

BÖLÜM 1

PROSTAT KANSERİ EPİDEMİYOLOJİSİ, ETİYOLOJİSİ VE RİSK FAKTÖRLERİ

Gökhan ÇEKER¹

PROSTAT KANSERİ EPİDEMİYOLOJİSİ

Prostat kanseri erkeklerde akciğer kanserinden sonra en sık rastlanan kanser türüdür. Erkeklerde kansere özgü ölüm oranında ise 5. sıradadır. 2020 yılında 185 ülkenin kanser verilerinin analiz edildiği global bir çalışmada yaklaşık 1,4 milyon yıllık yeni vaka ve 375.000 prostat kanserine bağlı ölüm tespit edilmiştir (1). Yaklaşık olarak 100.000 kişideki görülmeye oranı ise 30,7 olarak bildirilmiştir. 2070 yılında global olarak tahmini yıllık insidansın 2,9 milyon olması beklenmektedir (2). Dünya Sağlık Örgütü'nün organize ettiği 2020larındaki bu global çalışmanın Türkiye verilerine göre erkeklerde tüm non-kutanöz kanserler içerisinde akciğer kanserinden sonra en sık görülen kanser türüdür. 19.444 yeni vaka ile erkeklerde görülen kanserlerin %14,6'sını teşkil etmektedir. 5 yıllık prevalansı 69.682 kişidir (167,36 / 100.000).

Her ne kadar erkeklerde en sık rastlanan ikinci kanser türü olsa da ülke sayısı olarak değerlendirildiğinde dünyadaki ülkelerin %60'ından fazlasında (112/185) ilk sırada görülen kanser türüdür. Kansere bağlı mortalite açısından değerlendirildiğinde ise Afrika'daki birçok ülkede ve bazı Orta Amerika ülkelerinde ilk sıradaki ölüm sebebi olduğu görülmektedir (1). Ülkemizde 5464 ölüm sayısı ile kansere bağlı ölümlerde ilk 5 neden olan kanserden biridir.

İnsidans ve mortalite oranlarının coğrafi bölgeler arasında farklılık gösterdiği anlaşılmaktadır. Hastalığın en yaygın görüldüğü bölge başta İrlanda olmak üzere Kuzey Avrupa ülkeleridir (83,4 / 100.000 erkek). Batı Avrupa, Karayipler,

¹ Uzm. Dr., Başakşehir Çam ve Sakura Şehir Hastanesi, Üroloji Kliniği drgokhanceker@gmail.com

