

## DAFTAR PUSTAKA

- \_\_\_\_\_. Rekam Medis Pasien Bakterial Vaginosis Rumah Sakit Umum Pusat Dr. Sardjito Yogyakarta. 2021-2023. Rekam Medis Rumah Sakit Umum Pusat Dr. Sardjito Yogyakarta.
- Abdelmaksoud, A. A., Girerd, P. H., Garcia, E. M., Brooks, J. P., Leftwich, L. M., Sheth, N. U., *et al.* 2017. Association between statin use, the vaginal microbiome, and Gardnerella vaginalis vaginolysin-mediated cytotoxicity. *PloS one*, 12(8), e0183765.
- Abdullateef, R.M., Ijaiya, M.A., Abayomi, F., Adeniran, A.S. and Idris, H. 2017. “Bacterial vaginosis: Prevalence and associated risk factors among non-pregnant women of reproductive age attending a Nigerian tertiary hospital”, *Malawi Medical Journal*, Kamuzu University of Health Sciences and Medical Association of Malawi, Vol. 29 No. 4, p. 290, doi: 10.4314/MMJ.V29I4.2.
- Abou Chacra, L., Fenollar, F. and Diop, K. 2022. “Bacterial Vaginosis: What Do We Currently Know?”. *Frontiers in Cellular and Infection Microbiology*, Vol. 11, 672429.
- Adzitey, F., Huda, N., and Ali, G.R.R. 2013. Molecular techniques for detecting and typing of bacteria, advantages and application to foodborne pathogens isolated from ducks. *Biotechnology*, 3: 97–107.
- Africa, C.W.J., Nel, J., and Stemmet, M. 2014. Anaerobes and Bacterial Vaginosis in Pregnancy: Virulence Factors Contributing to Vaginal Colonisation. *Int. J. Environ. Res. Public Health*, 11 (7): 6979–70005.
- Ahrodia, T., Yodhaanjali, J. R., and Das, B. 2022. Vaginal microbiome dysbiosis in preterm birth. *Progress in molecular biology and translational science*, 192(1), 309–329.
- Akobeng, A. K. 2007. Understanding diagnostic tests 1: sensitivity, specificity and predictive values. *Acta Paediatr*, 96(3):338–41.
- Alhabbab R. Y. 2022. Lateral Flow Immunoassays for Detecting Viral Infectious Antigens and Antibodies. *Micromachines*, 13(11): 1901
- Alves, P., Castro, J., Sousa, C., Cereija, T. B., and Cerca, N. 2014. Gardnerella vaginalis outcompetes 29 other bacterial species isolated from patients with bacterial vaginosis, using in an in vitro biofilm formation model. *The Journal of infectious diseases*, 210(4), 593–596.
- Amabebe, E. and Anumba, D.O.C. 2022. “Mechanistic Insights into Immune Suppression and Evasion in Bacterial Vaginosis”. *Current Microbiology*, Springer, 79 (3): 84.
- Amsel, R., Totten, P. A., Spiegel, C. A., Chen, K. C., Eschenbach, D., and Holmes, K. K. 1983. Nonspecific vaginitis. Diagnostic criteria and microbial and epidemiologic associations. *The American journal of medicine*, 74(1), 14–22.
- Anahitar, M. N., Byrne, E. H., Doherty, K. E., Bowman, B. A., Yamamoto, H. S., Soumillon, M., *et al.* 2015. Cervicovaginal bacteria are a major modulator

- of host inflammatory responses in the female genital tract. *Immunity*, 42: 965–976.
- Andryukov B. G. 2020. Six decades of lateral flow immunoassay: from determining metabolic markers to diagnosing COVID-19. *AIMS microbiology*, 6(3): 280–304.
- Baka, S., Demeridou, S., Kaparos, G., Tsoutsouras, K., Touloumakos, S., Dage, M., *et al.* 2022. Microbiological findings in prepubertal and pubertal girls with vulvovaginitis. *European journal of pediatrics*, 181(12), 4149–4155.
- Bansal, R., Garg, P. and Garg, A. 2019. “Comparison of Amsel’s criteria and Nugent’s criteria for diagnosis of bacterial vaginosis in tertiary care centre”, *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. Medip Academy, 8(2): 637–40.
- Basso, B., Giménez, F., and López, C. 2005. IL-1beta, IL-6 and IL-8 levels in gynecologic infections. *Infectious diseases in obstetrics and gynecology*, 13(4), 207–211.
- Beebout, C. J., Eberly, A. R., Werby, S. H., Reasoner, S. A., Brannon, J. R., De, S., *et al.* 2019. Respiratory Heterogeneity Shapes Biofilm Formation and Host Colonization in Uropathogenic Escherichia Coli. *MBio*, 10 (2): e02400–e02185.
- Bhujel, R., Mishra, S. K., Yadav, S. K., Bista, K. D., and Parajuli, K. 2021. Comparative study of Amsel's criteria and Nugent scoring for diagnosis of bacterial vaginosis in a tertiary care hospital, Nepal. *BMC infectious diseases*, 21(1): 825.
