Abstract Presentations

1. Gihani Jayaweera, Sri Lanka

Airway inflammation and oxidative stress in biomass fuel (BMF) smoke exposed women as assessed by exhaled carbon monoxide (eCO) levels

G.U. Jayaweera[1], S.W. Wimalasekera[2] and C.S.E. Goonewardena[3]

[1]Department of Basic Sciences, Faculty of Allied Health Sciences, General Sir John Kotelawala Defence University and Faculty of Graduate Studies, University of Sri Jayewardenepura, Sri Lanka

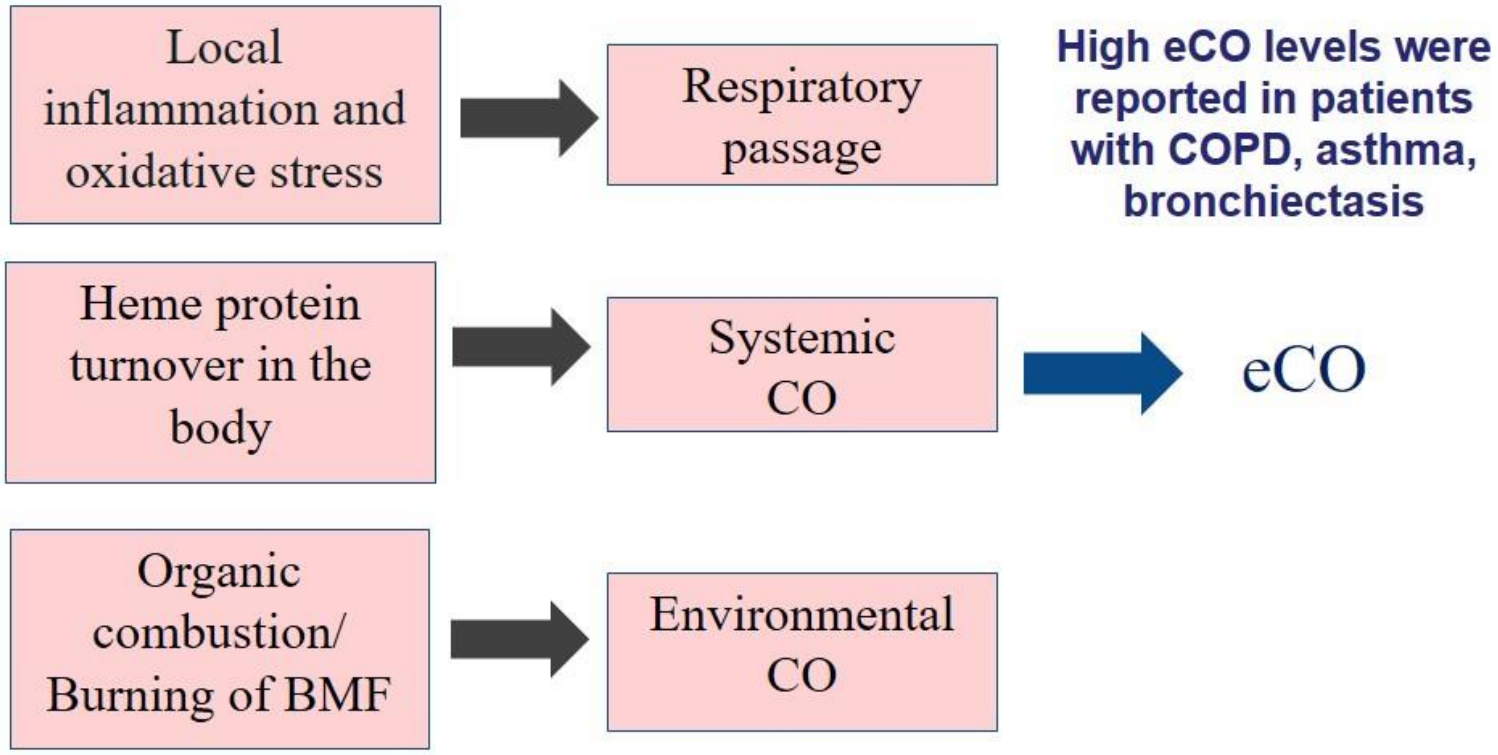
[2]Department of Physiology, [3]Department of Community Medicine, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka

