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Severance

Gender Differences in Relations of Smoking Status, Depression, and Suicidality in Korea: Findings from the Korea National Health and Nutrition Examination Survey 2008–2012

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INTRODUCTION

- The prevalence of smoking c **male** and **female** adults was respectively, in 2012.
- In Korea, smoking rates decre and old women, **while smokin 20–44 did not decrease durin 2003**

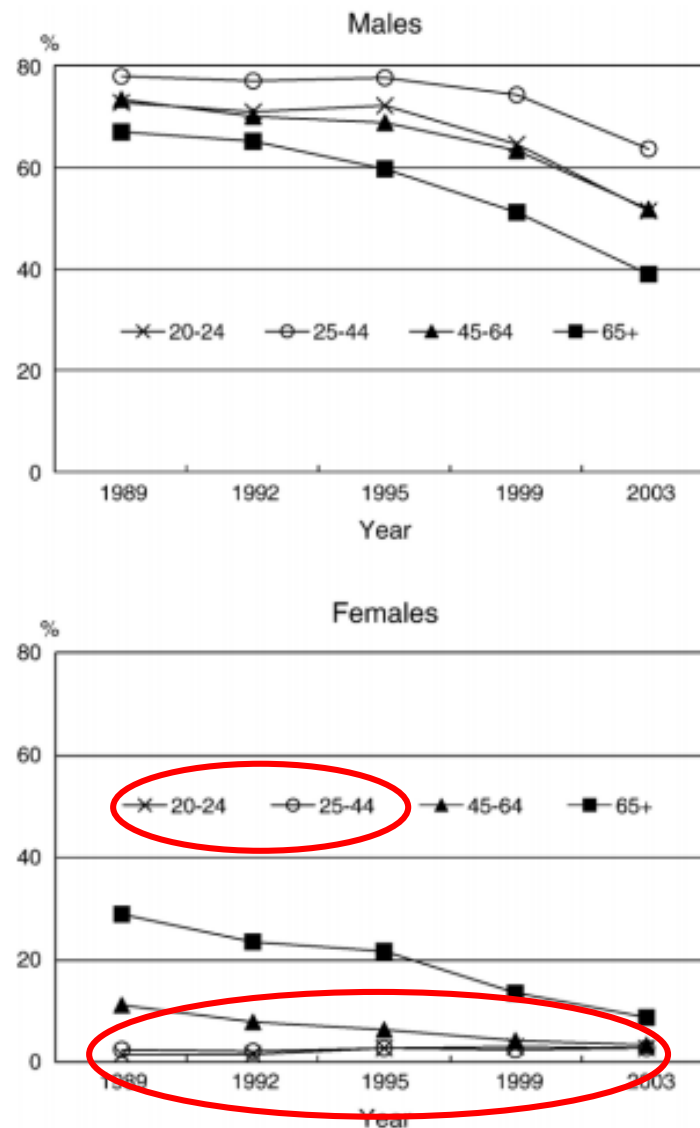


Fig. 1. Changes in age-standardized prevalence rates of current cigarette smoking between 1989 and 2003: 344,969 Korean men and women aged 20+ (standardized to 2000 Korean population).
Khang YH, *Prev Med* 2006;42:415-422

INTRODUCTION

- Female smoking is complicated by *female reproductive status, menstrual cycle phase, and mental health.*
- Women are known to experience more difficulty in maintaining smoking cessation.