KAYNAKLAR

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin.* 2021 May;71(3):209-249. doi: 10.3322/caac.21660. Epub 2021 Feb 4. PMID: 33538338.
2. Soerjomataram I, Bray F. Planning for tomorrow: global cancer incidence and the role of prevention 2020-2070. *Nat Rev Clin Oncol.* 2021 Oct;18(10):663-672. doi: 10.1038/s41571-021-00514-z. Epub 2021 Jun 2. PMID: 34079102.
3. Center MM, Jemal A, Lortet-Tieulent J, Ward E, Ferlay J, Brawley O, Bray F. International variation in prostate cancer incidence and mortality rates. *Eur Urol.* 2012 Jun;61(6):1079-92. doi: 10.1016/j.eururo.2012.02.054. Epub 2012 Mar 8. PMID: 22424666.
4. Zhou CK, Check DP, Lortet-Tieulent J, Laversanne M, Jemal A, Ferlay J, Bray F, Cook MB, Devesa SS. Prostate cancer incidence in 43 populations worldwide: An analysis of time trends overall and by age group. *Int J Cancer.* 2016 Mar 15;138(6):1388-400. doi: 10.1002/ijc.29894. Epub 2015 Nov 27. PMID: 26488767; PMCID: PMC4712103.
5. Bray F, Piñeros M. Cancer patterns, trends and projections in Latin America and the Caribbean: a global context. *Salud Publica Mex.* 2016 Apr;58(2):104-17. doi: 10.21149/spm.v58i2.7779. PMID: 27557369.
6. Kvåle R, Auvinen A, Adami HO, Klint A, Hernes E, Møller B, et al. Interpreting trends in prostate cancer incidence and mortality in the five Nordic countries. *J Natl Cancer Inst.* 2007 Dec 19;99(24):1881-7. doi: 10.1093/jnci/djm249. Epub 2007 Dec 11. PMID: 18073376.
7. Mottet N, Cornford P, van den Bergh R.C.N., et al. EAU- EANM - ESTRO - ESUR - ISUP - SIOG Guidelines on ProstateCancer. In: EAU Guidelines 2023.
8. Hemminki K. Familial risk and familial survival in prostate cancer. *World J Urol.* 2012 Apr;30(2):143-8. doi: 10.1007/s00345-011-0801-1. Epub 2011 Nov 25. PMID: 22116601.
9. Mottet N, Bellmunt J, Bolla M, Briers E, Cumberbatch MG, De Santis, et al. EAU-ESTRO-SIOG Guidelines on Prostate Cancer. Part 1: Screening, Diagnosis, and Local Treatment with Curative Intent. *Eur Urol.* 2017 Apr;71(4):618-629. doi: 10.1016/j.eururo.2016.08.003. Epub 2016 Aug 25. PMID: 27568654.
10. Brandt A, Bermejo JL, Sundquist J, Hemminki K. Age-specific risk of incident prostate cancer and risk of death from prostate cancer defined by the number of affected family members. *Eur Urol.* 2010 Aug;58(2):275-80. doi: 10.1016/j.eururo.2010.02.002. Epub 2010 Feb 13. PMID: 20171779.
11. Schumacher FR, Al Olama AA, Berndt SI, Benlloch S, Ahmed M, Saunders EJ, et al. Profile Study; Australian Prostate Cancer BioResource (APCB); IMPACT Study; Canary PASS Investigators; Breast and Prostate Cancer Cohort Consortium (BPC3); PRACTICAL (Prostate Cancer Association Group to Investigate Cancer-Associated Alterations in the Genome) Consortium; Cancer of the Prostate in Sweden (CAPS); Prostate Cancer Genome-wide Association Study of Uncommon Susceptibility Loci (PEGASUS); Genetic Associations and Mechanisms in Oncology (GAME-ON)/Elucidating Loci Involved in Prostate Cancer Susceptibility (ELLIPSE) Consortium. Association analyses of more than 140,000 men identify 63 new prostate cancer susceptibility loci. *Nat Genet.* 2018 Jul;50(7):928-936. doi: 10.1038/s41588-018-0142-8. Epub 2018 Jun 11. Erratum in: *Nat Genet.* 2019 Feb;51(2):363. PMID: 29892016; PMCID: PMC6568012.
12. Conti, D.V. Darst, B.F. Moss, L.C. Saunders, E.J. Sheng, et al. Trans-ancestry genome-wide association meta-analysis of prostate cancer identifies new susceptibility loci and informs genetic risk prediction. *Nat. Genet.* 2021, 53, 65–75
13. Giri VN, Hegarty SE, Hyatt C, O'Leary E, Garcia J, Knudsen KE, et al. Germline genetic testing for inherited prostate cancer in practice: Implications for genetic testing, precision the-

