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# We Will Never be Safe from Cigarette Smoke: The Danger of Third Hand Smoke

**Zohreh Karimiankakolaki**

Department of Health, Faculty of Medical Sciences, Shahrekord Branch, Islamic Azad University, Shahrekord, Iran.

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***ABSTRACT***

***Corresponding Author:**
Zohreh Karimiankakolaki

**Email:**
zohrehkarimian68@gmail.com

**Tel:** +98 9132366910

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Smoking is an important risk factor for health and development and should be considered as a confounding factor in studies analyzing potential environmental pollutant (Aurrekoetxea et al., 2013). In addition to the high prevalence of smoking as a health problem, the threats caused by cigarette smoke for people who are exposed to it is a double problem that can be pondered. Exposing to cigarette smoke includes inhalation of cigarette smoke caused by the burning of the cigarette itself and inhalation of smoke exhaled by the smoker (WHO, 2015).

The term third hand smoke (THS) is a relatively new concept, which was first used in 2006 and was then introduced by Winickoff et al. in 2009 (Winickoff et al., 2009). THS is the residue of nicotine and other chemicals that remain on surfaces and dust for a long time after smoking and become airborne through reactions with oxidants and other compounds inhaled into the body (Jacob III et al., 2017; Northrup et al., 2016). Although THS is less concentrated than second-hand smoke, it remains on surfaces for a longer period of time (Kuo & Rees, 2019; Northrup et al., 2016).

In this way, a person is also exposed to THS through the skin (Özpinar, Demir, Yazicioğlu, Bayçelebi, & Yazicioğlu, 2022). Exposure to THS comes from dust and surfaces, inhalation, ingestion (digestion), and skin absorption of cigarette residues in addition to air inhalation (G. E. Matt et al., 2011; Sleiman et al., 2010). Skin absorption is another important method of exposure to dust-bound pollutants (G. E. Matt et al., 2011). Babies and young children are more exposed to the effects of THS due to playing, crawling, and touching surfaces and floors and touching their mouths (G. Matt et al., 2004; Yolton, Dietrich, Auinger, Lanphear, & Hornung, 2005). More than 40% of children, 33% of non-smoking men, and 35% of non-smoking women are exposed to cigarette smoke worldwide (WHO, 2011). The highest exposure to secondhand smoke was in Eastern Europe, the Western Pacific, and Southeast Asia, with more than 50% of the population exposed (WHO, 2011).

Studies have shown that smoking indoors for just one day exposes people to toxins for days or even months (Alberg, Shopland, & Cummings,





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2014; G. E. Matt et al., 2011; Thomas et al., 2011). THS accumulated in smokers' homes is able to persist even after the homes had been vacant for 2 months (Becquemin et al., 2010; G. E. Matt et al., 2014). A study in Atlanta (2013) reported that almost all participants had never heard of THS and did not know what the term meant (Escoffery et al., 2013). The study by Winickoff et al. showed that there is no awareness of exposure or THS in children (Winickoff et al., 2009). In another study about THS beliefs, it was observed that parents who did not believe in the effects of THS initially tried to quit smoking after learning about THS (Drehmer et al., 2014). This data suggests that having accurate information about THS and its harms can help create a smoke-free environment (Drehmer et al., 2014; Haardörfer et al., 2017).

In the study by Ozpinar et al. (2022), the mean score of belief about THS in smoking pregnant women was lower than that of non-smoking pregnant women, and a high level of education reduced exposure to THS. Belief in THS is an important factor in pregnancy (Özpinar et al., 2022).

Various studies on secondhand smoke showed that education and awareness can be effective in improving knowledge, belief, and performance regarding the prevention of exposure (Karimiankakolaki, Mazloomy Mahmoodabad, & Kazemi, 2023; Karimiankakolaki, Mazloomy Mahmoodabad, Kazemi, & Fallahzadeh, 2019; MazloomyMahmoodabad, Karimiankakolaki, Kazemi, Mohammadi, & Fallahzadeh, 2019). Therefore, it seems necessary to educate and inform about THS, especially in high-risk groups such as pregnant women and children. It is also necessary to integrate awareness and education about THS in care programs.

According to the above, it can be stated as:

- Awareness and information about third hand cigarette smoke should be included in health and self-care education programs.
- Parents who smoke should be involved in their children’s care, especially to prevent exposure to THS.
- Men who smoke should take care of their spouses, especially to prevent exposure to THS smoke in pregnant women.
- It is necessary to justify health care personnel to educate high-risk groups about the danger of THS.

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## Conflict of interest

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## Ethical Considerations

All ethical considerations have been observed.

## Code of Ethics

Not applicable.

## Authors' Contribution

Z. K, was involved in write and approved the final version of the manuscript.

## Open Access Policy

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## Key words

Third hand Smoke, Smoking, Health

## References

Alberg, A. J., Shopland, D. R., & Cummings, K. M. (2014). The 2014 Surgeon General's report: commemorating the 50th Anniversary of the 1964 Report of the Advisory Committee to the US Surgeon General and updating the evidence on the health consequences of cigarette smoking. American journal of epidemiology, 179(4), 403-412.

Aurrekoetxea, J. J., Murcia, M., Rebagliato, M., López, M. J., Castilla, A. M., et al. (2013). Determinants of self-reported smoking and misclassification during pregnancy, and analysis of optimal cut-off points for urinary cotinine: a cross-sectional study. BMJ open, 3(1), e002034.