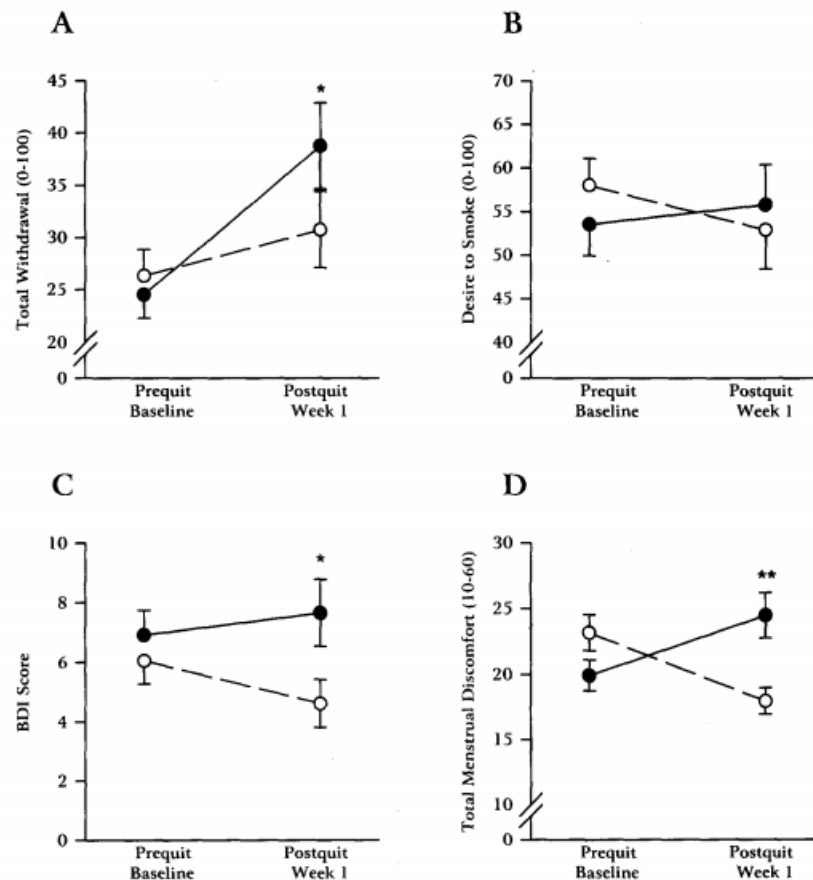


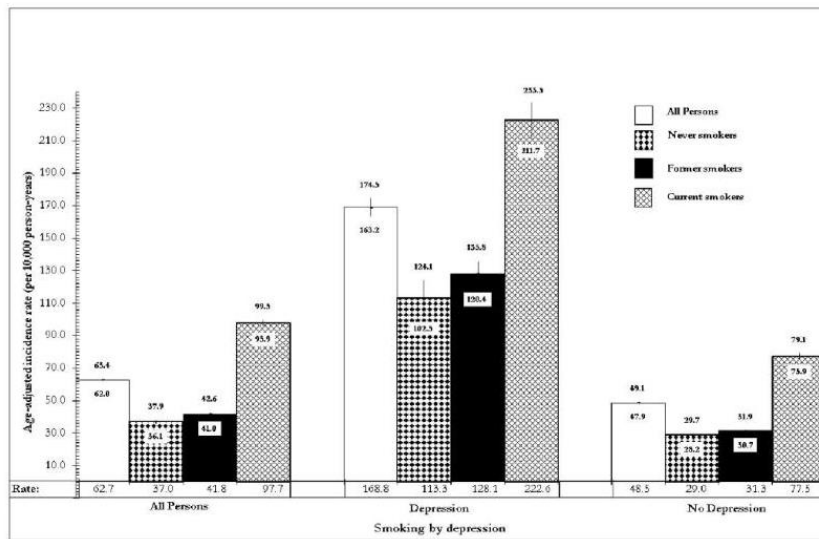
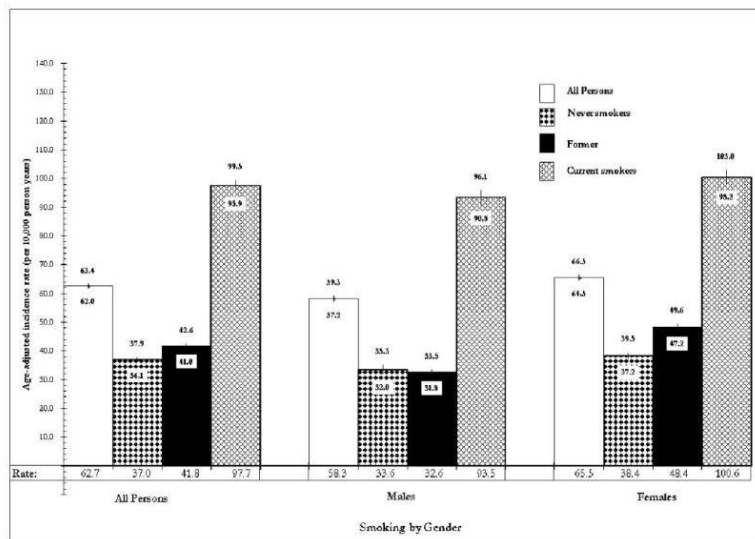
Figure 1. Mean (\pm SE) scores for (A) total withdrawal, (B) desire to smoke, (C) Beck Depression Inventory (BDI), and (D) total menstrual discomfort during prequit baseline and postquit Week 1 in abstinent premenopausal women whose quit day fell within the follicular ($n = 41$; empty circle) versus luteal ($n = 37$; filled circle) menstrual cycle phase. For all of the measures, there were no group differences at baseline. * $p < .05$. ** $p < .01$.

INTRODUCTION

- **60%** of the participants who were enrolled in a smoking cessation program had **past depressive episodes**, and they showed **twice as high a failure rate** in smoking cessation.

Glassman AH et al, JAMA 1988;259:2863-2866.

- **Smoking** is known to be an independent risk factor for **suicide**.



Clarke DE, et al Suicide Life Threat Behav 2010;40:307-318.

