



Sigaranın Yerine Konulanlar; Elektronik Sigara ve Nargile Masum Mu?

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- Tütün, üreticilerinin amaçladığı şekilde kullanıldığında, birçok kullanıcısını öldüren yasal bir uyuşturucudur¹.
- Kullanıcıların yaklaşık yarısını öldürmekte
- 8 milyon ölüm
- 7 milyon smoker, 1.2 milyon non-smoker²

1-World Health Organization. WHO global report on trends in prevalence of tobacco smoking 2015. Geneva; 2015.

2- World Health Organization. WHO global report on trends in prevalence of tobacco use 2000-2025, 3rd ed. Geneva; 2019.



- Tütün epidemisi halk sağlığı açısından en büyük tehditlerden biri
- Küresel tütün kullanımı son 2 dekada düşmüştür
- 2000 yılında 1.397 milyar
- 2018'de 1.337 milyar
- Kadın smokerda düşüş²



- E-sigara ve nargile kullanımı
- Daha az zararlı olduğu algısı³
- Özellikle gençlerde kullanıcı sayısı artmakta
- 2023 te 26.84 milyar dolarlık pazar öngörülmekte⁴
- Kaygı verici prevelans⁵
- Amerikada % 2.1 den % 44.0e ,
- İngilterede % 11.6dan %40.1e
- Almanyada % 2.0den % 28.9a
- Amerikada aromalı tütün ürünlerinin yasaklanması⁶

3- Eissenberg T, Bhatnagar A, Chapman S, Jordt SE, Shihadeh A, Soule EK. Invalidity of an oft-cited estimate of the relative harms of electronic cigarettes. Am J Public Health 2020;110:161–162.

4-Grana R, Benowitz N, Glantz SA. E-cigarettes: a scientific review. Circulation 2014;129:1972–1986.

5 -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:e0192191.

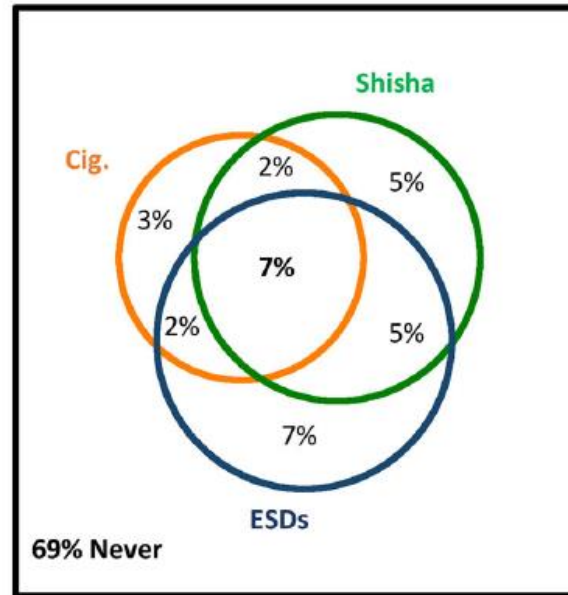
6- U.S. Food and Drug Administration. FDA finalizes enforcement policy on unauthorized flavored cartridge-based e-cigarettes that appeal to children, including fruit and mint. 2020



FIGURE 2 Venn diagrams showing the overlap between occasional or frequent active smoking of cigarettes, shishas and electronic smoking devices in adolescents aged A, 13 to 14 and B, 15 to 17 years. ESDs, electronic smoking devices [Color figure can be viewed at wileyonlinelibrary.com]