- Bitew, A., Abebaw, Y., Bekele, D., and Mihret, A. 2017. Prevalence of Bacterial Vaginosis and Associated Risk Factors Among Women Complaining of Genital Tract Infection. *Int. J. Microbiol*, 2017: 4919404.
- Blankenstein, T., Lytton, S. D., Leidl, B., Atweh, E., Friese, K., and Mylonas, I. 2015. Point-of-care (POC) diagnosis of bacterial vaginosis (VB) using VGTest™ ion mobility spectrometry (IMS) in a routine ambulatory care gynecology clinic. *Archives of gynecology and obstetrics*, 292(2): 355–62.
- Bostwick, G. D., Hunt, C. A., Parker, L. R., Mcdyer, D., Woody, J., and Budd, W. 2016. Utility of next-generation sequencing in managing bacterial vaginosis: examples from clinical practice. *J. Women’s Heal. Care*, 5:1000322.
- Bradshaw, C. S., Morton, A. N., Garland, S. M., Horvath, L. B., Kuzevska, I., and Fairley, C. K. 2005. Evaluation of a point-of-care test, VBBlue, and clinical and laboratory criteria for diagnosis of bacterial vaginosis. *J. Clin. Microbiol*, 43: 1304–8.
- Bujang, M. A., and Adnan, T. H. 2016. Requirements for Minimum Sample Size for Sensitivity and Specificity Analysis. *Journal of clinical and diagnostic research*, 10(10): YE01–YE06.
- Castro, J., Henriques, A., Machado, A., Henriques, M., Jefferson, K. K., and Cerca, N. 2013. Reciprocal interference between *Lactobacillus* spp. and *Gardnerella vaginalis* on initial adherence to epithelial cells. *International journal of medical sciences*, 10(9), 1193–1198.

- Castro, J., Machado, D., and Cerca, N. 2019. Unveiling the Role of Gardnerella Vaginalis in Polymicrobial Bacterial Vaginosis Biofilms: The Impact of Other Vaginal Pathogens Living as Neighbors. *ISME J*, 13 (5):1306–17.
- Cauci, S., Culhane, J. F., Di Santolo, M., and McCollum, K. 2008. Among pregnant women with bacterial vaginosis, the hydrolytic enzymes sialidase and prolidase are positively associated with interleukin-1beta. *American journal of obstetrics and gynecology*, 198(1), 132.e1–132.e1327.
- Cauci, S., Di Santolo, M., Casabellata, G., Ryckman, K., Williams, S. M., and Guaschino, S. 2007. Association of interleukin-1beta and interleukin-1 receptor antagonist polymorphisms with bacterial vaginosis in non-pregnant Italian women. *Molecular human reproduction*, 13(4), 243–250.
- Cauci, S., Guaschino, S., Driussi, S., De Santo, D., Lanzafame, P., and Quadrifoglio, F. 2002. Correlation of local interleukin-8 with immunoglobulin A against Gardnerella vaginalis hemolysin and with prolidase and sialidase levels in women with bacterial vaginosis. *The Journal of infectious diseases*, 185(11), 1614–1620.
- Cauci, S., Monte, R., Driussi, S., Lanzafame, P., and Quadrifoglio, F. 1998. Impairment of the mucosal immune system: IgA and IgM cleavage detected in vaginal washings of a subgroup of patients with bacterial vaginosis. *The Journal of infectious diseases*, 178(6), 1698–1706.
- Chart, H. 2012. “Vibrio, mobiluncus, gardnerella and spirillum: Cholera; vaginosis; rat bite fever” in *Medical microbiology*. eds. D. Greenwood, M. Barer, R. Slack and W. Irving. 18th ed (Edinburgh: Churchill Livingstone), 314–323.
- Chawla, R., Bhalla, P., Chadha, S., Grover, S., and Garg, S. 2013. Comparison of Hay’s criteria with Nugent’s scoring system for diagnosis of bacterial vaginosis. *Biomed. Res. Int*, 365194.
- Chen, X., Miao, X., Ma, T., Leng, Y., Hao, L., Duan, H., Yuan, J., Li, Y., Huang, X., and Xiong, Y. 2021. Gold Nanobeads with Enhanced Absorbance for Improved Sensitivity in Competitive Lateral Flow Immunoassays. *Foods (Basel, Switzerland)*, 10(7): 1488.
- Cherpes, T. L., Hillier, S. L., Meyn, L. A., Busch, J. L., and Krohn, M. A. 2008. A Delicate Balance: Risk Factors for Acquisition of Bacterial Vaginosis Include Sexual Activity, Absence of Hydrogen Peroxide-Producing Lactobacilli, Black Race, and Positive Herpes Simplex Virus Type 2 Serology. *Sex. Transm. Dis*, 35 (1): 78–83.
- Chopra, D., Sandhu, I., Bahl, R. K., Bhatia, R., and Goyal, A. 2015. Prevalence of sexually transmitted infections in HIV positive and HIV negative females, in a tertiary care hospital - An observational study. *Indian journal of sexually transmitted diseases and AIDS*, 36(1), 59–63.