METHODS

- Analyzed the 5-year cumulative data
 - ≥ 19 years of age or older, **n=32,184**
 - Korean National Health and Nutrition Examination Survey (KNHANES)
 - from 2008 to 2012.
- ✓ **Smoking habit, Urine cotinine**
- ✓ **Mental health status** : depressive episode, suicidal behaviors, and psychiatric counselling within the previous year
- ✓ “perceived level of **quality of life**”, “perceived level of **stress**” and “lifetime experience of having a **depressive episode**”

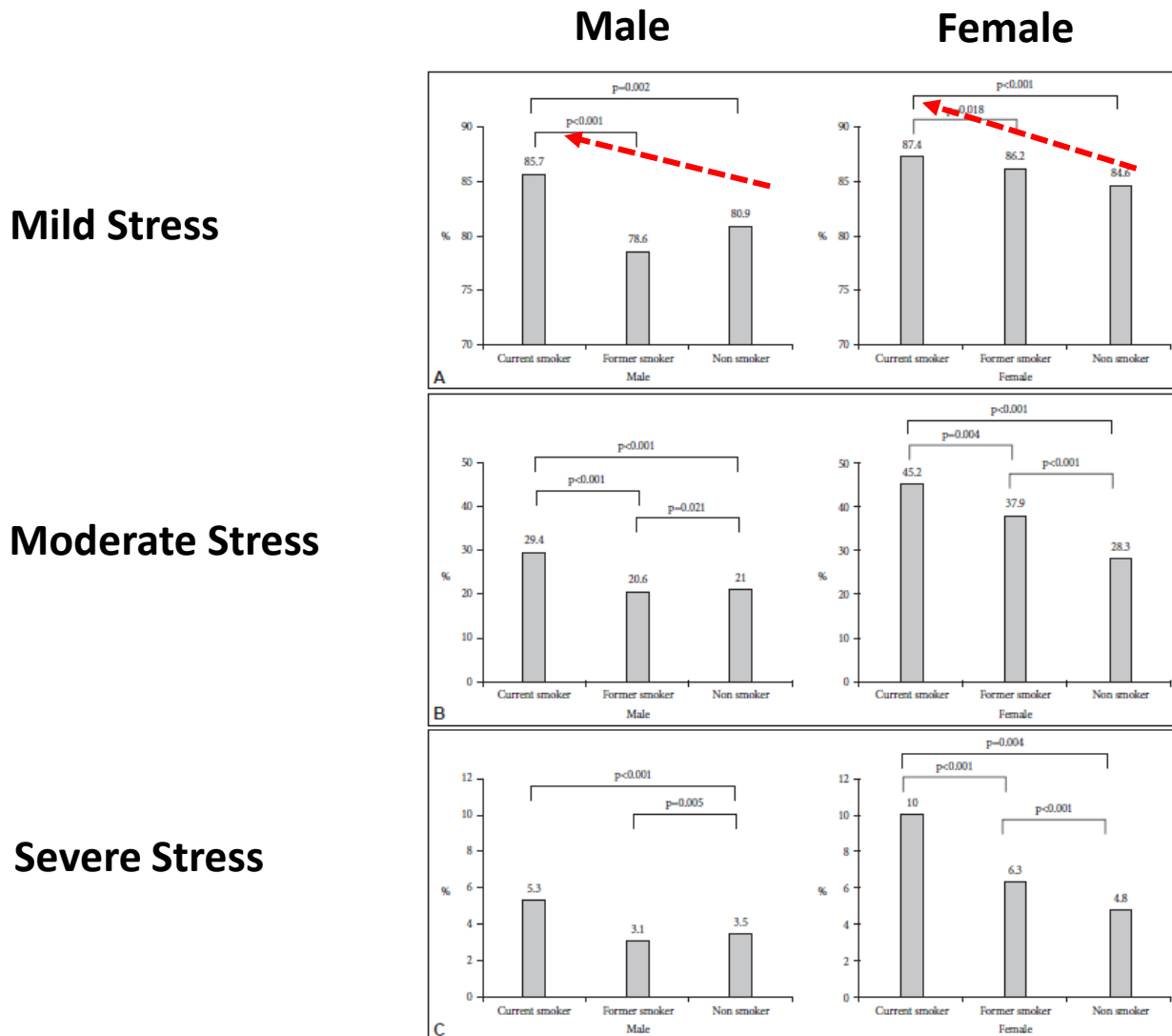
RESULT : Baseline characteristics

Table 1. Baseline characteristics of total participants

	Current smoker N=6,899 (21.4%)	Former smoker N=6,355 (19.7%)	Non smoker N=18,930 (58.5%)	P
Age	45.66±15.47	54.37±16.46	49.89±16.72	<0.001
Sex				<0.001
Male	5,797 (84.0%)	5,312 (83.6%)	4,553 (13.5%)	
Female	1,102 (16.0%)	1,043 (16.4%)	16,377 (86.5%)	
Pack year	19.64±16.65	17.95±21.16	0	
Urine cotinine	1324.86±971.87	72.33±270.35	30.13±163.32	<0.001
Urine cotinine in male	1379.82±988.93	64.83±254.49	19.52±117.37	<0.001
Urine cotinine in female	964.02±759.11	111.76±339.45	32.17±170.67	<0.001
Marital status				<0.001
Married (live with partner)	4792 (69.6%)	5265 (83.0%)	13264 (70.2%)	
Separated/divorced	397 (5.8%)	184 (2.9%)	624 (3.3%)	
Widow/widower	278 (4.0%)	331 (5.2%)	2505 (13.2%)	
Never married	1422 (20.6%)	564 (8.9%)	2515 (13.3%)	
Household income*				<0.001
Highest quartile	1265 (18.6%)	1345 (21.5%)	3836 (20.6%)	
Upper middle quartile	1843 (27.1%)	1542 (24.6%)	4640 (24.9%)	
Lower middle quartile	1918 (28.3%)	1699 (27.0%)	4966 (26.6%)	
Lowest quartile	1763 (26.0%)	1699 (27.0%)	5198 (27.9%)	
Level of education				<0.001
≤Elementary school	1218 (17.7%)	1575 (24.8%)	5880 (31.2%)	
≤Middle school	799 (11.6%)	796 (12.5%)	1950 (10.3%)	
≤High school	2785 (40.5%)	2094 (33.0%)	5991 (31.7%)	
≥College	2067 (30.1%)	1881 (29.6%)	5050 (26.8%)	

*household income was measured as combined income from all sources of the respondent and her family members and was divided to 4 quartiles according to criteria of each year

RESULT : Perceived Stress in relation to cigarette smoking status



