

THE EFFECT OF SECONDHAND SMOKE EXPOSURE ON HIGH MOLECULAR WEIGHT ADIPONECTIN LEVELS IN ADULT WOMEN: A PRELIMINARY REPORT

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INTRODUCTION

- ❖ **Secondhand smoke**
 - ✓ Sidestream smoke (> toxic)
 - ✓ Mainstream smoke
- ❖ **WHO define → Non-smoker who exposed for at least 15 min/day more than one day/week***
- ❖ **In Malaysia, ≈ 30% adult women exposed to SHS at home and workplace****
- ❖ **SHS increases the risk of cardiovascular disease*****

*Samet, J. M. & Yang, G. (2001). Passive smoking, women and children. In: Samet, J. & Yoon, S.-Y., eds *Women and the Tobacco Epidemic, Challenges for the 21st Century* (WHO/NMH/TF1/01.1), Geneva, World Health Organization, 17

**WHO (2011). The Global Adult Tobacco Survey: Malaysia

***U.S. Department of Health and Human Services (2006)

❖ Adiponectin involved in glucose and lipid metabolism

❖ HWM adiponectin

- ✓ Bioactive adiponectin*
- ✓ More relevant in the prediction of insulin resistance than total adiponectin**

❖ Smoking → Hypoadiponectinemia***



*Pajvani, UB., et al. (2004). Complex Distribution, Not Absolute Amount of Adiponectin, Correlates with Thiazolidinedione-mediated Improvement in Insulin Sensitivity. *Journal of Biological Chemistry*, 279(13), 12152-12162.

**Hara, K., et al. (2006). Measurement of the Higher Molecular Weight Form of Adiponectin in Plasma Is Useful for the Prediction of Insulin Resistance and Metabolic Syndrome. *Diabetes Care*, 29(6), 1357-1362.

***Takefuji, S., et al. (2007). Smoking status and adiponectin in healthy Japanese men and women. *Prev Med*, 45(6), 471-475.

OBJECTIVES & HYPOTHESIS

OBJECTIVE

- ❖ To compare the levels of HMW adiponectin between SHS and non-SHS exposure

HYPOTHESIS

- ❖ HWM adiponectin is decrease in SHS compared to non-SHS exposure

METHODOLOGY

- ❖ Comparative cross sectional study
 - ✓ Ethical approval
 - ✓ Written consent form
- ❖ Subjects were recruited at Klinik Rawatan Keluarga (KRK), HUSM between May 2011 until Dec 2012
- ❖ 125 subjects recruited



Inclusion Criteria

Women: Aged 18 to 60 years

Exposed to cigarette smoke for > 15 min/day
more than one day/week* either at home,
workplace or in car AND Minimum 2 years
exposure to SHS

SHS
Cases

Free exposure OR < 15 min/day more than
one day/week to cigarette smoke at home,
workplaces and in car