Breathing and feeling well through universal access to right care

Introduction

- **Exposure to BMF smoke is a main cause for respiratory diseases.**
- **eCO is being studied as a biomarker of air way inflammation and oxidative stress.**

Sources of eCO



Ryter and Choi 2014, Horvath et al., 1998, Zhou et al., 2014, Kharitonov and Barnes, 2001, Mazzatenta et al., 2013

International Primary Care Respiratory Group
IPCRG work locally collaborate globally

Aim

- **To assess the airway inflammation and oxidative stress in a population of women exposed to biomass fuel smoke by eCO level**

Method

- Cross sectional study
- Women primary cooks over 18 years of age using BMF (n=400)
- Pregnant women were excluded
- Ethical approval by Faculty of Medical Sciences, USJP

Method *ctd*

Exposure Index

- **Hours of cooking per day × Years of cooking**
- **Low exposure group:** EI≤150 hours-years
- **High exposure group:** EI>150 hours-years

Ventilation

- **Good ventilation:** Kitchens with both chimneys and windows
- **Poor ventilation:** Kitchens with no chimneys & no windows and kitchens with no chimney + windows

eCO

- **Using Micro^{+TM} Smokerlyzer (Bedfont Scientific, UK)**

Results

(n=400, excluded 12)

Table 1: Baseline parameters

	Mean ± SD
Age	46 years ± 14SD
Exposure index	170 ± 108SD
eCO (ppm)	2.22 ± 1.4

Table 2: Number of participants with eCO categories

eCO (ppm)	n (%)
1-5	367 (94.6%)
6-10	21 (5.4%)
> 10	0

Results *ctd*

(n=400, excluded 12)

Table 3: eCO values with exposure index and kitchen ventilation

		n	Mean ± SD ppm	Mean rank	p-value
Exposure index	High exposure group	184	2.34±1.5	206	0.029
	Low exposure group	204	2.11±1.4	183	
Ventilation	Poor ventilation	102	2.65±1.9	217	0.009
	Good ventilation	286	2.07±1.2	186	

Mann-Whitney U test

Groups with higher exposure index and poorly ventilated kitchens had significantly higher eCO.

Discussion and conclusion

- Inflammation and oxidative stress of airways, as a result of longer durations of exposure to BMF smoke and in the presence of poor ventilation may elevate the levels of eCO women exposed to BMF smoke.
- Environmental CO might contribute to the eCO, if the breath test was performed soon after cooking using BMF.
- eCO could be a potential marker for screening of inflammation and oxidative stress in the airways in BMF smoke exposed population.

References

- Horvath, I., Loukides, S., Wodehouse, T., Kharitonov, S.A., Cole, P.J., Barnes, P.J., 1998. Increased levels of exhaled carbon monoxide in bronchiectasis: a new marker of oxidative stress. Thorax 53, 867–870. https://doi.org/10.1136/thx.53.10.867
- Kharitonov, S.A., Barnes, P.J., 2001. Exhaled Markers of Pulmonary Disease. Am J Respir Crit Care Med 163, 1693–1722. https://doi.org/10.1164/ajrccm.163.7.2009041
- Mazzatenta, A., Di Giulio, C., Pokorski, M., 2013. Pathologies currently identified by exhaled biomarkers. Respiratory Physiology & Neurobiology 187, 128–134. https://doi.org/10.1016/j.resp.2013.02.016
- Ryter, S.W., Choi, A.M.K., 2013. Carbon monoxide in exhaled breath testing and therapeutics. J. Breath Res. 7, 017111. https://doi.org/10.1088/1752-7155/7/1/017111
- Zhou, M., Liu, Y., Duan, Y., 2012. Breath biomarkers in diagnosis of pulmonary diseases. Clinica Chimica Acta 413, 1770–1780. https://doi.org/10.1016/j.cca.2012.07.006

Acknowledgements

- University research grant/UJSP – ASP/MED/2017/35 for funding
- Members of the research team
- Medical Officers of Health, Public Health Midwives, and other staff in healthcare centers
- All participants