Supplementary Figure 2. Distribution of participants' smoking status according to degrees of perceived stress. A: Mild, moderate and severe stress, combined. B: Moderate and severe stress, combined. C: Severe stress. p values were adjusted by age, income, level of education and marital status.

RESULT : Prevalence of depression-related experiences in relation to cigarette smoking status

Table 2. Prevalence of depression-related experiences in relation to cigarette smoking

	Current, N (%)	Former, N (%)	Non, N (%)	OR (95% CI)*		
				Current vs. non	Current vs. former	Former vs. non
Male, N	5,797	5,312	2,553			
Lifetime experience of having a depressive episode	390 (6.7%)	420 (7.9%)	138 (5.4%)	1.267 (1.033–1.555)	0.991 (0.849–1.156)	1.279 (1.039–1.573)
Lifetime experience of doctor-diagnosed major depression	88 (1.5%)	108 (2.0%)	32 (1.3%)	1.228 (0.814–1.851)	0.794 (0.587–1.075)	1.546 (1.024–2.332)
Current diagnosis of depression	93 (1.6%)	108 (2.0%)	39 (1.5%)	0.987 (0.674–1.445)	0.883 (0.656–1.189)	1.118 (0.761–1.641)
Lifetime experience of receiving treatment for depression	27 (0.6%)	29 (0.7%)	8 (0.4%)	1.387 (0.624–3.081)	0.961 (0.549–1.681)	1.443 (0.644–3.234)
Female, N	1,102	1,043	16,377			
Lifetime experience of having a depressive episode	313 (28.4%)	269 (25.8%)	3171 (19.4%)	1.744 (1.512–2.011)	1.133 (0.832–1.378)	1.539 (1.328–1.784)
Lifetime experience of doctor-diagnosed major depression	95 (8.6%)	87 (8.3%)	880 (5.4%)	1.945 (1.536–2.463)	1.036 (0.759–1.413)	1.626 (1.255–2.108)
Current diagnosis of depression	93 (8.4%)	70 (6.7%)	741 (4.5%)	1.838 (1.461–2.314)	1.196 (0.860–1.664)	1.775 (1.403–2.247)
Lifetime experience of receiving treatment for depression	29 (3.5%)	23 (2.9%)	216 (1.7%)	2.298 (1.532–3.446)	1.284 (0.728–2.264)	1.789 (1.140–2.807)

*adjusted by age, income quartile, level of education, and marital state

RESULT : Mental health status within the previous year in relation to cigarette smoking

Table 3. Mental health status within the previous year in relation to cigarette smoking in males and females