- Coleman, J. S., and Gaydos, C. A. 2018. Molecular diagnosis of bacterial vaginosis: an update. *J. Clin. Microbiol*, 56(9): e00342-18.
- Colonna, C. and Steelman, M. 2022, “Amsel Criteria”, *StatPearls*, StatPearls Publishing.
- Cortés-Sarabia, K., Rodríguez-Nava, C., Medina-Flores, Y., Mata-Ruiz, O., López-Meza, J. E., Gómez-Cervantes, M. D., et al. 2020. Production and

- characterization of a monoclonal antibody against the sialidase of *Gardnerella vaginalis* using a synthetic peptide in a MAP8 format. *Applied microbiology and biotechnology*, 104(14), 6173–6183.
- Coudray MS, Madhivanan P. 2020. Bacterial Vaginosis - A Brief Synopsis of the Literature. *Eur J Obstet Gynecol Reprod Biol*, Feb 1; 245:143.
- Delves, P. J., Martin, S. J., Burton, D. R., and Roitt, I. M. 2017. Roitt's essential immunology. *John Wiley and Sons*.
- Dhamnetiya, D., Jha, R. P., Shalini, S., and Bhattacharyya, K. 2021. How to Analyze the Diagnostic Performance of a New Test? Explained with Illustrations. *Journal of laboratory physicians*, 14(1), 90–98.
- Dowdy D. W. 2014. Evaluation of Diagnostic Tests. A Two-week Intensive Course. *Department of Epidemiology Johns Hopkins Bloomberg School of Public Health*. July 21.
- FDA. 2021. Commercial Laboratory Test and FDA Approval. <https://www.testing.com/articles/commercial-tests-fda-approval/> (diakses 6 Mei 2023)
- Fenollar, F., and Raoult, D. 2016. Does Bacterial Vaginosis Result From Fecal Transplantation? *J. Infect. Dis*, 214 (11): 17845.
- Ferreira, C. S. T., Da Silva, M. G., De Pontes, L. G., dos Santos, L. D., and Marconi, C. 2018. Protein content of cervicovaginal fluid is altered during bacterial vaginosis. *J. Low Genit. Tract. Dis*, 22: 147–51.
- Fredricks D. N. 2011. Molecular methods to describe the spectrum and dynamics of the vaginal microbiota. *Anaerobe*, 17(4), 191–195.
- Gajer, P., Brotman, R. M., Bai, G., Sakamoto, J., Schütte, U. M., Zhong, X., *et al.* 2012. Temporal Dynamics of the Human Vaginal Microbiota. *Science translational medicine*, 4(132): 132ra52.
- Gilbert, N. M., Lewis, W. G., Li, G., Sojka, D. K., Bernard Lubin, J., and Lewis, A. L. 2019. Gardnerella Vaginalis and Prevotella Bivia Trigger Distinct and Overlapping Phenotypes in a Mouse Model of Bacterial Vaginosis. *J. Infect. Dis.*, 220(7): 1099–11085.
- Gonçalves, A.K., Machado, P.R., de Souza, L., Costa, A.P., Gimenes, F., Consolaro, M.E. *et al.* 2014. Detection of immunoglobulin IgA and IgG against human papilloma virus. *Viral immunology*, 27 9, 471-7 .
- Gosmann, C., Anahtar, M. N., Handley, S. A., Farcasanu, M., Abu-Ali, G., Bowmanet, B. A., *et al.* 2017. *Lactobacillus*-deficient cervicovaginal bacterial communities are associated with increased HIV acquisition in young South African women. *Immunity*, 46: 29–37.
- Green, K. A., Zarek, S. M., and Catherino, W. H. 2015. Gynecologic Health and Disease in Relation to the Microbiome of the Female Reproductive Tract. *Fertil Steril*, 104 (6): 1351–1575.
- Harwich, M. D., Jr, Alves, J. M., Buck, G. A., Strauss, J. F., 3rd, Patterson, J. L., Oki, A. T., Girerd, P. H., and Jefferson, K. K. 2010. Drawing the line between commensal and pathogenic Gardnerella vaginalis through genome analysis and virulence studies. *BMC genomics*, 11, 375.

- Haggerty, C. L., Totten, P. A., Ferris, M., Martin, D. H., Hoferka, S., Astete, S. G., *et al.* 2009. Clinical characteristics of bacterial vaginosis among women testing positive for fastidious bacteria. *Sex. Transm. Infect*, 85: 242–48.
- Hawkes, S., Morison, L., Foster, S., Gausia, K., Chakraborty, J., Peeling, R. W. *et al.* 1999. Reproductive-tract infections in women in low-income, low-prevalence situations: assessment of syndromic management in Matlab, Bangladesh. *Lancet (London, England)*, 354(9192): 1776–81.
- Hay, P. E. 2002. *Bacterial Vaginosis as a Mixed Infection*. In: Brogden, K., and Guthmiller, J., editors. Polymicrobial Diseases, Washington.
