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## Waterpipe Smoking and Breast Cancer Risk: The Emerging Need for Research and Prevention

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Breast cancer has now overrun lung cancer as the world's most commonly diagnosed cancer, based on the latest estimates released by the International Agency for Research on Cancer.<sup>1</sup> To prevent an estimated 2.5 million deaths per annum, it is crucial to focus on increasing public awareness for risk reduction and early diagnosis, especially in the regions with increasing rates and unequitable resources.<sup>2</sup>

Tobacco smoke is the most important human carcinogen and passive and active smoking is among the known risk factors of breast cancer.<sup>3</sup> Although much evidence exists for a moderate increase in the risk of breast cancer in tobacco smoking women,<sup>4,5</sup> much less is known about potential association between waterpipe smoking and breast cancer risk. Waterpipe (also known as hookah, hubble-bubble, narghile, shisha, borri or goza) is a form of tobacco consumption where the smoke bubbles through water before reaching the smoker.

The highest rates of waterpipe use have been reported from the Middle East, Asia and Africa, but it has rapidly become an emerging problem in the United States as well as Europe.<sup>6</sup> The reasons for increasing popularity include misconceptions about safety (in comparison to cigarette smoking, as the smoke passes through water,) introduction of flavoured tobacco, social acceptability and lack of waterpipe-specific control policy and regulations.<sup>7,8</sup> Women and young people seem more likely to be choosing waterpipe over

cigarettes, with the prevalence surpassing cigarette smoking in some areas.<sup>8</sup>

A typical waterpipe smoking session lasts about 45 minutes to one hour, exposing the active and passive smokers to tobacco-specific nitrosamines, polycyclic aromatic hydrocarbons, volatile aldehydes, nitric oxide and heavy metals.<sup>3</sup> A naturalistic study (in a bar setting) among 55 water pipe smokers (43.6% female) demonstrated 73-fold increase in urine nicotine and 2-fold increase in tobacco-specific nitrosamine (NNAL) immediately following waterpipe smoking.<sup>9</sup>

Although the impact of these alarming trends are not yet reflected in breast cancer risk, there are some in vitro studies supporting this association. Waterpipe smoke has been shown to induce epithelial-mesenchymal transition (EMT) of MCF7 and BT20 breast cancer cell lines, increasing their cell invasion ability in comparison with their matched controls. Also, waterpipe smoke causes a down- and up-regulation of E-cadherin and focal adhesion kinase (FAK), respectively, which are considered as vital regulators of cancer progression genes. Waterpipe smoke also activates *Erk1/Erk2*, which could be the major factor for stimulating epithelial-mesenchymal transition, increasing invasion and the deregulation of E-cadherin and FAK expression.<sup>10</sup>

These studies are alarming and call for an urgent need for increasing awareness among women and promoting research in this area.

### CONFLICT OF INTEREST

None.

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## REFERENCES

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*. 2021. doi: 10.3322/caac.21660.
2. Karbakhsh M. Global Breast Cancer Initiative: an Integrative Approach to Thinking Globally, Acting Locally. *Archives of Breast Cancer*. 2021;8(2):63-64. doi: 10.32768/abc.20218157-62.
3. Johnson KC, Miller AB, Collishaw NE, Palmer JR, Hammond SK, Salmon AG, et al. Active smoking and secondhand smoke increase breast cancer risk: the report of the Canadian Expert Panel on Tobacco Smoke and Breast Cancer Risk (2009). *Tobacco control*. 2011;20(1):e2-e2. doi: 10.1136/tc.2010.035931.
4. Macacu A, Autier P, Boniol M, Boyle P. Active and passive smoking and risk of breast cancer: a meta-analysis. *Breast cancer research and treatment*. 2015;154(2):213-224. doi: 10.1007/s10549-015-3628-4.
5. Gaudet MM, Gapstur SM, Sun J, Diver WR, Hannan LM, Thun MJ. Active Smoking and Breast Cancer Risk: Original Cohort Data and Meta-Analysis. *JNCI: Journal of the National Cancer Institute*. 2013;105(8):515-525. doi:10.1093/jnci/djt023.
6. Jawad M, Charide R, Waziry R, Darzi A, Ballout RA, Akl EA. The prevalence and trends of waterpipe tobacco smoking: A systematic review. *PloS one*. 2018;13(2):e0192191. doi: 10.1371/journal.pone.0192191.
7. Canadian Motor Vehicle Traffic Collision Statistics: 2015 - Transport Canada. Available from: <https://www.tc.gc.ca/eng/motorvehiclesafety/tp-tp3322-2015-1487.html>. Accessed June 13, 2018.
8. Maziak W, Taleb ZB, Bahelah R, Islam F, Jaber R, Auf R, et al. The global epidemiology of waterpipe smoking. *Tobacco control*. 2015;24(Suppl 1):i3-i12. doi: 10.1136/tobaccocontrol-2014-051903.
9. Helen GS, Benowitz NL, Dains KM, Havel C, Peng M, Jacob P. Nicotine and carcinogen exposure after water pipe smoking in hookah bars. *Cancer Epidemiology Biomarkers and Prevention*. 2014;23(6):1055-1066. doi:10.1158/1055-9965.EPI-13-0939.
10. Sadek KW, Haik MY, Ashour AA, Baloch T, Aboukassim T, Yasmeeen A, et al. Water-pipe smoking promotes epithelial-mesenchymal transition and invasion of human breast cancer cells via ERK1/ERK2 pathways. *Cancer cell international*. 2018;18:180. doi:10.1186/s12935-018-0678-9.

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