	Current, N (%)	Former, N (%)	Non, N (%)	OR (95% CI)*		
				Current vs. non	Current vs. former	Former vs. non
Males, N	5,797	5,312	2,553			
Depressive episode within the previous year	644 (11.1%)	492 (9.3%)	211 (8.3%)	1.364 (1.154–1.611)	1.309 (1.146–1.494)	1.042 (0.874–1.242)
Suicidal ideation within the previous year	720 (12.4%)	578 (10.9%)	213 (8.4%)	1.564 (1.325–1.845)	1.360 (1.199–1.543)	1.150 (0.967–1.367)
Suicide attempts within the previous year	52 (0.9%)	36 (0.7%)	21 (0.8%)	1.005 (0.593–1.701)	1.404 (0.893–2.209)	0.715 (0.406–1.262)
Experience of having counseling in psychiatric clinic within the previous year	84 (1.4%)	75 (1.4%)	41 (1.6%)	0.925 (0.630–1.357)	0.935 (0.671–1.303)	0.989 (0.660–1.428)
Females, N	1,102	1,043	16,377			
Depressive episode within the previous year	318 (28.9%)	231 (22.2%)	2794 (17.1%)	1.912 (1.659–2.203)	1.309 (1.146–1.494)	1.405 (1.203–1.642)
Suicidal ideation within the previous year	386 (35.1%)	306 (29.4%)	3009 (18.9%)	2.200 (1.919–2.522)	1.360 (1.199–1.543)	1.797 (1.554–2.078)
Suicide attempts within the previous year	40 (3.6%)	22 (2.1%)	127 (0.8%)	3.930 (2.701–5.719)	1.404 (0.893–2.209)	0.715 (0.406–1.262)
Experience of having counseling in psychiatric clinic within the previous year	49 (4.4%)	47 (4.5%)	433 (2.6%)	1.603 (1.175–2.188)	0.935 (0.671–1.303)	0.989 (0.660–1.428)

여성의 자살 시도율
-비흡연자의 4.5배
-남성흡연자의 4배

*adjusted by age, income quartile, level of education, and marital state

RESULT : Gender differences in mental health status among current smokers

Table 4. Gender differences in mental health status among current smokers

	Male N=5,797 (42.4%)	Female N=1,102 (5.9%)	OR (95% CI)*
Depression-related experiences			
Lifetime experience of having a depressive episode	390 (6.7%)	313 (28.4%)	4.800 (4.020–5.732)
Lifetime experience of doctor-diagnosed major depression	88 (1.5%)	95 (8.6%)	5.432 (3.957–7.457)
Current diagnosis of depression	93 (1.6%)	93 (8.4%)	4.126 (3.015–5.646)
Lifetime experience of receiving treatment for depression	27 (0.6%)	29 (3.5%)	4.715 (2.682–8.289)
Mental health status within the previous year			
Depressive episode within the previous year	644 (11.1%)	318 (28.9%)	2.839 (2.411–3.342)
Suicidal ideation within the previous year	720 (12.4%)	386 (35.1%)	3.266 (2.792–3.819)
Suicide attempts within the previous year	52 (0.9%)	40 (3.6%)	3.135 (2.019–4.867)
Experience of having counseling in psychiatric clinic within the previous year	84 (1.4%)	49 (4.4%)	2.856 (1.957–4.167)

*adjusted by age, income quartile, level of education, and marital state

RESULT

- Among current smokers, **females** showed **higher** lifetime prevalence in having a **depression-related experience** in comparison with males.
 - Females were more likely to report on having a depressive episode, suicidal ideation and attempts, and psychiatric counselling within the previous year, as compared to males.
 - Female former smokers showed **intermediate characteristics** in parameters of mental health status within the previous year, ranking between lifetime non-smokers and the current smokers.

CONCLUSION

- Identifying the factors related to **mental health status among current smokers** could
 - Increase opportunities for an **early intervention**
 - Reduce the prevalence of **smoking**
 - Increase **smoking cessation** rates
- Developing **adaptive strategies** other than smoking in female youth is potentially important in **reducing the initiation of smoking**

RESEARCH ARTICLE

Effect of Exposure to Second-Hand Smoke on the Quality of Life: A Nationwide Population-Based Study from South Korea

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INTRODUCTION

- More than 5,000,000 deaths a year are estimated to be the direct result of tobacco use, and more than **600,000 deaths** are the **result of exposure to second-hand smoke (SHS)**
- **57.2%** of men and **38.7%** of women belonging to the never smoker adult population were reported to have been exposed to SHS at the workplace in 2013
- Decreased health-related quality of life (HRQOL), and the potential development of mental health problems among **never-smokers exposed to SHS** should also be concerned