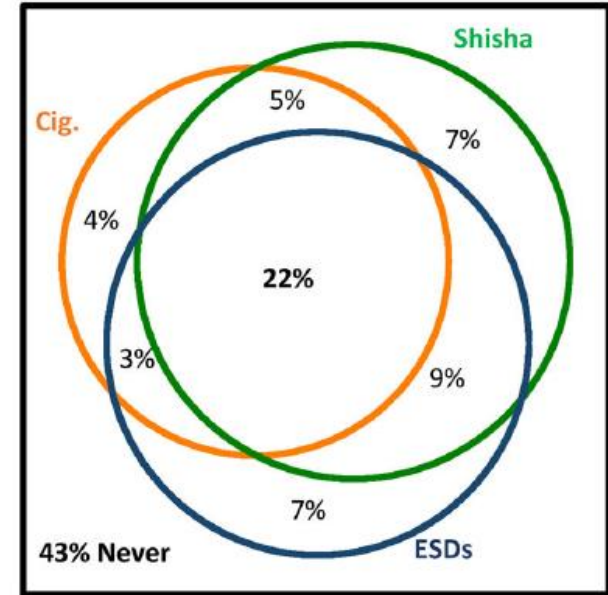
(A)

Age 13-14 years
N=1106



(B)

Age 15-17 years
N=477



Cigarette, shisha, and electronic smoking and respiratory symptoms in Swiss children: The LUIS study