Non-SHS
Control

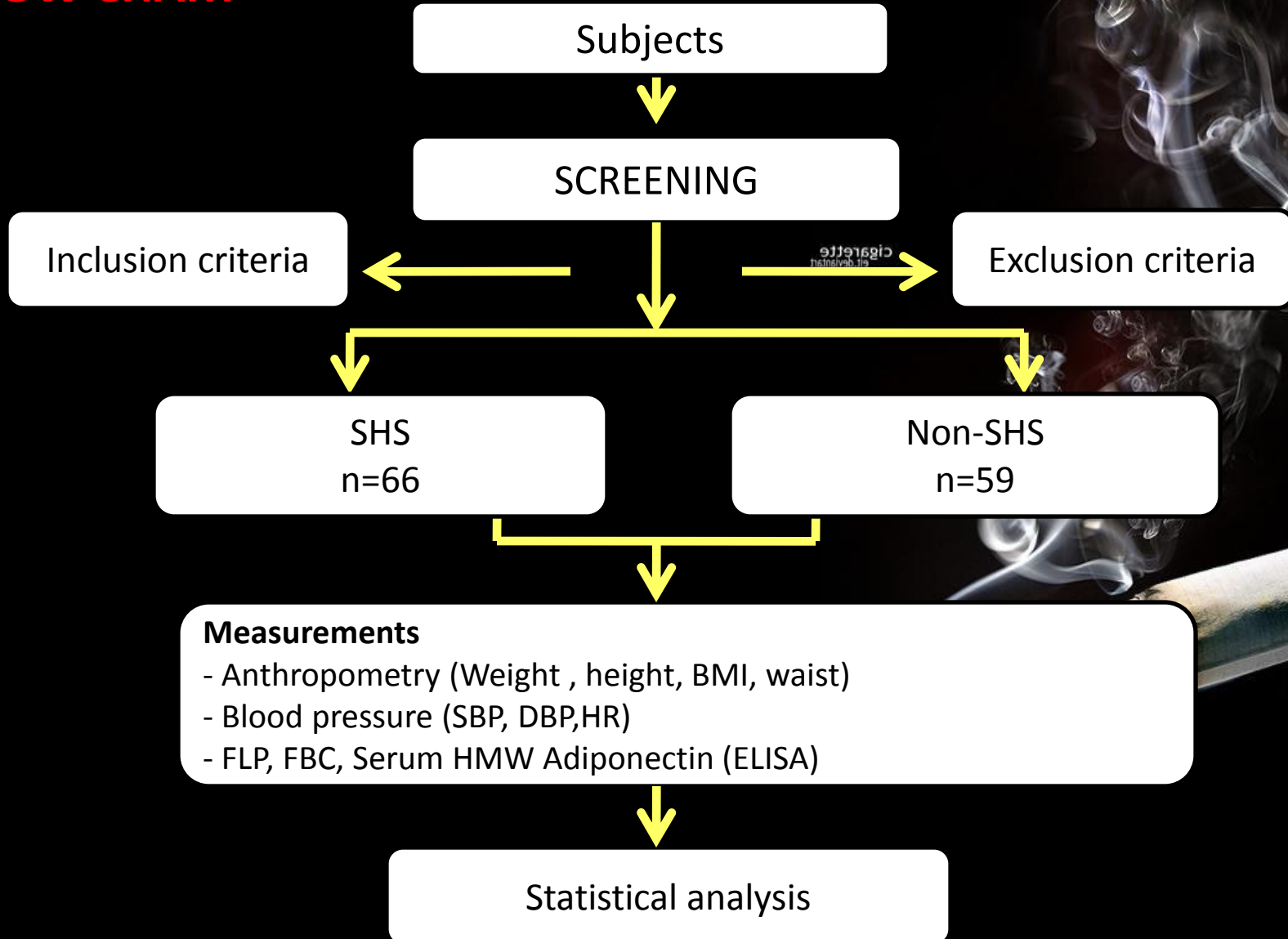
*Samet, J. M. & Yang, G. (2001). Passive smoking, women and children. In: Samet, J. & Yoon, S.-Y., eds *Women and the Tobacco Epidemic, Challenges for the 21st Century* (WHO/NMH/TF1/01.1), Geneva, World Health Organization, 17

Exclusions Criteria

1. Current smoker or past smoker.
2. Hypertension ($\geq 140/90$ mmHg or on therapy for hypertension).
3. Dyslipidemia on anti-lipid therapy.
4. Capillary plasma glucose ≥ 5.6 or used of medication for the treatment of diabetes.
5. Treatment with insulin or other drug known to influence glucose metabolism.
6. History of cardiovascular disease (CVD)
7. Inflammatory disease eg. Arthritis.
8. Connective tissue disease eg. SLE, Rheumatoid arthritis, Scleroderma.
9. History of acute / recent illness less than 1 months eg. Fever, infection, tissue injury (muscle sprain).
10. Abnormal liver, kidney function or endocrine disease.
11. HIV, Hepatitis
12. Malignancy
13. History of alcohol or drug abuse
14. History of taking NSAIDs, aspirins and steroids within the last 6 weeks
15. Pregnant
16. Obesity ($\text{BMI} \geq 35 \text{ kg/m}^2$)

