Endosc* [Internet]. 2017 Jan 1 [cited 2022 Mar 24];19(1):2–11. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S1096288316300833>
29. Kinlen D, Cody D, O’Shea D. Complications of obesity. *QJM: An International Journal of Medicine* [Internet]. 2018 Jul 1 [cited 2022 Mar 24];111(7):437–43. Available from: <https://academic.oup.com/qjmed/article/111/7/437/4016386>
30. Wadden TA, Tronieri JS, Butrym ML. Lifestyle modification approaches for the treatment of obesity in adults. *Am Psychol* [Internet]. 2020 Feb 1 [cited 2022 Mar 26];75(2):235–51. Available from: /record/2020-09435-009
31. Wharton S, Lau DCW, Vallis M, Sharma AM, Biertho L, Campbell-Scherer D, et al. Obesity in adults: A clinical practice guideline. *CMAJ* [Internet]. 2020 Aug 4 [cited 2022 Mar 25];192(31):E875–91. Available from: <https://www.cmaj.ca/content/suppl/2020/07/27/192.31.E875.DC1>
32. Drake RL, Vogl AW, Mitchell AWM. *Gray’s Basic Anatomy*. Philadelphia: Churchill Livingstone Elsevier; 2012. 540–550 p.
33. Soeroso NN, Pandia P, Syarani F. Buku ajar respirasi. Medan: Departemen Pulmonologi dan Kedokteran Respirasi Fakultas Kedokteran Universitas Sumatera Utara; 2017.
34. Saladin KS. *Anatomy & Physiology: The unity of form and function*. 6th ed. Connely JF, editor. America, New York: McGraw-Hill Companies; 2012. 856–860 p.
35. Sateia MJ. International classification of sleep disorders third edition highlights and modifications. 2014 [cited 2022 Apr 22]; Available from: <https://pubmed.ncbi.nlm.nih.gov/25367475/>

36. Gottlieb DJ, Punjabi NM. Diagnosis and management of obstructive sleep apnea: A Review. *JAMA* [Internet]. 2020 Apr 14 [cited 2022 Apr 4];323(14):1389–400. Available from: <https://jamanetwork.com/journals/jama/fullarticle/2764461>
37. Johnson DA, Guo N, Rueschman M, Wang R, Wilson JG, Redline S. Prevalence and correlates of obstructive sleep apnea among African Americans: the Jackson Heart Sleep Study. *Sleep* [Internet]. 2018 Oct 1 [cited 2022 Apr 4];41(10). Available from: <https://pubmed.ncbi.nlm.nih.gov/30192958/>
38. Cunningham J, Hunter M, Budgeon C, Murray K, Knuiman M, Hui J, et al. The prevalence and comorbidities of obstructive sleep apnea in middle-aged men and women: the Busselton Healthy Ageing Study. *Journal of Clinical Sleep Medicine* [Internet]. 2021 Oct 1 [cited 2022 Apr 4];17(10):2029–39. Available from: <https://jcsm.aasm.org/doi/abs/10.5664/jcsm.9378>
39. Bakhtiar A. Buku ajar ilmu penyakit paru 2010. Wibisono MJ, Winariani, Hariadi S, editors. Surabaya: Departemen Ilmu Penyakit Paru FK UNAIR-RSUD Dr. Soetomo ; 2010. 286–295 p.
40. Kryger M, Roth T, Dement WC. Principles and practice of sleep medicine. 6th ed. Philadelphia: Elsevier; 2017. 1102–1137 p.
41. Fishman JA, Elias JA, Grippi MA, Kotloff RM, Pack AI, Senior RM. Fishman's pulmonary disease and disorders. 5th ed. United States: McGraw-Hill Education; 2015.