STOP SMOKING & START VAPING

In 1 week
your sense of taste
and smell improves

In 3 months
your lung function
begin to improve

In 8 hours
excess carbon
monoxide is out
of your blood

In 1 year
a pack-a-day
smoker will
save over
\$4,000

In 1 year
your risk of a stroke
has dramatically
decreased

In 12 weeks
your lungs regain the
ability to clean
themselves

In 12 months
your risk of heart
disease has halved

In 5 days
you'll feel
better from
drinking more
water and
less flavoured
drinks

**EVERY CIGARETTE YOU DON'T SMOKE
IS DOING YOU GOOD**

WHAT HAPPENS WHEN YOU STOP SMOKING & START VAPING

▼ SMOKER ▼ VAPER

HEAD

▼ The risk of
having a stroke
is 50% higher

▼ The risk of a stroke
decreases
dramatically

MOUTH

▼ Increased risk of
developing lips,
tongue, throat, voice
box and gullet cancer

▼ Improved
sense of
taste

LUNGS

▼ 84% of deaths
caused by lung
cancer are due to
smoking

▼ They will regain
the ability to
clean
themselves

HEART

▼ Increased risk of heart
attacks, strokes and
cerebrovascular
disease

▼ Lower risk of
heart
diseases

SKIN

▼ The amount of
oxygen that
get's into your
skin is reduced

▼ Your skin will
become clearer
and healthier

STOMACH

▼ Increased risk of
developing
stomach cancers
or ulcers

▼ Less prone
to stomach
issues

CIRCULATION

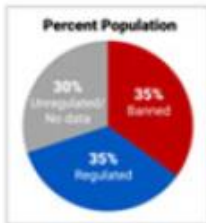
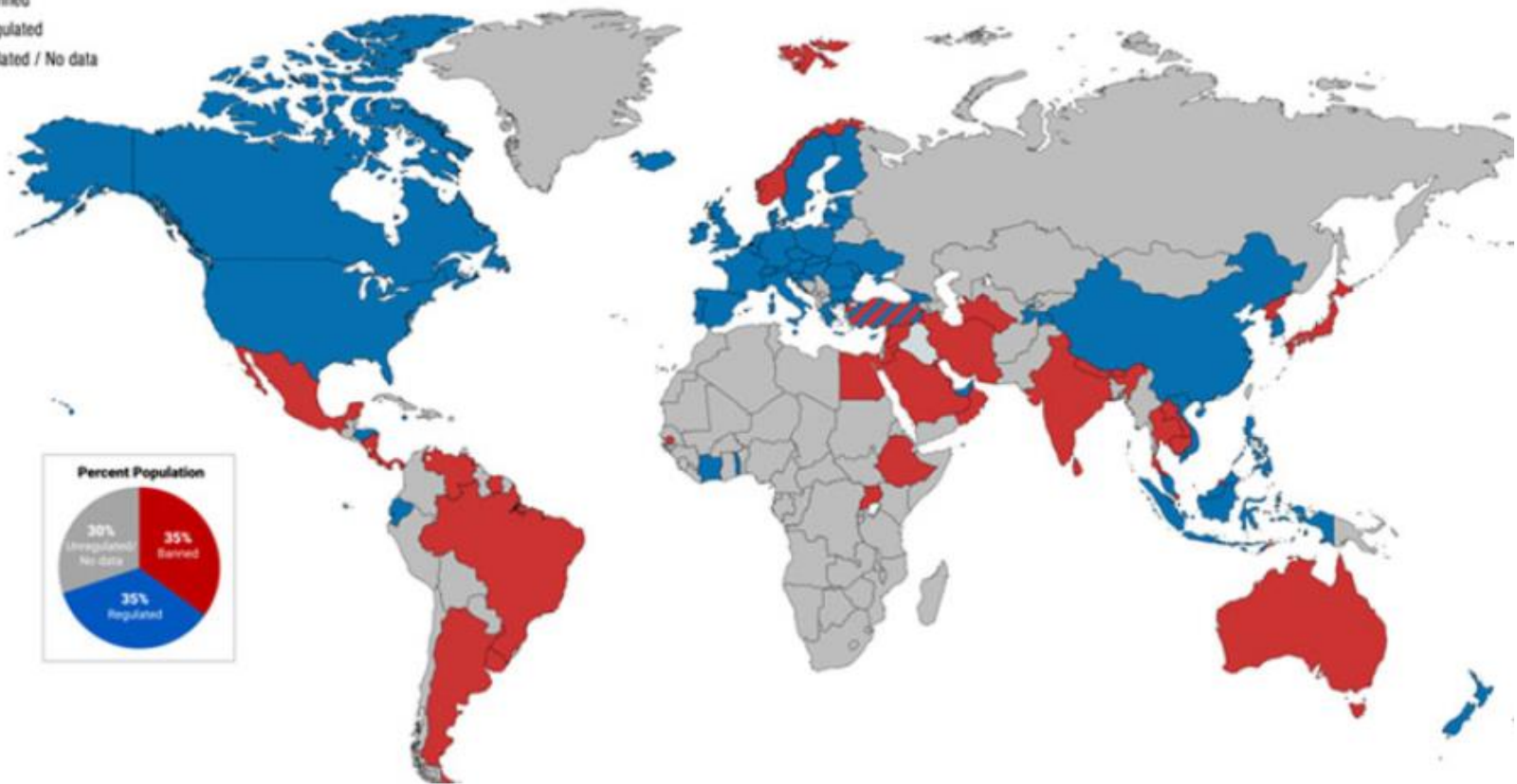
▼ Smoking makes
your blood thicker
which increases
the risk of blood
clots