STUDY FLOW CHART

COMPARATIVE CROSS SECTIONAL STUDY



STATISTICAL ANALYSIS

- ❖ Performed with SPSS version 20
- ❖ Univariate level
 - ✓ Independent t test (mean±SD)
 - ✓ Mann–Whitney U test [median (interquartile range)]
 - ✓ Pearson chi square test [n (%)]
- ❖ ANCOVA was used to analyze multivariable analysis
- ❖ Statistical significance, $p \leq 0.05$

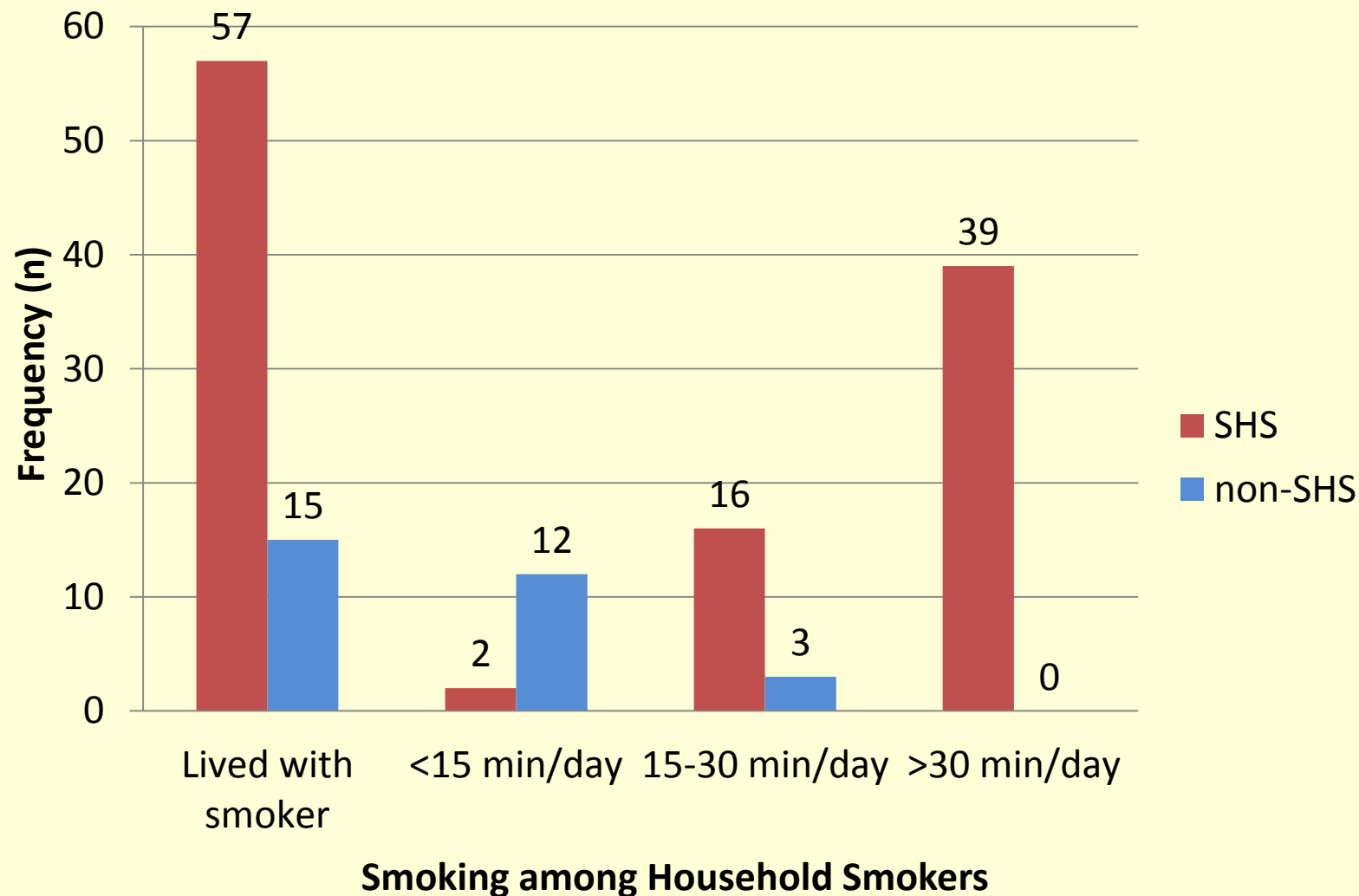
RESULT : SOCIAL DEMOGRAPHICS AND BIOCHEMICAL PROFILES

Variable	SHS (n=66)	Non-SHS (n=59)	P-value
Social-demographic			
Age (years)	32.5±6.96	33.9±9.53	0.361
Race			0.174 ^a
Malay	61 (92.4)	50 (84.7)	
Non-malay	5 (7.6)	9 (15.3)	
Occupation			0.127 ^a
Government servant	28 (42.4)	25 (42.4)	
Private sector	12 (18.2)	5 (8.5)	
Housewife	20 (30.3)	16 (27.1)	
others	6 (9.1)	13 (22.0)	