- Hess, A. S., Shardell, M., Johnson, J. K., Thom, K. A., Strassle, P., Netzer, G., and Harris, A. D. 2012. Methods and recommendations for evaluating and reporting a new diagnostic test. *European journal of clinical microbiology and infectious diseases : official publication of the European Society of Clinical Microbiology*, 31(9), 2111–2116.
- Hill, J. E., Albert, A. Y. K., and VOGUE Research Group. 2019. Resolution and Cooccurrence Patterns of Gardnerella leopoldii, G. swidsinskii, G. piotii, and G. vaginalis within the Vaginal Microbiome. *Infection and immunity*, 87(12), e00532-19.
- Hoffman, B.L., Schorge, J.O., Bradshaw, K.D., Halvorson, L.M., Schaffer, J.I. and Corton, M.M. 2020, *Williams Gynecology*, 3rd ed., McGraw-Hill Education, Philadelphia.
- Jespers, V., van de Wijgert, J., Cools, P., Verhelst, R., Verstraelen, H., Vaginal Biomarkers Study Group, *et al.* 2015. The significance of Lactobacillus crispatus and L. vaginalis for vaginal health and the negative effect of recent sex: a cross-sectional descriptive study across groups of African women. *BMC infectious diseases*, 15, 115.
- Jiangsu Medomic Medical Technology Co., Ltd. Medomic *Candida albicans/Trichomonas vaginalis/Gardnerella vaginalis* antigen Combo Test Kit (LFIA) Clinical Evaluation Report. 2022. Nanjing, China.
- Jiangsu Medomic Medical Technology Co., Ltd. Medomic *Candida albicans/Trichomonas vaginalis/Gardnerella vaginalis* antigen Combo Test Kit (LFIA) Manual Product. Nanjing, China.
- Kairys N, Garg M. 2022. Bacterial Vaginosis. *Stat Pearls*, Jul 4:1–6.
- Kalia, N., Singh, J. and Kaur, M. 2020. Microbiota in vaginal health and pathogenesis of recurrent vulvovaginal infections: a critical review. *Annals of Clinical Microbiology and Antimicrobials* 1, 19(1): 5
- Kaambo, E., Africa, C., Chambuso, R., and Passmore, J. S. 2018. Vaginal Microbiomes Associated With Aerobic Vaginitis and Bacterial Vaginosis. *Frontiers in public health*, 6, 78.
- Kementrian Kesehatan RI. 2014. Pedoman Pelayanan Izin Edar Perbekalan Kesehatan Rumah Tangga. Kementrian Kesehatan RI, Jakarta.
- Kementrian Kesehatan RI. 2016. Pedoman Klasifikasi Izin Edar Alat Kesehatan. Kementrian Kesehatan RI, Jakarta.
- Kementrian Kesehatan RI. 2017. Peraturan Menteri Kesehatan No. 62 Tahun 2017. Kementrian Kesehatan RI, Jakarta.



- Khedkar R, Pajai S. 2022. Bacterial Vaginosis: A Comprehensive Narrative on the Etiology, Clinical Features, and Management Approach. *Cureus*, Nov 10: 14(11).
- Koczula, K. M., and Gallotta, A. 2016. Lateral flow assays. *Essays in biochemistry*, 60(1): 111–20.
- Köhler, G., and Milstein, C. 1975. Continuous cultures of fused cells secreting antibody of predefined specificity. *Nature*, 256(5517), 495–497.
- Koumans, E. H., Sternberg, M., Bruce, C., McQuillan, G., Kendrick, J., Sutton, M., *et al.* 2007. The Prevalence of Bacterial Vaginosis in the United States 2001– 2004; Associations With Symptoms, Sexual Behaviors, and Reproductive Health. *Sex. Transm. Dis*, 34 (11): 864–69.
- Kunze, M., Klar, M., Morfeld, C. A., Thorns, B., Schild, R. L., Markfeld-Erol, F., *et al.* 2016. Cytokines in noninvasively obtained amniotic fluid as predictors of fetal inflammatory response syndrome. *Am. J Obstet. Gynecol*, 215(1): 96.e1–96.e968.
- Kyongo, J. K., Crucitti, T., Menten, J., Hardy, L., Cools, P., Michiels, J., *et al.* 2015. Cross-sectional analysis of selected genital tract immunological markers and molecular vaginal microbiota in sub-Saharan African women, with relevance to HIV risk and prevention. *Clin. Vaccine Immunol*, 22: 526–38.
- Laín, A., Elguezabal, N., Brena, S., García-Ruiz, J. C., Del Palacio, A., Moragues, M. D., *et al.* (2007). Diagnosis of invasive candidiasis by enzyme-linked immunosorbent assay using the N-terminal fragment of *Candida albicans* hyphal wall protein 1. *BMC microbiology*, 7, 35.
- Laniewski, P. and Herbst-Kralovetz, M. 2018. *Encyclopedia of Reproduction*. Vol. 2, Elsevier, Philadelphia.