▼ Blood pressure
will lower to more
normal levels



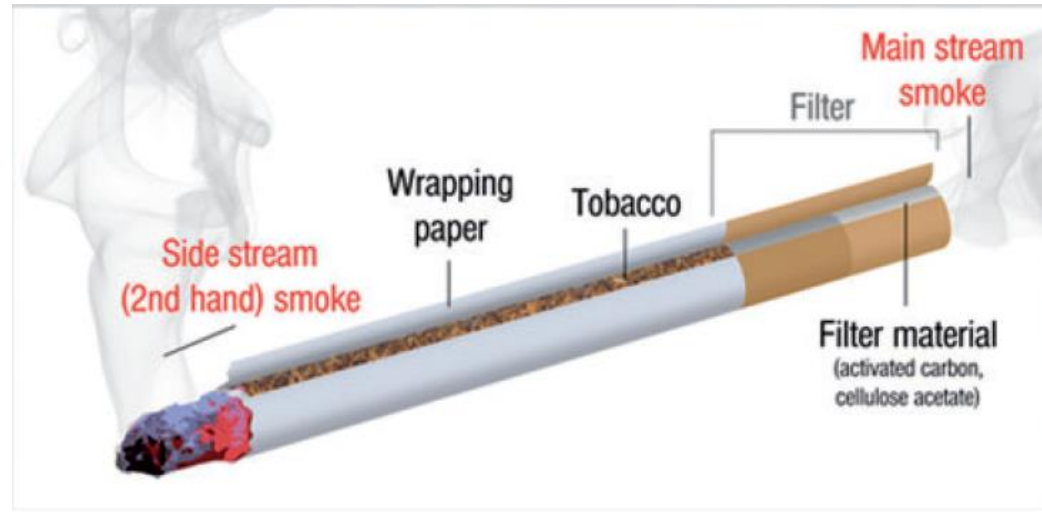
E-cigarette sales regulations

- Sales banned
- Sales regulated
- Not regulated / No data





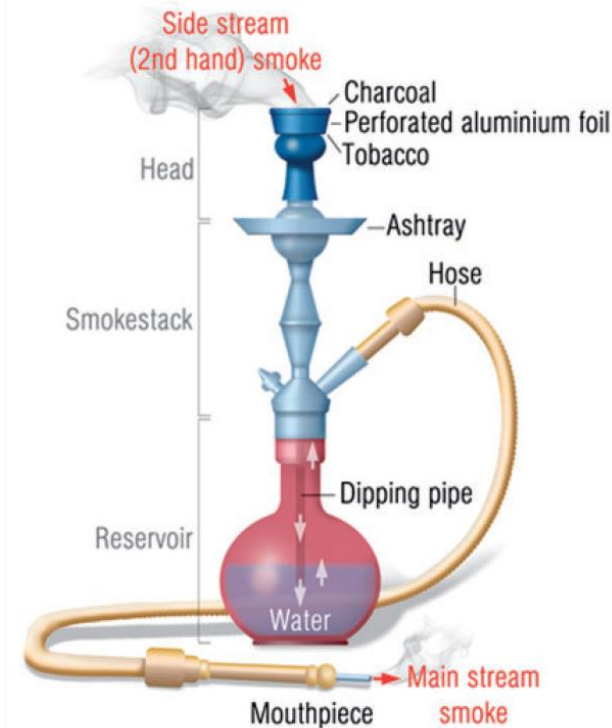
- Sigara kullanıcıları
- Tütün alışkanlığı
- Nikotin
- Nitrozamin
- Polisiklik hidrokarbonlar





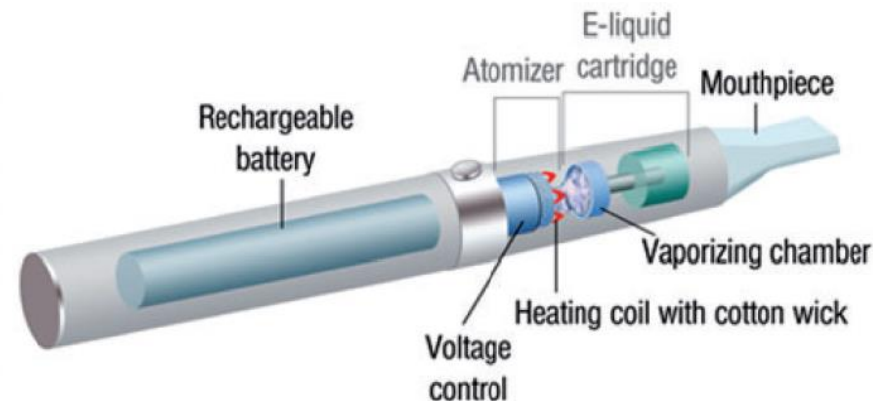
- Nargile
- Tütünü yakarak tüketme
- Sigaraya benzer içerik
- Amerikada % 5- % 17
- Ortadoğuda % 6- % 43⁷

7-MacKillop J, Amlung MT, Wier LM, David SP, Ray LA, Bickel WK The neuroeconomics of nicotine dependence: A preliminary functional magnetic resonance imaging study of delay discounting of monetary and cigarette rewards in smokers. Psych Res. 2012;202(1):20-29.





- Elektronik Sigara
- Nikotin
- Gliserin
- Propilen glikol
- Ana toksik madde Karbonil bileşikleri





- Karbonmonoksit her 3 tütün tüketiminde de kanda artmaktadır.
- Irreversibl olarak hemoglobine bağlanır.
- Oksijen transferini bozarak, hipoksiye sebep olur¹⁰.
- Mammalian hücrelerinden salınır.
- Vazodilatasyon
- Lökosit agregasyonunun regülasyonu
- İskemi/reperfüzyon hasarının azaltılması¹¹

10-Prockop LD, Chichkova RI. Carbon monoxide intoxication: an updated review. J Neurol Sci 2007;262:122–130.