Education level			0.001 ^{a*}
Primary and secondary	52 (78.8)	28 (47.5)	
College and university	14 (21.2)	31 (52.5)	
Physical examination			
SBP (mmHg)	113.2±10.80	113.3±12.59	0.990
DBP (mmHg)	72.1±8.66	72.5±10.00	0.802
Height (m)	1.6±0.06	1.6±0.06	0.924
Weight (Kg)	61.2±13.26	57.6±10.11	0.084
BMI (kg/m ²)	25.3±5.03	23.9±3.93	0.073
Waist (cm)	76.1±11.09	73.6±9.00	0.169
Biochemical profile			
FBG (mmol/L)	5.3±0.78	5.1±0.84	0.252
TC (mmol/L)	5.3±0.84	5.3±0.89	0.614
HDL (mmol/L)	1.7±0.43	1.7±0.33	0.479
LDL (mmol/L)	3.1±0.71	3.1±0.75	0.887
TG (mmol/L)	0.9 (0.57)	1.0 (0.60)	0.688 ^b
TWC (x10 ⁹ /L)	7.2±1.83	6.6±1.51	0.043 [*]
Hb (gm/L)	129.5 (15.25)	126.0 (18.00)	0.707 ^b
Hematocrit (L)	0.4±0.04	0.4±0.03	0.736
Platelet (x10 ⁹ /L)	279.4±66.57	294.4±60.05	0.189