- Li, Z., Palaniyandi, S., Zeng, R., Tuo, W., Roopenian, D. C., and Zhu, X. 2011. Transfer of IgG in the female genital tract by MHC class I-related neonatal Fc receptor (FcRn) confers protective immunity to vaginal infection. *Proceedings of the National Academy of Sciences of the United States of America*, 108(11), 4388–4393.
- Machado, A., Cerca, N. 2015. Influence of Biofilm Formation by *Gardnerella vaginalis* and Other Anaerobes on Bacterial Vaginosis. *The Journal of infectious diseases*, 212(12), 1856–1861.
- Machado, A., Salgueiro, D., Harwich, M., Jefferson, K. K., and Cerca, N. 2013. Quantitative analysis of initial adhesion of bacterial vaginosis-associated anaerobes to ME-180 cells. *Anaerobe*, 23, 1–4.
- Madhivanan, P., Krupp, K., Hardin, J., Karat, C., Klausner, J. D., and Reingold, A. L. 2009. Simple and inexpensive point-of-care tests improve diagnosis of vaginal infections in resource constrained settings. *Tropical medicine and international health*, 14(6):703–8.
- Majigo, M. V., Kashindye, P., and Mtulo, Z. 2021. Bacterial Vaginosis, the Leading Cause of Genital Discharge Among Women Presenting With Vaginal Infection in Dar Es Salaam, Tanzania. *Afr. Health Sci*, 21 (2): 531–7.
- Mala R, Sood S, Kapil A, Gupta S, Singh N. 2022. Comparison of Amsel's criteria with low and high Nugent's scores for the diagnosis of bacterial vaginosis. *Indian J Sex Transm Dis AIDS*, Jan-Jun;43(1):56-8.

- Malla, M. A., Dubey, A., Kumar, A., Yadav, S., Hashem, A., and Abd\_Allah, E. F. 2019. Exploring the human microbiome: the potential future role of next-generation sequencing in disease diagnosis and treatment. *Front. Immunol.*, 9:2868.
- Manuputty, A. G., and Matodiharjo, S. 2020. The Profile of Bacterial Vaginosis in Academic Hospital Surabaya: A Retrospective Study. *Berkala Ilmu Kesehatan Kulit Dan Kelamin*, 32(2):141–8.
- Marot-Leblond, A., Beucher, B., David, S., Nail-Billaud, S., & Robert, R. 2006. Development and evaluation of a rapid latex agglutination test using a monoclonal antibody to identify *Candida dubliniensis* colonies. *Journal of clinical microbiology*, 44(1), 138–142.
- Marrazzo, J. M., Fiedler, T. L., Srinivasan, S., Thomas, K. K., Liu, C., Ko, D., *et al.* 2012. Extravaginal Reservoirs of Vaginal Bacteria as Risk Factors for Incident Bacterial Vaginosis. *J. Infect. Dis.*, 205(10): 1580– 5.
- McMillan, A., Rulisa, S., Sumarah, M., Macklaim, J. M., Renaud, J., Bisanz, J. E., *et al.* 2015. A multi-platform metabolomics approach identifies highly specific biomarkers of bacterial diversity in the vagina of pregnant and non-pregnant women. *Sci. Rep.*, 5:14174.
- Menard, J. P., Fenollar, F., Henry, M., Bretelle, F., and Raoult, D. 2008. Molecular Quantification of *Gardnerella Vaginalis* and *Atopobium Vaginae* Loads to Predict Bacterial Vaginosis. *Clin. Infect. Dis.*, 47 (1): 33–43.
- Mikamo, H., Sato, Y., Hayasaki, Y., Hua, Y. X., and Tamaya, T. 2000. Vaginal microflora in healthy women with *Gardnerella vaginalis*. *Journal of infection and chemotherapy : official journal of the Japan Society of Chemotherapy*, 6(3), 173–177.
- Mirica, A. C., Stan, D., Chelcea, I. C., Mihailescu, C. M., Ofiteru, A., and Bocancia-Mateescu, L. A. 2022. Latest Trends in Lateral Flow Immunoassay (LFIA) Detection Labels and Conjugation Process. *Frontiers in bioengineering and biotechnology*, 10, 922772.
- Mitra, S., and Tomar, P. C. 2021. Hybridoma technology; advancements, clinical significance, and future aspects. *Journal, genetic engineering and biotechnology*, 19(1), 159.
- Modak, T., Arora, P., Agnes, C., Ray, R., Goswami, S., Ghosh, P., *et al.* 2011. Diagnosis of bacterial vaginosis in cases of abnormal vaginal discharge: comparison of clinical and microbiological criteria. *Journal of infection in developing countries*, 5(5), 353–360.
- Mondal, A. S., Sharma, R., and Trivedi, N. 2023. Bacterial vaginosis: A state of microbial dysbiosis. *Medicine in Microecology*, 16.
- Money, D. 2005. The Laboratory Diagnosis of Bacterial Vaginosis. *Can. J. Infect. Dis. Med. Microbiol.*, 16 (2): 77–9.