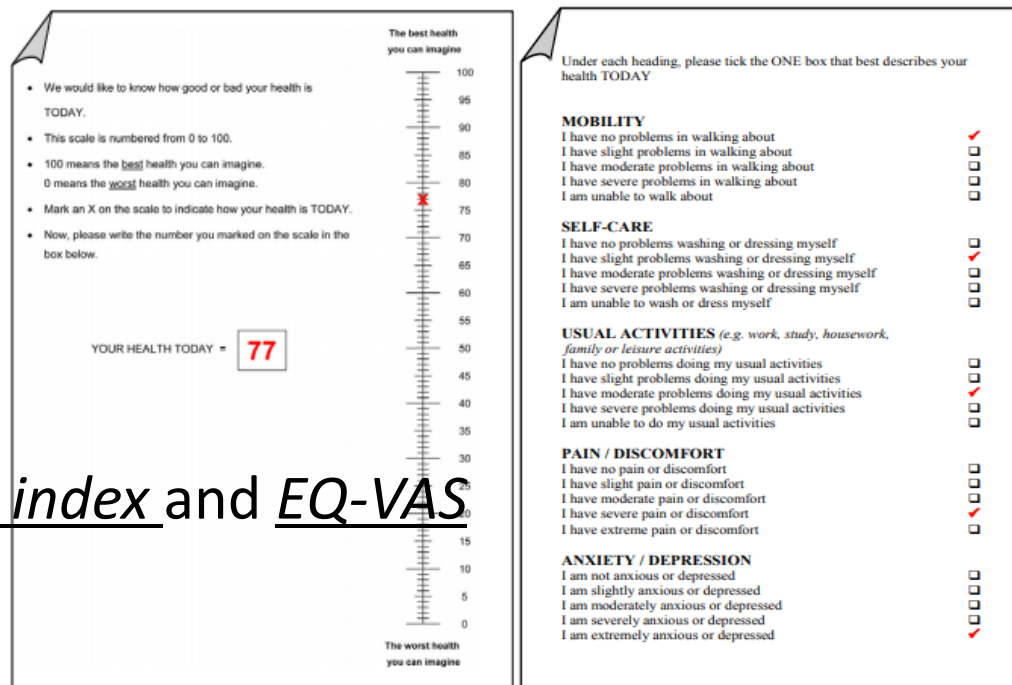
METHODS

- Analyzed the 3-year cumulative data
 - ≥ 20 years old, never smoker, **n=10,768**
 - KNHANES from 2010 to 2012.

- SHS exposure**

- Unexposed
 - < 2 hrs/d
 - ≥ 2 hrs/d

- HRQOL** measured by EQ-5D index and EQ-VAS



The image shows two parts of a health questionnaire. The left part is the EQ-VAS (EuroQol Visual Analogue Scale), which is a vertical scale from 0 to 100. The top is labeled 'The best health you can imagine' and the bottom is 'The worst health you can imagine'. A red 'X' is marked at the number 77. Below the scale, it says 'YOUR HEALTH TODAY = 77'. The right part is the EQ-5D index, which consists of five domains: MOBILITY, SELF-CARE, USUAL ACTIVITIES, PAIN / DISCOMFORT, and ANXIETY / DEPRESSION. Each domain has three statements with checkboxes to the right. Some checkboxes are checked with a red checkmark.

EQ-VAS Instructions:

- We would like to know how good or bad your health is TODAY.
- This scale is numbered from 0 to 100.
- 100 means the best health you can imagine. 0 means the worst health you can imagine.
- Mark an X on the scale to indicate how your health is TODAY.
- Now, please write the number you marked on the scale in the box below.

EQ-5D Index Instructions:

Under each heading, please tick the ONE box that best describes your health TODAY

MOBILITY

- I have no problems in walking about
- I have slight problems in walking about
- I have moderate problems in walking about
- I have severe problems in walking about
- I am unable to walk about

SELF-CARE

- I have no problems washing or dressing myself
- I have slight problems washing or dressing myself
- I have moderate problems washing or dressing myself
- I have severe problems washing or dressing myself
- I am unable to wash or dress myself

USUAL ACTIVITIES (e.g. work, study, housework, family or leisure activities)

- I have no problems doing my usual activities
- I have slight problems doing my usual activities
- I have moderate problems doing my usual activities
- I have severe problems doing my usual activities
- I am unable to do my usual activities

PAIN / DISCOMFORT

- I have no pain or discomfort
- I have slight pain or discomfort
- I have moderate pain or discomfort
- I have severe pain or discomfort
- I have extreme pain or discomfort

ANXIETY / DEPRESSION

- I am not anxious or depressed
- I am slightly anxious or depressed
- I am moderately anxious or depressed
- I am severely anxious or depressed
- I am extremely anxious or depressed

RESULTS : Baseline characteristics

- 10,532 never-smokers had available exposure status to SHS and were eligible for analysis. Among the respondents included, 3,073 (29.2%) reported *routine exposure to SHS*, and 667 (6.3%) reported *exposure of 2 hours per day* (Fig 1).