42. Rundo JV. Obstructive sleep apnea basics. *Cleve Clin J Med* [Internet]. 2019 Sep 1 [cited 2022 Mar 26];86(9 Suppl 1):2–9. Available from: <https://europepmc.org/article/med/31509498>
43. Hsu WY, Chiu NY, Chang CC, Chang TG, Lane HY. The association between cigarette smoking and obstructive sleep apnea. *Tob Induc Dis* [Internet]. 2019 Apr 5 [cited 2022 Apr 20];17(April). Available from: <http://www.tobaccoinduceddiseases.org/The-association-between-cigarette-smoking-and-obstructive-sleep-apnea,105893,0,2.html>
44. SOMNOmedics. SOMNOScreen® plus - in-lab polysomnography [Internet]. [cited 2022 May 30]. Available from: <https://somnomedics.de/enus/somnomedics-diagnostic-devices/sleep-diagnostics/in-lab-polysomnography/somnoscreen-plus/>
45. Obstructive Sleep Apnea. American Academy of Sleep Medicine [Internet]. 2008 [cited 2022 Apr 2]; Available from: <https://aasm.org/resources/factsheets/sleepapnea.pdf>
46. Morsy NE, Farrag NS, Zaki NFW, Badawy AY, Abdelhafez SA, El-Gilany AH, et al. Obstructive sleep apnea: Personal, societal, public health, and legal implications. *Rev Environ Health* [Internet]. 2019 Jun 1 [cited 2022 Apr 2];34(2):153–69. Available from: <https://www.degruyter.com/document/doi/10.1515/reveh-2018-0068/html>
47. Garrigue S, Bordier P, Jaïs P, Shah DC, Hocini M, Raherison C, et al. Sleep apnea treatment options. *New England Journal of Medicine* [Internet]. 2002 Feb 7 [cited 2022 May 30];346(6):404–12. Available from: <https://www.sleepapnea.org/treat/sleep-apnea-treatment-options/>
48. Hudgel DW, Patel SR, Ahasic AM, Bartlett SJ, Bessesen DH, Coaker MA, et al. The role of weight management in the treatment of adult obstructive

- sleep apnea. <https://doi.org/10.1164/rccm.201807-1326ST> [Internet]. 2018 Sep 14 [cited 2022 May 29];198(6):e70–87. Available from: <http://www.atsjournals.org/doi/suppl/10.1164/rccm.201807-1326ST>.
49. Carneiro-Barrera A, Díaz-Román A, Guillén-Riquelme A, Buela-Casal G. Weight loss and lifestyle interventions for obstructive sleep apnoea in adults: Systematic review and meta-analysis. *Obes Rev* [Internet]. 2019 May 1 [cited 2022 May 29];20(5):750–62. Available from: <https://pubmed.ncbi.nlm.nih.gov/30609450/>
50. Slowik JM, Collen JF. Obstructive sleep apnea. *StatPearls* [Internet]. 2022 Feb 10 [cited 2022 Apr 5]; Available from: <https://www.ncbi.nlm.nih.gov/books/NBK459252/>
51. Wali SO, Abalkhail B, Krayem A. Prevalence and risk factors of obstructive sleep apnea syndrome in a Saudi Arabian population. *Ann Thorac Med* [Internet]. 2017 Apr 1 [cited 2022 Sep 5];12(2):88. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5399696/>
52. Bahari ES, Bustamam N, Thadeus MS. Hubungan antara tingkat keparahan obstructive sleep apnea dan fungsi kognitif pada pasien Rumah Sakit Angkatan Laut Dr. Mintohardjo. *Jurnal Kedokteran dan Kesehatan Publikasi Ilmiah Fakultas Kedokteran Universitas Sriwijaya* [Internet]. 2021 Jan 2 [cited 2022 Sep 6];8(1):17–24. Available from: <https://ejournal.unsri.ac.id/index.php/jkk/article/view/11073>
53. Park DY, Kim JS, Park B, Kim HJ. Risk factors and clinical prediction formula for the evaluation of obstructive sleep apnea in Asian adults. *PLoS One* [Internet]. 2021 Feb 2 [cited 2022 Sep 7];16(2):e0246399. Available from: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0246399>
54. Ernst G, Mariani J, Blanco M, Finn B, Salvado A, Borsini E. Increase in the frequency of obstructive sleep apnea in elderly people. *Sleep Science* [Internet]. 2019 [cited 2022 Nov 8];12(3):222. Available from: [/pmc/articles/PMC6932834/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6932834/)
55. Jonassen TM, Bjorvatn B, Saxvig IW, Eagan TM, Lehmann S. Clinical information predicting severe obstructive sleep apnea: A cross-sectional study of patients waiting for sleep diagnostics. *Respir Med* [Internet]. 2022 [cited 2022 Sep 6];197:106860. Available from: [https://www.resmedjournal.com/article/S0954-6111\(22\)00125-1/pdf](https://www.resmedjournal.com/article/S0954-6111(22)00125-1/pdf)
56. Thompson C, Legault J, Moullec G, Baltzan M, Cross N, Thanh Dang-Vu T, et al. A portrait of obstructive sleep apnea risk factors in 27,210 middle-aged and older adults in the Canadian Longitudinal Study on Aging. *Scientific Reports* [Internet]. 123AD [cited 2022 Sep 6];12:5127. Available from: <https://www.nature.com/articles/s41598-022-08164-6.pdf>
57. Heinzer R, Vat S, Marques-Vidal P, Martí-Soler H, Andries D, Tobback N, et al. Prevalence of sleep-disordered breathing in the general population: the HypnoLaus study. *Lancet Respir Med* [Internet]. 2015 Apr 1 [cited 2022 Oct 12];3(4):310–8. Available from: <https://pubmed.ncbi.nlm.nih.gov/25682233/>
58. Loscalzo J. Harrison's Pulmonary and Critical Care Medicine. 2nd ed. Longo DL, Kasper DL, Jameson JL, Fauci AS, Hauser SL, Loscalzo J, editors. United States: McGraw-Hill Education; 2013.