Becquemin, M., Bertholon, J., Bentayeb, M., Attoui, M., Ledur, D., et al. (2010). Third-hand smoking: indoor measurements of concentration and sizes of cigarette smoke particles after resuspension. Tobacco control, 19(4), 347-348.

Drehmer, J. E., Ossip, D. J., Nabi-Burza, E., Rigotti, N. A., Hipple, B., et al. (2014). Thirdhand smoke beliefs of parents. Pediatrics, 133(4), e850-e856.

Escoffery, C., Bundy, L., Carvalho, M., Yembra, D., Haardörfer, R., et al. (2013). Third-hand smoke as a potential intervention message for promoting smoke-free homes in low-income communities. Health education research, 28(5), 923-930.

Haardörfer, R., Berg, C. J., Escoffery, C., Bundy, Ł. T., Hovell, M., et al. (2017). Development of a scale assessing Beliefs about ThirdHand Smoke (BATHS). Tobacco induced diseases, 15, 1-8.

Jacob III, P., Benowitz, N. L., Destaillats, H., Gundel, L., Hang, B., et al. (2017). Thirdhand smoke: new evidence, challenges, and future directions. Chemical research in toxicology, 30(1), 270-294.

Karimiankakolaki, Z., Mazloomy Mahmoodabad, S. S., & Kazemi, A. (2023). Designing, implementing and evaluating an educational program regarding the effects of second-hand smoke in pregnancy on the knowledge, attitude and performance of male smokers. Reproductive Health, 20(1), 1-8. [Persian]

Karimiankakolaki, Z., Mazloomy Mahmoodabad, S. S., Kazemi, A., & Fallahzadeh, H. (2019). Designing an educational intervention on second-hand smoke in smoker men on the exposure of pregnant wives: a protocol for a randomized controlled trial. Reproductive Health, 16(11), 1-5.

Kuo, H.-W., & Rees, V. W. (2019). Third-hand smoke (THS): What is it and what should we do about it. J Formos Med Assoc, 118(11), 1478-1479.

Matt, G., Quintana, P., Hovell, M., Bernert, J., Song, S., et al. (2004). Households contaminated by environmental tobacco smoke: sources of infant exposures. Tobacco control, 13(1), 29-37.

Matt, G. E., Quintana, P. J., Destaillats, H., Gundel, L. A., Sleiman, M., et al. (2011). Thirdhand tobacco smoke: emerging evidence and arguments for a multidisciplinary research agenda. Environmental health perspectives, 119(9), 1218-1226.

Matt, G. E., Quintana, P. J., Fortmann, A. L., Zakarian, J. M., Galaviz, V. E., et al. (2014). Thirdhand smoke and exposure in California hotels: non-smoking rooms fail to protect non-smoking hotel guests from tobacco smoke exposure. Tobacco control, 23(3), 264-272.

MazloomyMahmoodabad, S. S., Karimiankakolaki, Z., Kazemi, A., Mohammadi, N. K., & Fallahzadeh, H. (2019). Exposure to secondhand smoke in Iranian pregnant women at home and the related factors. Tobacco Prevention and Cessation, 5(7), 1-9. [Persian]

Northrup, T. F., Jacob III, P., Benowitz, N. L., Hoh, E., Quintana, P. J.,et al. (2016). Thirdhand smoke: state of the science and a call for policy expansion. Public health reports, 131(2), 233-238.

Özpinar, S., Demir, Y., Yazicioğlu, B., Bayçelebi, S., & Yazicioğlu, B. (2022). Pregnant women's beliefs about third-hand smoke and exposure to tobacco smoke. Central European Journal of Public Health, 30(3).

Sleiman, M., Gundel, L. A., Pankow, J. F., Jacob III, P., Singer, B. C., et al. (2010). Formation of carcinogens indoors by surface-mediated reactions of nicotine with nitrous acid, leading to potential thirdhand smoke hazards. Proceedings of the National Academy of Sciences, 107(15), 6576-6581.

Thomas, J. L., Guo, H., Carmella, S. G., Balbo, S., Han, S., et al. (2011). Metabolites of a tobacco-specific lung carcinogen in children exposed to secondhand or thirdhand tobacco smoke in their homes. Cancer epidemiology, biomarkers & prevention, 20(6), 1213-1221.

WHO. (2011). World Health Organization. Gender, Health, Tobacco and Equity. Available

at: http://www.who.int/tobacco/ publications/ gender/gender_tobacco_2010.pdf.

WHO. (2015). Tobacco Free Initiative (TFI) Second-hand tobacco smoke. Secondary Tobacco Free Initiative (TFI) Second-hand tobacco smoke. Available at: http://www.who. int/tobacco/research/ secondhand_smoke/en/.

Winickoff, J. P., Friebely, J., Tanski, S. E., Sherrod, C., Matt, G. E., et al. (2009). Beliefs about the health effects of "thirdhand" smoke and home smoking bans. Pediatrics, 123(1), e74-e79.

Yolton, K., Dietrich, K., Auinger, P., Lanphear, B. P., & Hornung, R. (2005). Exposure to environmental tobacco smoke and cognitive abilities among US children and adolescents. Environmental health perspectives, 113(1), 98-103.



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