11-Stein AB, Bolli R, Dawn B, Sanganalmath SK, Zhu Y, Wang OL, Guo Y, Motterlini R, Xuan YT. Carbon monoxide induces a late preconditioningmimetic cardioprotective and antiapoptotic milieu in the myocardium. J Mol Cell Cardiol 2012;52:228–236.



Toxic compound type	Toxic compound	Concentration range cigarette	Concentration range e-cigarette	Concentration range waterpipe
Carbonyls	Formaldehyde	7–10 µg/puff ^{2,32,180}	0.12–82 µg/puff ^{181–184}	0.21–0.65 µg/puff ^{185,186}
	Acetaldehyde	50–140 µg/puff ^{2,32,180}	0.2–53 µg/puff ^{181–184}	2.0–5.5 µg/puff ^{185,186}
	Acrolein	6–14 µg/puff ^{2,32,180}	0.12–3.3 µg/puff ^{181–184,187}	0.06–1.19 µg/puff ^{185,186}
	Propionaldehyde	0.4–5.9 µg/puff ^{2,32,180}	0.057–1.79 µg/puff ^{181,182}	0.05–1.06 µg/puff ^{185,186}
	Crotonaldehyde	1–2 µg/puff ^{2,32,180}	ND–0.04 µg/puff ¹⁸⁸	0.78–1.39 µg/puff ¹⁸⁹
N-Nitrosamines	N'-Nitrosanonicotine (NNN)	0.5–370 ng/puff ^{2,32,180}	ND–0.029 ng/puff ^{22,183,190}	0.2 ng/puff ^{185,191}
	N'-Nitrosoanabasine (NAB)	ND–15 ng/puff ^{2,32,180}	ND–0.01 ng/puff ^{22,190}	0.05 ng/puff ^{185,191}
	4-(Methylnitrosamino)-1-(3-pyridyl)- 1-butanone (NNK)	1.2–77 ng/puff ^{2,32,180}	ND–0.019 ng/puff ^{22,183,190}	0.27 ng/puff ^{185,191}
	N'-nitrosoanatabine (NAT)	0.8–16 ng/puff ^{2,32,180}	ND–0.085 ng/puff ^{22,190}	0.6 ng/puff ^{185,191}
VOCs	Toluene	0.8–6.9 µg/puff ^{2,32,180}	ND–1.53 µg/puff ¹⁹²	0.058 µg/puff ^{185,193}
	Benzene	0.6–4.5 µg/puff ^{2,32,180}	ND–0.41 µg/puff ¹⁹²	1.58 µg/puff ^{185,193}
Inorganic compounds	Nickel	ND–60 ng/puff ^{2,32,180}	0.1–6.4 ng/puff ¹⁹⁴	9.9 ng/puff ^{185,195}
	Cobalt	0.013–0.02 ng/puff ^{2,32,180}	0.05–0.58 ng/puff ¹⁹⁶	0.7 ng/puff ^{185,195}
	Chromium	0.4–7 ng/puff ^{2,32,180}	0.05–9 ng/puff ¹⁹⁴	13.4 ng/puff ^{185,195}
	Lead	3.4–8.5 ng/puff ^{2,32,180}	0.16–3.8 ng/puff ¹⁹⁷	68.7 ng/puff ^{185,195}
	Carbon monoxide (CO)	1–2.3 mg/puff ^{2,32,180}	not applicable	1.15–1.67 mg/puff ^{185,186}
PAHs	Benz[a]anthracene	2–7 ng/puff ^{2,32,180}	Not applicable ^a	1.3–1.6 ng/puff ^{185,191}
	Benzo[b,k]fluoranthene	1–3.4 ng/puff ^{2,32,180}	Not applicable ^a	0.13–2.16 ng/puff ^{185,191}
	Benzo[a]pyrene	2–4 ng/puff ^{2,32,180}	Not applicable ^a	0.78–1.79 ng/puff ^{185,191}
	Dibenzo[a,h]anthracene	0.06–0.4 ng/puff ^{2,32,180}	Not applicable ^a	0.86–ng/puff ^{185,191}
Nicotine		0.1–0.3 mg/puff ^{2,32,180}	0–0.142 mg/puff ¹⁹⁶	0–0.058 mg/puff ^{185,186,198}
Particulate matter	TPM	0.1–1.7 mg/puff ²	0.87–5.8 mg/puff ^{199,200,b}	1.8–9.3 mg/puff ^{185,198,201}

PAHs, polycyclic aromatic hydrocarbons and heterocyclic aromatic hydrocarbons; VOCs, volatile organic compounds.