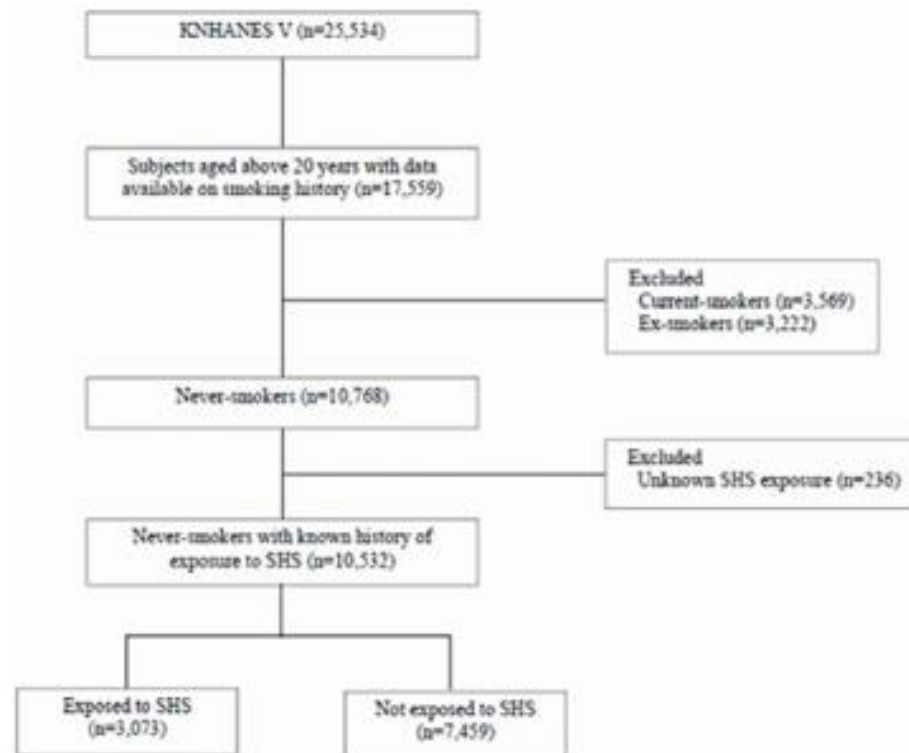


Fig 1. Flow Diagram of the Study Population.

RESULTS : Baseline characteristics

Table 1. Demographic Characteristics of the Never-Smoker Population Estimated Using Survey Weight Analysis.

Characteristics	Unexposed to SHS	Exposed to SHS	P-value
Proportion of participants (%)	(65.1)	(34.9)	
Age (years), mean ± SE	48.3 ± 0.3	41.9 ± 0.3	<0.001
Sex, % of women	83.4%	72.7%	<0.001
BMI (kg/m ²), mean ± SE	23.5 ± 0.1	23.5 ± 0.1	0.916
Comorbid condition, (%)			
Diabetes mellitus	14.0	9.8	<0.001
Hypertension	28.6	21.6	<0.001
Depression	4.8	4.3	0.103
Stroke	1.2	0.6	0.019
Osteoarthritis	13.4	8.4	<0.001
Asthma	3.0	3.1	0.725
Employed, (%)	44.0	81.2	<0.001
Any alcohol use, (%)	62.7	78.2	<0.001
Married, (%)	83.7	73.3	<0.001
Education, (%)			<0.001
Elementary school	27.0	15.0	
Middle school	9.2	9.9	
High school	32.0	40.5	
Higher education	31.9	34.7	
Personal economic status, (%)			0.593
1Q	26.1	25.1	
2Q	25.9	24.3	
3Q	25.3	25.4	
4Q	22.7	25.1	
EQ-5D index, mean ± SE	0.933 ± 0.002	0.956 ± 0.002	<0.001
EQ-VAS score, mean ± SE	73.755 ± 0.278	74.288 ± 0.393	0.019

RESULTS : Effect of exposure to SHS on EQ-5D and EQ-VAS

Table 2. Adjusted Differences in HRQOL Measures in the SHS-Exposure Group Compared with the Unexposed Group. *