- rapy, and cascade testing. *Prostate*. 2019 Mar;79(4):333-339. doi: 10.1002/pros.23739. Epub 2018 Nov 18. PMID: 30450585.
- 14. Castro E, Goh C, Olmos D, Saunders E, Leongamornlert D, Tymrakiewicz M, et al. Germline BRCA mutations are associated with higher risk of nodal involvement, distant metastasis, and poor survival outcomes in prostate cancer. *J Clin Oncol*. 2013 May 10;31(14):1748-57. doi: 10.1200/JCO.2012.43.1882. Epub 2013 Apr 8. PMID: 23569316; PMCID: PMC3641696.
 - 15. Castro E, Goh C, Leongamornlert D, Saunders E, Tymrakiewicz M, Dadaev T, et al. Effect of BRCA Mutations on Metastatic Relapse and Cause-specific Survival After Radical Treatment for Localised Prostate Cancer. *Eur Urol*. 2015 Aug;68(2):186-93. doi: 10.1016/j.euro.2014.10.022. Epub 2014 Nov 6. PMID: 25454609.
 - 16. Sanchez-Ortiz RF, Troncoso P, Babaian RJ, Lloreta J, Johnston DA, Pettaway CA. African-American men with nonpalpable prostate cancer exhibit greater tumor volume than matched white men. *Cancer*. 2006 Jul 1;107(1):75-82. doi: 10.1002/cncr.21954. PMID: 16736511.
 - 17. Freedman ML, Haiman CA, Patterson N, McDonald GJ, Tandon A, Waliszewska A, et al. Admixture mapping identifies 8q24 as a prostate cancer risk locus in African-American men. *Proc Natl Acad Sci U S A*. 2006 Sep 19;103(38):14068-73. doi: 10.1073/pnas.0605832103. Epub 2006 Aug 31. PMID: 16945910; PMCID: PMC1599913.
 - 18. Breslow N, Chan CW, Dhom G, Drury RA, Franks LM, Gellei B, et al. Latent carcinoma of prostate at autopsy in seven areas. The International Agency for Research on Cancer, Lyons, France. *Int J Cancer*. 1977 Nov 15;20(5):680-8. doi: 10.1002/ijc.2910200506. PMID: 924691.
 - 19. Haas GP, Delongchamps N, Brawley OW, Wang CY, de la Roza G. The worldwide epidemiology of prostate cancer: perspectives from autopsy studies. *Can J Urol*. 2008 Feb;15(1):3866-71. PMID: 18304396; PMCID: PMC2706483.
 - 20. Bell KJ, Del Mar C, Wright G, Dickinson J, Glasziou P. Prevalence of incidental prostate cancer: A systematic review of autopsy studies. *Int J Cancer*. 2015 Oct 1;137(7):1749-57. doi: 10.1002/ijc.29538. Epub 2015 Apr 21. PMID: 25821151; PMCID: PMC4682465.
 - 21. Esposito K, Chiodini P, Capuano A, Bellastella G, Maiorino MI, Parretta E, et al. Effect of metabolic syndrome and its components on prostate cancer risk: meta-analysis. *J Endocrinol Invest*. 2013 Feb;36(2):132-9. doi: 10.1007/BF03346748. PMID: 23481613.
 - 22. Zhang X, Zhou G, Sun B, Zhao G, Liu D, Sun Jet al. Impact of obesity upon prostate cancer-associated mortality: A meta-analysis of 17 cohort studies. *Oncol Lett*. 2015 Mar;9(3):1307-1312. doi: 10.3892/ol.2014.2841. Epub 2014 Dec 31. PMID: 25663903; PMCID: PMC4315023.
 - 23. Wilson RL, Taaffe DR, Newton RU, Hart NH, Lyons-Wall P, Galvão DA. Crit Rev Oncol Hematol. 2022 Jan;169:103543. doi: 10.1016/j.critrevonc.2021.103543. Epub 2021 Nov 20. PMID: 34808374
 - 24. Zhao J, Stockwell T, Roemer A, Chikritzhs T. Is alcohol consumption a risk factor for prostate cancer? A systematic review and meta-analysis. *BMC Cancer*. 2016 Nov 15;16(1):845. doi: 10.1186/s12885-016-2891-z. PMID: 27842506; PMCID: PMC5109713.
 - 25. Dickerman BA, Markt SC, Koskenvuo M, Pukkala E, Mucci LA, Kaprio J. Alcohol intake, drinking patterns, and prostate cancer risk and mortality: a 30-year prospective cohort study of Finnish twins. *Cancer Causes Control*. 2016 Sep;27(9):1049-58. doi: 10.1007/s10552-016-0778-6. Epub 2016 Jun 28. PMID: 27351919; PMCID: PMC5278639.
 - 26. Chen X, Zhao Y, Tao Z, Wang K. Coffee consumption and risk of prostate cancer: a systematic review and meta-analysis. *BMJ Open*. 2021 Jan 11;11(2):e038902. doi: 10.1136/bmjopen-2020-038902. PMID: 33431520; PMCID: PMC7805365.
 - 27. Bylsma LC, Alexander DD. A review and meta-analysis of prospective studies of red and processed meat, meat cooking methods, heme iron, heterocyclic amines and prostate cancer. *Nutr J*. 2015 Dec 21;14:125. doi: 10.1186/s12937-015-0111-3. PMID: 26689289; PMCID: PMC4687294.