^aOnly a few studies find concentrations of PAHs in e-cigarette vapour that are close to the limit of quantification.

^bLiquid aerosol droplets.



Kardiyovasküler Etkiler

- Sigara
- Koroner arter hastalığı, Miyokard enfarktüsü, İnme, Kalp yetmezliği, kardiyak mortalite
- British Doctors Study¹³ and the Framingham Heart Study¹⁴
- INTERHEART¹⁵ multicentre case–control çalışması with 27 089 participants from 52 countries
- ARIC¹⁶ çalışması 26 yıl takip sonrası doz bağımlı olarak periferik arter hastalığı, koroner arter hastalığı, inme gelişimi

12-U.S. Department of Health and Human Services. The health consequences of smoking: 50 years of progress. A report of the surgeon general. 2014.

13- Doll R, Hill AB. The mortality of doctors in relation to their smoking habits; a preliminary report. Br Med J 1954;1:1451–1455.

14- Doyle JT, Dawber TR, Kannel WB, Heslin AS, Kahn HA. Cigarette smoking and coronary heart disease. Combined experience of the Albany and Framingham studies. N Engl J Med 1962;266:796–801.

15- Teo KK, Ounpuu S, Hawken S, Pandey MR, Valentin V, Hunt D, Diaz R, Rashed W, Freeman R, Jiang L, Zhang X, Yusuf S; INTERHEART Study Investigators. Tobacco use and risk of myocardial infarction in 52 countries in the INTERHEART study: a case-control study. Lancet 2006;368:647–658.

16- Ding N, Sang Y, Chen J, Ballew SH, Kalbaugh CA, Salameh MJ, Blaha MJ, Allison M, Heiss G, Selvin E, Coresh J, Matsushita K. Cigarette smoking, smoking cessation, and long-term risk of 3 major atherosclerotic diseases. J Am Coll Cardiol 2019;74:498–507.



Kardiyovasküler Etkiler

- Nargile
- Kardiyovasküler ölüm ile ilişkisi gösterilmiştir
- İskemik kalp hastalığı ve kalp yetmezliği
- Uzun süreli nargile içiminin olumsuz kardiyovasküler etkileri, sigara içimi ile karşılaştırıldığında,
- 40 nargile yılını aşan kronik kullanımın, koroner arter stenoz olasılığında üç kat artış¹⁷

17-Sibai AM, Tohme RA, Almedawar MM, Itani T, Yassine SI, Nohra EA, Isma'eel HA. Lifetime cumulative exposure to waterpipe smoking is associated with coronary artery disease. *Atherosclerosis* 2014;234:454–460.



Kardiyovasküler Etkiler

- Elektronik sigara
- Akut etkileri ve toksik özellikleri;
- Oksidatif stres ve endotelyal disfonksiyon
- Uzun dönemli etkilerinde miyokard enfarktüsü arttığı tespit edilmiştir.
- **Sigara kullanıcılarının elektronik sigaraya geçtiklerinde nabız, tansiyon değerlerinde iyileşme saptanmış¹⁸**

18-Skotsimara G, Antonopoulos AS, Oikonomou E, Siasos G, Ioakeimidis N, Tsalamandris S, Charalambous G, Galiatsatos N, Vlachopoulos C, Tousoulis D. Cardiovascular effects of electronic cigarettes: a systematic review and metaanalysis. Eur J Prev Cardiol 2019;26:1219–1228.