- Morrill, S., Gilbert, N. M., and Lewis, A. L. 2020. *Gardnerella vaginalis* as a Cause of Bacterial Vaginosis: Appraisal of the Evidence From *in vivo* Models. *Frontiers in cellular and infection microbiology*, 10, 168.

- Moyano, A., Serrano-Pertierra, E., Salvador, M., Martínez-García, J. C., Rivas, M., & Blanco-López, M. C. 2020. Magnetic Lateral Flow Immunoassays. *Diagnostics (Basel, Switzerland)*, 10(5), 288.
- Muhammed Y. 2020. The Best IgG Subclass for the Development of Therapeutics Monoclonal Antibodies Drugs and their Commercial Production: A Review. *Immunome Res.* 16:173.
- Muhleisen, A. L., and Herbst-Kralovetz, M. M. 2016. Menopause and the Vaginal Microbiome. *Maturitas*, 91: 42–50.
- Mullany, P. 2014. Functional metagenomics for the investigation of antibiotic resistance. *Virulence*, 5: 443–7.
- Munzila, S, Wiknjosastro G. H. 2007. Pemeriksaan pH dan LEA vagina dengan dipstick sebagai metoda penapisan vaginosis bakterial dalam kehamilan. *Indones J Obstet Gynecol.*, 31(3): 134-42.
- Muthusamy, S., Varghese, J., Raveendran, V., Ezilarasan, K. and Easow, J.M. 2018. Evaluation of interobserver reliability of Nugent score for diagnosis of bacterial vaginosis. *Indian Journal of Sexually Transmitted Diseases and AIDS*, 39(2): 120.
- Muzny, C.A., Taylor, C.M., Swords, W.E., Tamhane, A., Chattopadhyay, D., Cerca, N. and Schwebke, J.R. 2019. An Updated Conceptual Model on the Pathogenesis of Bacterial Vaginosis. *The Journal of Infectious Diseases*, 220 (9): 1399–1405.
- Myziuk, L., Romanowski, B., and Johnson, S. C. 2003. VBBlue test for diagnosis of bacterial vaginosis. *J. Clin. Microbiol.*, 41: 1925–8.
- Narayankhedkar, A., Hodiwala, A., and Mane, A. 2015. Clinicoetiological Characterization of Infectious Vaginitis amongst Women of Reproductive Age Group from Navi Mumbai, India. *Journal of sexually transmitted diseases*, 2015: 817092.
- Nelson, T. M., Borgogna, J. C., Michalek, R. D., Roberts, D. W., Rath, J. M., Glover, E. D., *et al.* 2018. Cigarette Smoking Is Associated With an Altered Vaginal Tract Metabolomic Profile. *Sci. Rep.*, 8 (1): 1–13.
- Nisha, K., Antony, B., and Udayalaxmi, J. 2019. Comparative analysis of virulence factors and biotypes of *Gardnerella vaginalis* isolated from the genital tract of women with and without bacterial vaginosis. *The Indian journal of medical research*, 149(1), 57–61.
- Nugent, R. P., Krohn, M. A., and Hillier, S. L. 1991. Reliability of diagnosing bacterial vaginosis is improved by a standardized method of gram stain interpretation. *Journal of clinical microbiology*, 29(2), 297–301.
- Nuriel-Ohayon, M., Neuman, H., and Koren, O. 2016. Microbial Changes During Pregnancy, Birth, and Infancy. *Front Microbiol.*, 7: 1031.
- O’farrell, B. 2013. Lateral Flow Immunoassay Systems: Evolution from the Current State of the Art to the Next Generation of Highly Sensitive, Quantitative Rapid Assays. *The Immunoassay Handbook*. 4 ed. Elsevier, 89–107.
- Ocviyanti D, Rosana Y, Olivia S, Darmawan F. 2010. Risk factors for bacterial vaginosis among Indonesian women. *Med J Indones.*, 19(2):130–5.



- Onderdonk, A. B., Delaney, M. L., and Fichorova, R. N. 2016. The Human Microbiome During Bacterial Vaginosis. *Clin. Microbiol. Rev.*, 29 (2): 223–38.
- Patterson, J. L., Stull-Lane, A., Girerd, P. H., and Jefferson, K. K. 2010. Analysis of adherence, biofilm formation and cytotoxicity suggests a greater virulence potential of Gardnerella vaginalis relative to other bacterial-vaginosis-associated anaerobes. *Microbiology (Reading, England)*, 156(Pt 2), 392–399.
- Peebles K, Velloza J, Balkus JE, McClelland RS, Barnabas R V. 2019. High Global Burden and Costs of Bacterial Vaginosis: A Systematic Review and Meta-Analysis. *Sex Transm Dis.*, May 1; 46(5):304–11.
- Peeling, R. W., Mabey, D., Herring, A., *et al.* 2006. Why do we need quality-assured diagnostic tests for sexually transmitted infections?. *Nature reviews. Microbiology.*, 4 (12): 7–19.