28. Ilic D, Misso M. Lycopene for the prevention and treatment of benign prostatic hyperplasia and prostate cancer: a systematic review. *Maturitas*. 2012 Aug;72(4):269-76. doi: 10.1016/j.maturitas.2012.04.014. Epub 2012 May 23. PMID: 22633187.
29. Applegate, C. C., J. L. Rowles 3rd, K. M. Ranard, S. Jeon, and J. W. Erdman. Soy consumption and the risk of prostate cancer: an updated systematic review and meta-analysis. *Nutrients* 2018; 10: 40.
30. Kristal AR, Till C, Song X, Tangen CM, Goodman PJ, Neuhauser ML, Schenk JM, et al. Plasma vitamin D and prostate cancer risk: results from the Selenium and Vitamin E Cancer Prevention Trial. *Cancer Epidemiol Biomarkers Prev*. 2014 Aug;23(8):1494-504. doi: 10.1158/1055-9965.EPI-14-0115. Epub 2014 Apr 14. PMID: 24732629; PMCID: PMC4119495.
31. Cui Z, Liu D, Liu C, Liu G. Serum selenium levels and prostate cancer risk: A MOOSE-compliant meta-analysis. *Medicine (Baltimore)*. 2017 Feb;96(5):e5944. doi: 10.1097/MD.0000000000005944. PMID: 28151881; PMCID: PMC5293444.
32. Oczkowski M, Dziendzikowska K, Pasternak-Winiarska A, Włodarek D, Gromadzka-Ostrowska J. Dietary Factors and Prostate Cancer Development, Progression, and Reduction. *Nutrients*. 2021 Feb 3;13(2):496. doi: 10.3390/nu13020496. PMID: 33546190; PMCID: PMC7913227.
33. Cui R, Liu ZQ, Xu Q. Blood α -tocopherol, γ -tocopherol levels and risk of prostate cancer: a meta-analysis of prospective studies. *PLoS One*. 2014 Mar 25;9(3):e93044. doi: 10.1371/journal.pone.0093044. PMID: 24667740; PMCID: PMC3965522.
34. Huggins C, Hodges CV. Studies on prostatic cancer: I. The effect of castration, of estrogen and of androgen injection on serum phosphatases in metastatic carcinoma of the prostate. 1941. *J Urol*. 2002 Jul;168(1):9-12. doi: 10.1016/s0022-5347(05)64820-3. PMID: 12050481.
35. Roddam AW, Allen NE, Appleby P, Key TJ. Endogenous Hormones and Prostate Cancer Collaborative Group; Endogenous sex hormones and prostate cancer: a collaborative analysis of 18 prospective studies. *J Natl Cancer Inst*. 2008 Feb 6;100(3):170-83. doi: 10.1093/jnci/djm323. Epub 2008 Jan 29. PMID: 18230794; PMCID: PMC6126902.
36. Watts EL, Appleby PN, Perez-Cornago A, Bueno-de-Mesquita HB, Chan JM, et al. Low Free Testosterone and Prostate Cancer Risk: A Collaborative Analysis of 20 Prospective Studies. *Eur Urol*. 2018 Nov;74(5):585-594. doi: 10.1016/j.eururo.2018.07.024. Epub 2018 Aug 1. PMID: 30077399; PMCID: PMC6195673
37. Haider A, Zitzmann M, Doros G, Isbarn H, Hammerer P, Yassin A. Incidence of prostate cancer in hypogonadal men receiving testosterone therapy: observations from 5-year median followup of 3 registries. *J Urol*. 2015 Jan;193(1):80-6. doi: 10.1016/j.juro.2014.06.071. Epub 2014 Jun 26. PMID: 24980615
38. Freedland SJ, Hamilton RJ, Gerber L, Banez LL, Moreira DM, Andriole GL, et al. Statin use and risk of prostate cancer and high-grade prostate cancer: results from the REDUCE study. *Prostate Cancer Prostatic Dis*. 2013 Sep;16(3):254-9. doi: 10.1038/pcan.2013.10. Epub 2013 Apr 9. PMID: 23567655.
39. Li Y, Cheng X, Zhu JL, Luo WW, Xiang HR, Zhang QZ, Peng WX. Effect of Statins on the Risk of Different Stages of Prostate Cancer: A Meta-Analysis. *Urol Int*. 2022;106(9):869-877. doi: 10.1159/000518164. (38) Epub 2021 Sep 8. PMID: 34518476
40. Hu, X., Wang, Y.H., Yang, Z.Q., Shao, Y.X., Yang, W.X. and Li, X., 2020. Association of 5-alpha-reductase inhibitor and prostate cancer incidence and mortality: a meta-analysis. *Translational Andrology and Urology*, 9(6), p.2519.PMID: 33457226; PMCID: PMC7807305
41. Knijnik PG, Brum PW, Cachoeira ET, Paludo AO, Gorgen ARH, Burttet LM, Neyeloff JL, Neto BS. The impact of 5-alpha-reductase inhibitors on mortality in a prostate cancer chemoprevention setting: a meta-analysis. *World J Urol*. 2021 Feb;39(2):365-376. doi: 10.1007/s00345-020-03202-2. Epub 2020 Apr 20. PMID: 32314009.
42. Islami F, Moreira DM, Boffetta P, Freedland SJ. A systematic review and meta-analysis of