Vasküler Endotelyal Disfonksiyon

- Uzun dönem endotelyum bağımlı koroner vazodilatasyon
- Akut etkiler ağır metallere bağı nargilede sigaradan daha fazla
- Elektronik sigara ile normal sigara içiminin kıyaslandığı bir çalışmada hastaların vit E ve NO seviyelerine bakılmış

Vasküler Endotelyal Disfonksiyon

- Aynı doz nikotin içeren mamüllerde sigara ile elektronik sigara arasında istatistiksel anlamlı fark saptanmamış¹⁹

19-Carnevale R, Sciarretta S, Violi F, Nocella C, Loffredo L, Perri L, Peruzzi M, Marullo AG, De Falco E, Chimenti I, Valenti V, Biondi-Zoccai G, Frati G. Acute impact of tobacco vs electronic cigarette smoking on oxidative stress and vascular function. Chest 2016;150:606–612.



 — Transition metals Carbon monoxide Aldehydes Nicotine N-nitrosamines Solid particulate matter VOCs, PAHs	 Transition metals Carbon monoxide Aldehydes Nicotine N-nitrosamines Solid particulate matter VOCs, PAHs	 Transition metals Aldehydes Nicotine N-nitrosamines VOCs
Oxidative stress: Serum TBARs, 3-NT, oxLDL, isoprostane ↑ Cellular NOX activation and ROS ↑ Aortic NOX-2 ↑, ROS ↑, eNOS uncoupling, BH4 depletion Cardiac mTHUS ↑, impaired sirtuin-3 Inflammation: IL-1β ↑, IL-6, TNF-α ↑, iNOS, CRP, WBCs ↑ Aortic Vcam1, Icam1, Mcp1, p22phox ↑ Thrombosis: Fibrinogen, d-dimer ↑ DNA damage: Methylguanine ↑ γ-hydroxy-propano-deoxyguanosine ↑ 8-hydroxy-2'-deoxyguanosine ↑	Oxidative stress: MDA in lung ↑ TBARs in heart ↑ GOD, GPx-1, catalase in lung ↓ Plasma vitamin C, GSH reductase ↓ Lipid peroxidation ↑ urinary isoprostane Inflammation: IL-1β, IL-6, IL-8, TNF-α, CRP, WBCs ↑ iNOS and NO in lung ↑ MMP-9, MPD activity ↑ ICAM-1, PGE2 Thrombosis: Fibrinogen, PAI-1 ↑ DNA damage: DNA repair genes OGG1 and XRCC1 ↓ DNA strand breaks ↑ 8-hydroxy-2'-deoxyguanosine ↑	Oxidative stress: Soluble NOX2-derived peptide ↑ NO ↓ isoprostane ↑ Plasma vitamin E ↓ oxLDL ↑ Aortic NOX-2 ↑, ROS ↑ eNOS uncoupling Inflammation: IL-1β, IL-6, IL-8, interferon-γ, MMP-9 ↑ ICAM-1, PECAM-1, VCAM-1 ↑ angiopoietin-1, epidermal growth factor, IL-8 Thrombosis: integrin, phosphatidylserine ↑ Platelet activation, tail bleeding time ↑ DNA damage: O⁶-methyldeoxyguanosine ↑ DNA repair genes ↓ γ-hydroxy-1,N⁷-propano-deoxyguanosine ↑ 8-hydroxy-2'-deoxyguanosine ↑
Atherosclerotic plaques Cerebral aneurysm Collagen deposition Impaired endothelial function Hypertension Emphysema Higher LDL and total cholesterol COPD, cancer, ischemic heart disease Circadian clock dysregulation	Thrombosis Increased heart weight (troponin-I and B-type natriuretic peptide) COPD, cancer, ischemic heart disease Impaired endothelial function Circadian clock dysregulation	Fibrosis of multiple organs COPD, cancer, ischemic heart disease Impaired endothelial function Ischemic brain damage aggravated Circadian clock dysregulation
Vitamin E Genetic p47phox deletion NOX inhibition by apocynin Transgenic overexpression of catalase Nrf2 knockout aggravates lung damage Resveratrol from red wine	Selenium Betaine	Metformin Betaine Genetic Nox2 deletion



Teşekkürler