- Peters, D. L., Wang, W., Zhang, X., Ning, Z., Mayne, J., and Figeys, D. 2019. Metaproteomic and metabolomic approaches for characterizing the gut microbiome. *Proteomics*, 19:1800363.
- Pleckaityte, M., Janulaitiene, M., Lasickiene, R., and Zvirbliene, A. 2012. Genetic and biochemical diversity of Gardnerella vaginalis strains isolated from women with bacterial vaginosis. *FEMS immunology and medical microbiology*, 65(1), 69–77.
- Plummer EL, Vodstrcil LA, Fairley CK, Tabrizi SN, Garland SM, Law MG, *et al.* 2019. Sexual practices have a significant impact on the vaginal microbiota of women who have sex with women. *Sci Reports*, Dec 24; 9(1):1–14.
- Pramanick, R., Mayadeo, N., Warke, H., Begum, S., Aich, P., and Aranha, C. 2019. Vaginal microbiota of asymptomatic bacterial vaginosis and vulvovaginal candidiasis: Are they different from normal microbiota?. *Microbial pathogenesis*, 134, 103599.
- Putra I.W.G.A.E., Sutarga I. M., Kardiwinata M.P., Suariyani N.L.P., Septarini N.W., Subrata I.M. 2016. *Modul Penelitian Uji Diagnostik dan Skrining*. Fakultas Kedokteran Universitas Udayana, Denpasar.
- Rao, V.L., Mahmood, T. 2019. Vaginal discharge. *Obstet Gynaecol Reprod Med.*, 30(1):11–8.
- Ravel, J., Moreno, I., and Simón, C. 2021. Bacterial vaginosis and its association with infertility, endometritis, and pelvic inflammatory disease. *American journal of obstetrics and gynecology*, 224(3), 251–257.
- Redelinghuys, M., Ehlers, M., Bezuidenhout, J., Becker, P., and Kock, M. 2017. Assessment of *Atopobium vaginae* and *Gardnerella vaginalis* concentrations in a cohort of pregnant South African women. *Sex. Transm. Infect.*, 93:410–15.
- Reichert J. M. 2011. Antibody-based therapeutics to watch in 2011. *mAbs*, 3(1), 76–99.
- Reid. 2018. Is Bacterial Vaginosis a Disease? *Appl. Microbiol. Biotechnol.*, 102 (2): 553–58.
- Romero, R., Hassan, S. S., Gajer, P., Tarca, A. L., Fadrosh, D. W., Nikita, L., *et al.* 2014. The Composition and Stability of the Vaginal Microbiota of Normal

- Pregnant Women Is Different From That of Non-Pregnant Women. *Microbiome*, 2: 1–19.
- Sabo MC, Balkus JE, Richardson BA, Srinivasan S, Kimani J, Anzala O, *et al.* 2019. Association between vaginal washing and vaginal bacterial concentrations. *PLoS One*, Jan 1;14(1): e0210825.
- Salipante, S. J., Sengupta, D. J., Rosenthal, C., Costa, G., Spangler, J., Sims, E. H., *et al.* 2013. Rapid 16S rRNA next-generation sequencing of polymicrobial clinical samples for diagnosis of complex bacterial infections. *PLoS ONE*, 8: e65226.
- Schwebke, J. R., Hillier, S. L., Sobel, J. D., McGregor, J. A., and Sweet, R. L. 1996. Validity of the vaginal gram stain for the diagnosis of bacterial vaginosis. *Obstetrics and gynecology*, 88(4 Pt 1), 573–576.
- Sgibnev, A. V., and Kremleva, E. A. 2015. Vaginal Protection by H<sub>2</sub>O<sub>2</sub>-Producing Lactobacilli. *Microbiol.*, 8(10): e22913–e22913.
- Sherrard J, Wilson J, Donders G, Mendling W, Jensen JS. 2018. 2018 European (IUSTI/WHO) International Union against sexually transmitted infections (IUSTI) World Health Organisation (WHO) guideline on the management of vaginal discharge. *Int J STD AIDS*, Nov 1;29 (13):1258–72.
- Shimaoka, M., Yo, Y., Doh, K., Kotani, Y., Suzuki, A., Tsuji, I., Mandai, M., and Matsumura, N. 2019. Association between preterm delivery and bacterial vaginosis with or without treatment. *Scientific reports*, 9(1), 509.
- Shrivastava, S. R., Shrivastava, S., and Ramasamy, J. 2014. Utility of syndromic approach in management of sexually transmitted infections: public health perspective. *Doc. Head. J. Coast. Life Med.*, 2: 7–13.
- Sim, M., Logan, S., and Goh, L. H. 2020. Vaginal discharge: evaluation and management in primary care. *Singapore medical journal*, 61(6), 297–301.
- Smith, R.P. 2015. *Netter's Obstetrics and Gynecology*. 3rd ed., Elsevier, Philadelphia.
- Sobel, J. D. 2017. *Vaginitis, Vulvitis, Cervicitis and Cutaneous Vulval Lesions. Infectious Diseases*, Elsevier: 483–491.