59. Bonsignore MR, Saaresranta T, Riha RL. Sex differences in obstructive sleep apnoea. 2019 [cited 2022 Sep 8]; Available from: <https://err.ersjournals.com/content/errev/28/154/190030.full.pdf>
60. Ayub S, Won CH. Obstructive sleep apnea in women. J Sleep Med [Internet]. 2019 [cited 2022 Sep 8];16(2):75–80. Available from: <https://www.e-jsm.org/upload/jsm-190047.pdf>
61. Aris M, Hamzah AA, Abdullah F, Ash'a'ri Z. Prevalence of high risk for obstructive sleep apnoea and its risk factors among adults attending government primary health clinics in Kuantan. IIUM Medical Journal Malaysia [Internet]. 2021 Jan 1 [cited 2022 Sep 8];20(1):83–9. Available from: <https://journals.iium.edu.my/kom/index.php/imjm/article/view/1782>
62. Khokhrina A, Andreeva E, Degryse JM. The prevalence of sleep-disordered breathing in Northwest Russia: The ARKHSleep study. Chron Respir Dis [Internet]. 2020 [cited 2022 Sep 8];17. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7394028/>
63. Duong-Quy S, Hua-Huy T, Tran-Mai-Thi HT, Le-Dong NN, Craig TJ, Dinh-Xuan AT. Study of exhaled nitric oxide in subjects with suspected obstructive sleep apnea: A pilot study in Vietnam. Pulm Med [Internet]. 2016 [cited 2022 Oct 29];2016. Available from: <https://pubmed.ncbi.nlm.nih.gov/26881073/>
64. Pacheco D, DeBanto J. How weight affects asleep apnea [Internet]. Sleep Foundation. 2022 [cited 2022 Sep 9]. Available from: <https://www.sleepfoundation.org/sleep-apnea/weight-loss-and-sleep-apnea>
65. Nogueira JF, Poyares D, Simonelli G, Leiva S, Carrillo-Alduenda JL, Bazurto MA, et al. Accessibility and adherence to positive airway pressure treatment in patients with obstructive sleep apnea: a multicenter study in Latin America. Sleep and Breathing [Internet]. 2020 Jun 25 [cited 2022 Sep 23];24(2):455–64. Available from: <https://pubmed.ncbi.nlm.nih.gov/31240542/>
66. Kainulainen S, Töyräs J, Oksenberg A, Korkalainen H, Sefa S, Kulkas A, et al. Severity of desaturations reflects OSA-related daytime sleepiness better than AHI. Journal of Clinical Sleep Medicine [Internet]. 2019 Aug 15 [cited 2022 Sep 9];15(8):1135–42. Available from: <https://jcsm.aasm.org/doi/10.5664/jcsm.7806>
67. Hongyo K, Ito N, Yamamoto K, Yasunobe Y, Takeda M, Oguro R, et al. Factors associated with the severity of obstructive sleep apnea in older adults. Geriatr Gerontol Int [Internet]. 2017 Apr 1 [cited 2022 Sep 9];17(4):614–21. Available from: <https://pubmed.ncbi.nlm.nih.gov/27246824/>
68. Almeneessier AS, Alshahrani M, Aleissi S, Hammad OS, Olaish AH, Bahammam AS. Comparison between blood pressure during obstructive respiratory events in REM and NREM sleep using pulse transit time. [cited 2022 Sep 9]; Available from: <https://www.nature.com/articles/s41598-020-60281-2.pdf>
69. Gray EL, McKenzie DK, Eckert DJ. Obstructive sleep apnea without obesity is common and difficult to treat: Evidence for a distinct pathophysiological phenotype. Journal of Clinical Sleep Medicine. 2017;13(1):81–8.

70. Wolk R, Shamsuzzaman ASM, Somers VK. Obesity, sleep apnea, and hypertension. *Hypertension* [Internet]. 2003 Dec 1 [cited 2022 Dec 24];42(6):1067–74. Available from: <https://www.ahajournals.org/doi/abs/10.1161/01.hyp.0000101686.98973.a3>