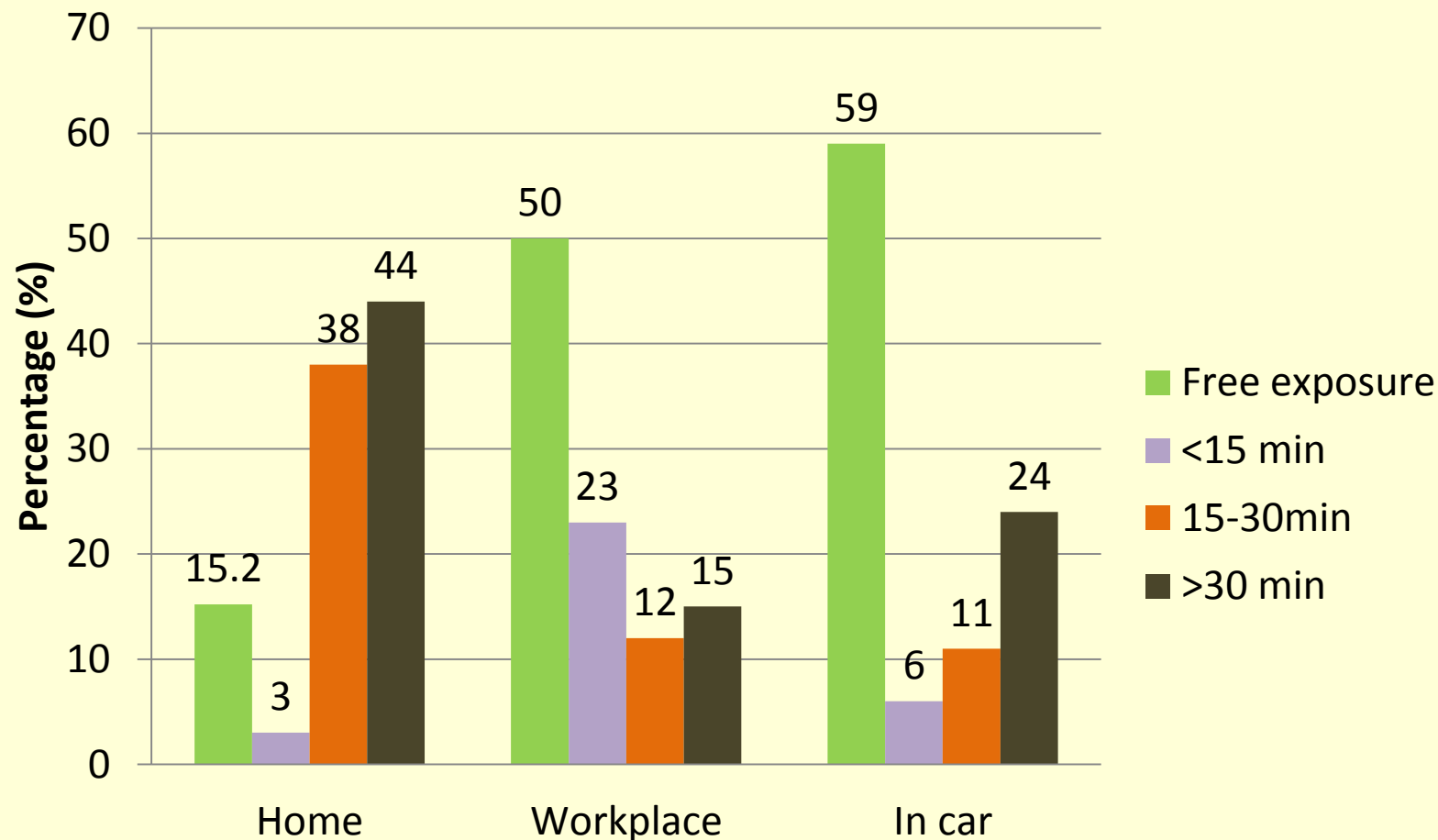
Independent t test, ^aPearson Chi –Square test, ^bMann-Whitney U test,

*Significant different between groups, $p < 0.05$

RESULT : SMOKING AMONG HOUSEHOLD SMOKERS



RESULT : THE PERCENTAGE OF EXPOSURE DURATION TO TOBACCO SMOKE AT HOME, IN CAR AND WORKPLACE AMONG SHS SUBJECTS



The percentage of exposure duration to tobacco smoke at home, in car and workplace among SHS (N=66) subjects