- Song, Y., He, L., Zhou, F., Chen, S., Ni, D., Lei, B., *et al.* 2017. Segmentation, splitting, and classification of overlapping bacteria in microscope images for automatic bacterial vaginosis diagnosis. *IEEE J Biomed Health Inform*, 21: 1095–104.
- Srinivasan, S., Morgan, M. T., Liu, C., Matsen, F. A., Hoffman, N. G., Fiedler, T. L., Agnew, K. J., Marrazzo, J. M., and Fredricks, D. N. 2013. More than meets the eye: associations of vaginal bacteria with gram stain morphotypes using molecular phylogenetic analysis. *PloS one*, 8(10), e78633.
- Stafford, G. P., Parker, J. L., Amabebe, E., Kistler, J., Reynolds, S., Stern, V., *et al.* 2017. Spontaneous preterm birth is associated with differential expression of vaginal metabolites by lactobacilli- dominated microflora. *Front. Physiol.*, 8:615.
- Stoyancheva, G., Marzotto, M., Dellaglio, F., and Torriani, S. 2014. Bacteriocin Production and Gene Sequencing Analysis From Vaginal Lactobacillus Strains. *Arch Microbiol.*, 196 (9): 645–53.
- Sudarsana, P., Suardana, K., Mirah, I. and Alit, N. 2022. Bakterial vaginosis:

- etiologi, diagnosis, dan tatalaksana. *Ganesha Medicina Journal*, 2(2): 1–5.
- Tachedjian, G., Aldunate, M., Bradshaw, C. S., and Cone, R. A. 2017. The Role of Lactic Acid Production by Probiotic *Lactobacillus* Species in Vaginal Health. *Res. Microbiol.*, 168 (9–10): 782–92.
- Umami A, Paulik E, Molnár R, Murti B. 2022. The relationship between genital hygiene behaviors and genital infections among women: A systematic review. *J Ners.*, 17(1):89–101.
- Venugopal, S., Gopalan, K., Devi, A., and Kavitha, A. 2017. Epidemiology and clinico-investigative study of organisms causing vaginal discharge. *Indian journal of sexually transmitted diseases and AIDS*, 38(1), 69–75.
- Vetter, T.R., Schober, P., Mascha, E.J., 2018. Diagnostic Testing and Decision-Making: Beauty Is Not Just in the Eye of the Beholder. *Anesth. Analg.* 127, 1085–1091.
- Vieira-Baptista, P., Silva, A.R., Costa, M., Figueiredo, R., Saldanha, C. and Sousa, C. 2022. Diagnosis of bacterial vaginosis: Clinical or microscopic? A cross-sectional study *International Journal of Gynecology and Obstetrics. John Wiley and Sons, Ltd.*, 156 (3): 552–559.
- Wang, C., Peng, J., Liu, D. F., Xing, K. Y., Zhang, G. G., Huang, Z., *et al.* 2018. Lateral flow immunoassay integrated with competitive and sandwich models for the detection of aflatoxin M<sub>1</sub> and *Escherichia coli* O157:H7 in milk. *Journal of dairy science*, 101(10), 8767–8777.
- Wasiela, M., Krzemiński, Z., Kalinka, J., and Brzezińska-Błaszczyk, E. 2005. Korelacja steżeń wybranych cytokin w wydzielinie pochwowo-szyjkowej u cieżarnych kobiet z różnymi mikroskopowymi obrazami tej wydzieliny [Correlation between levels of selected cytokines in cervico-vaginal fluid of women with abnormal vaginal bacterial flora]. *Medycyna doświadczalna i mikrobiologia*, 57(3), 327–333.
- Wati, R., Amperaningsih, Y. 2017. Perilaku pengobatan infeksi menular seksual pada wanita pekerja seks. *Jurnal Ilmiah Keperawatan Sai Betik*, 9(2), 206–213.
- West, B., Morison, L., van der Loeff, M. S., Gooding, E., Awasana, A. A., Demba, E., *et al.* 2003. Evaluation of a new rapid diagnostic kit (FemExam) for bacterial vaginosis in patients with vaginal discharge syndrome in the Gambia. *Sex. Transm. Dis.*, 30: 483–9.
- Workowski K.A., Bachmann L.H., Chan P.A., Johnston C.M., Muzny C.A., Park I., *et al.* 2021. Sexually Transmitted Infections Treatment Guidelines, 2021. *MMWR Recomm Rep.*, Jul 23;70(4):1-187.
- Yeoman, C. J., Thomas, S. M., Miller, M. E. B., Ulanov, A. V., Torralba, M., Lucas, S., *et al.* 2013. A multiomic systems-based approach reveals metabolic markers of bacterial vaginosis and insight into the disease. *PLoS ONE*, 8:e56111.
- Yıldırım R, Vural G, Koçoğlu E. 2020. Effect of vaginal douching on vaginal flora and genital infection. *J Turkish Ger Gynecol Assoc.*, 21(1):29.
- Zhou, J. Z., Way, S. S., and Chen, K. 2018. Immunology of the Uterine and Vaginal Mucosae. *Trends in immunology*, 39(4), 302–314.