- tobacco use and prostate cancer mortality and incidence in prospective cohort studies. *Eur Urol.* 2014 Dec;66(6):1054-64. doi: 10.1016/j.eururo.2014.08.059. Epub 2014 Sep 18. PMID: 25242554; PMCID: PMC4566150.
43. Bhindi B, Wallis CJD, Nayan M, Farrell AM, Trost LW, Hamilton RJ, et al. The Association Between Vasectomy and Prostate Cancer: A Systematic Review and Meta-analysis. *JAMA Intern Med.* 2017 Sep 1;177(9):1273-1286. doi: 10.1001/jamainternmed.2017.2791. PMID: 28715534; PMCID: PMC5710573.
44. Rider JR, Wilson KM, Sinnott JA, Kelly RS, Mucci LA, Giovannucci EL. Ejaculation Frequency and Risk of Prostate Cancer: Updated Results with an Additional Decade of Follow-up. *Eur Urol.* 2016 Dec;70(6):974-982. doi: 10.1016/j.eururo.2016.03.027. Epub 2016 Mar 28. PMID: 27033442; PMCID: PMC5040619
45. Lian WQ, Luo F, Song XL, Lu YJ, Zhao SC. Gonorrhea and Prostate Cancer Incidence: An Updated Meta-Analysis of 21 Epidemiologic Studies. *Med Sci Monit.* 2015 Jul 1;21:1902-10. doi: 10.12659/MSM.893579. PMID: 26126881; PMCID: PMC4502545
46. Ju-Kun S, Yuan DB, Rao HF, Chen TF, Luan BS, Xu XM, Jiang FN, Zhong WD, Zhu JG. Association Between Cd Exposure and Risk of Prostate Cancer: A PRISMA-Compliant Systematic Review and Meta-Analysis. *Medicine (Baltimore).* 2016 Feb;95(6):e2708. doi: 10.1097/MD.0000000000002708. PMID: 26871808; PMCID: PMC4753904
47. Burns JA, Weiner AB, Catalona WJ, Li EV, Schaeffer EM, Hanauer SB, Strong S, Burns J, Hussain MHA, Kundu SD. Inflammatory Bowel Disease and the Risk of Prostate Cancer. *Eur Urol.* 2019 May;75(5):846-852. doi: 10.1016/j.eururo.2018.11.039. Epub 2018 Dec 4. PMID: 30528221; PMCID: PMC6542355.
48. Zhou CK, Levine PH, Cleary SD, Hoffman HJ, Graubard BI, Cook MB. Male Pattern Baldness in Relation to Prostate Cancer-Specific Mortality: A Prospective Analysis in the NHANES I Epidemiologic Follow-up Study. *Am J Epidemiol.* 2016 Feb 1;183(3):210-7. doi: 10.1093/aje/kwv190. Epub 2016 Jan 12. PMID: 26764224; PMCID: PMC4724092.
49. Zhou CK, Littman AJ, Levine PH, Hoffman HJ, Cleary SD, White E, Cook MB. Male pattern baldness in relation to prostate cancer risks: an analysis in the VITamins and lifestyle (VITAL) cohort study. *Prostate.* 2015 Mar 1;75(4):415-23. doi: 10.1002/pros.22927. Epub 2014 Dec 9. PMID: 25492530; PMCID: PMC4293210.
50. Mancio J, Leal C, Ferreira M, Norton P, Lunet N. Does the association of prostate cancer with night-shift work differ according to rotating vs. fixed schedule? A systematic review and meta-analysis. *Prostate Cancer Prostatic Dis.* 2018 Sep;21(3):337-344. doi: 10.1038/s41391-018-0040-2. Epub 2018 Apr 27. PMID: 29700389.
51. Moghoofei M, Keshavarz M, Ghorbani S, Babaei F, Nahand JS, Tavakoli A, Mortazavi HS, Marjani A, Mostafaei S, Monavari SH. Association between human papillomavirus infection and prostate cancer: A global systematic review and meta-analysis. *Asia Pac J Clin Oncol.* 2019 Oct;15(5):e59-e67. doi: 10.1111/ajco.13124. Epub 2019 Feb 10. PMID: 30740893.