RESULT : HMW ADIPONECTIN IN SHS & NON-SHS

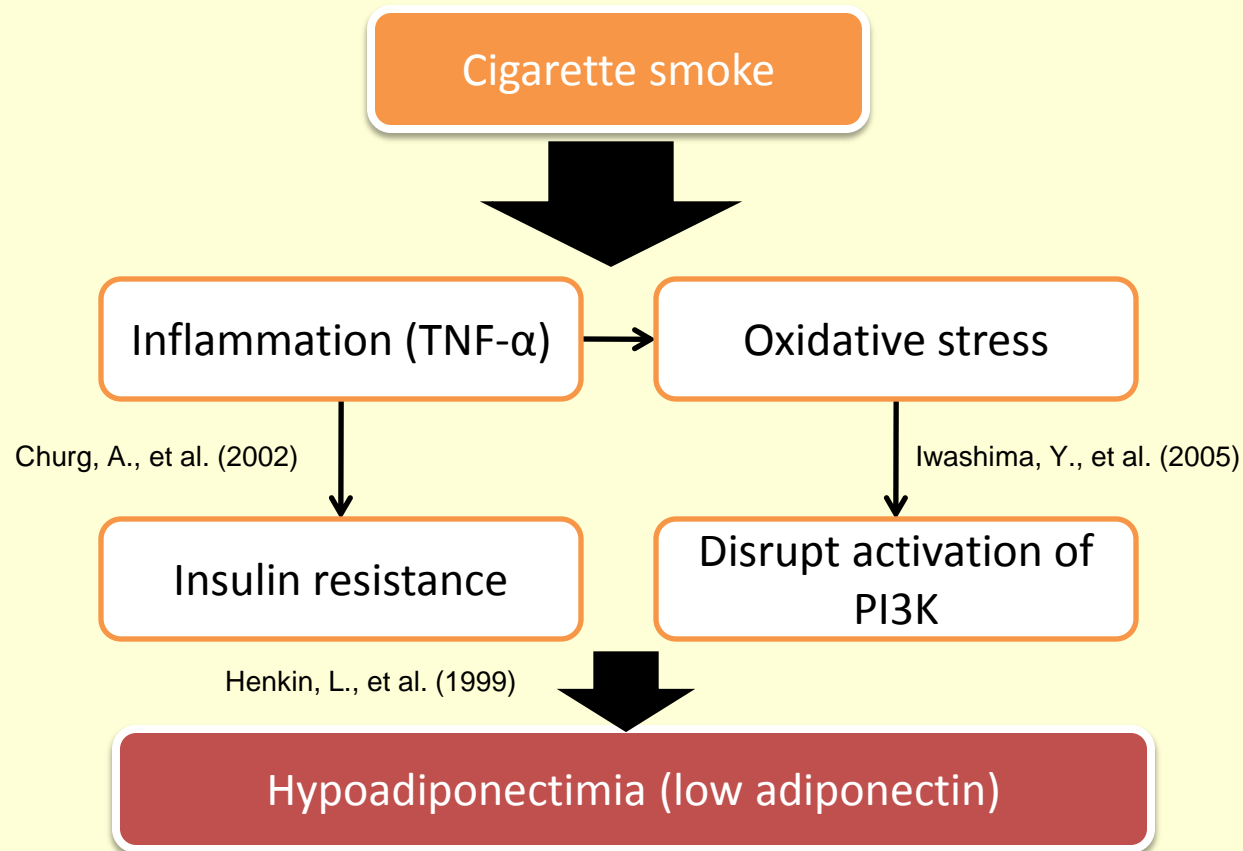
Variable	SHS (n=66)	Non-SHS (n=59)	p value
HMW adiponectin ($\mu\text{g/ml}$)	3.7 \pm 2.92	4.9 \pm 3.72	0.050 ^{a*} 0.022 ^{b*}

^aIndependent t test

^bANCOVA with controlled age, SBP, DBP, LDL and TG

*Indicates significant difference between groups, $p < 0.05$

DISCUSSION



Iwashima, Y., et al. (2005). Association of Hypoadiponectinemia With Smoking Habit in Men. *Hypertension*, **45**(6), 1094-1100

Churg, A., et al. (2002). Tumor necrosis factor-α is central to acute cigarette smoke-induced inflammation and connective tissue breakdown. *Am J Respir Crit Care Med*, **166**(6), 849-54

Henkin, L., et al. (1999). Cigarette Smoking, Environmental Tobacco Smoke Exposure and Insulin Sensitivity: The Insulin Resistance Atherosclerosis Study. *Ann Epidemiol*, **9**(5), 290-296.

CONCLUSION

- ❖ Serum HMW adiponectin level significantly reduced in secondhand smoke exposure than in non-secondhand smoke exposure even after controlling for potential confounders

ACKNOWLEDGEMENT

- ❑ Funding from Research University (RU) grant
Universiti Sains Malaysia (*1001/PPSP/812088*)
- ❑ Staff and subjects who had co-operated in this
study

SECONDHAND SMOKE IS DANGEROUS!!!!



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Thank you!