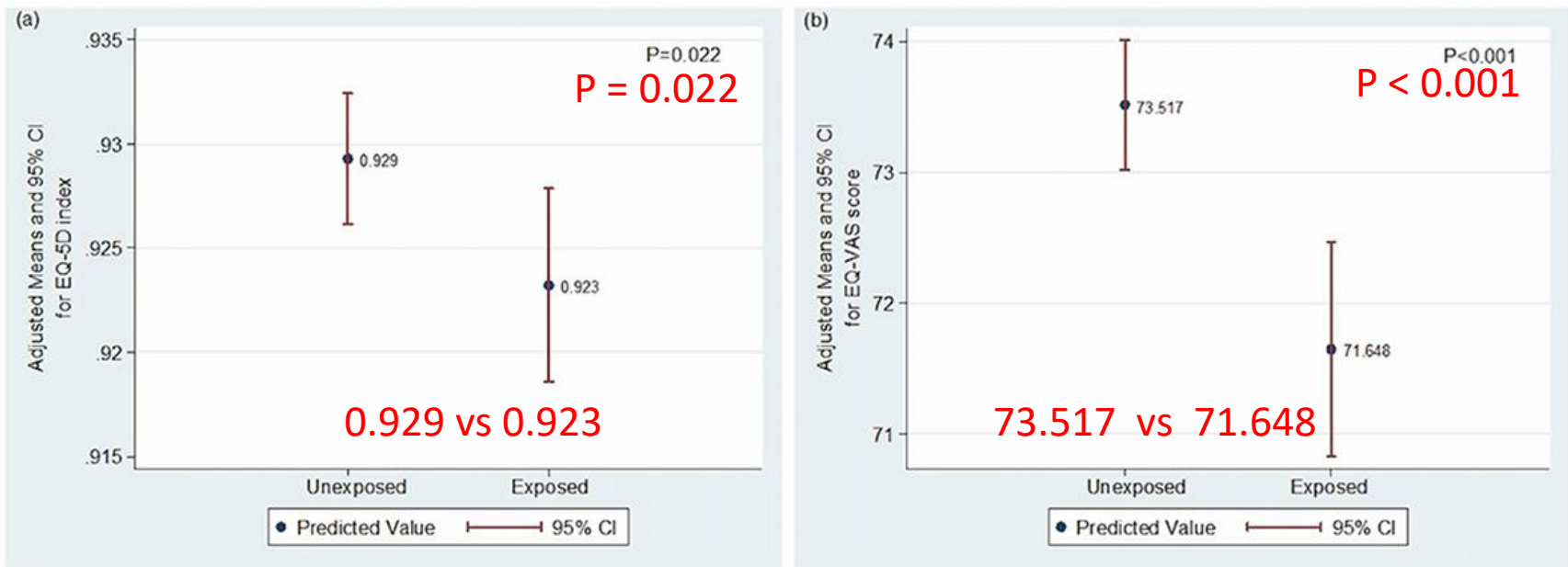
HRQOL measures	Variable Estimate (SE)	95% CI	P-value
EQ-5D dimension [†]			
Mobility	0.127 (0.091)	-0.052–0.305	0.162
Self-care	-0.013 (0.162)	-0.331–0.304	0.934
Usual activities	0.087 (0.111)	-0.130–0.304	0.430
Pain/discomfort	0.104 (0.074)	-0.042–0.250	0.161
Anxiety/depression	0.134 (0.088)	-0.039–0.307	0.129
EQ-5D index	-0.007 (0.003)	-0.013 – -0.002	0.005
EQ-VAS score	-1.936 (0.455)	-2.830 – -1.042	<0.001

HRQOL: health-related quality of life, SHS: second-hand smoke, CI: confidence interval.

*Adjusted for age, sex, body mass index, education, employed status, individual economic status, any alcohol use, marital status, and any comorbid condition (diabetes mellitus, hypertension, depression, stroke, osteoarthritis, asthma).

† Calculated using polynomial ordinal logistic regression analysis, evaluating the variable estimate (β coefficient) for higher problem level in each dimension.

RESULTS : Effect of exposure to SHS on EQ-5D and EQ-VAS



*Adjusted for age, sex, body mass index, education, employed status, individual economic status, any alcohol use, marital status, and any comorbid condition (diabetes mellitus, hypertension, depression, stroke, osteoarthritis, asthma)

Fig 2. Adjusted Means of EQ-5D Index (A) and EQ-VAS Score (B) in the SHS-Exposed Group and the Unexposed Group.

RESULTS : Effect of exposure to SHS on EQ-5D and EQ-VAS

Table 3. Adjusted Differences in HRQOL Measures in the Groups with Exposure to SHS of <2 h/day and ≥2 h/day Compared with the Unexposed Group.*

HRQOL measures	Variable Estimate (SE)	95% CI	P-value
EQ-5D dimension [†]			
Mobility			
<2 h/day	0.082 (0.101)	-0.116–0.280	0.416
≥2 h/day	0.256 (0.158)	-0.055–0.566	0.106
Self-care			
<2 h/day	-0.206 (0.184)	-0.568–0.156	0.264
≥2 h/day	0.468 (0.272)	-0.066–1.003	0.086
Usual activities			
<2 h/day	-0.003 (0.125)	-0.249–0.244	0.983
≥2 h/day	0.341 (0.178)	-0.009–0.691	0.056
Pain/discomfort			
<2 h/day	0.053 (0.083)	-0.111–0.216	0.527
≥2 h/day	0.266 (0.115)	0.040–0.491	0.021
Anxiety/depression			
<2 h/day	0.093 (0.096)	-0.095–0.282	0.330
>2 h/day	0.264 (0.153)	-0.037–0.565	0.085
EQ-5D index			
<2 h/day	-0.006 (0.003)	-0.012 – -0.001	0.023
≥2 h/day	-0.011 (0.004)	-0.020 – -0.002	0.013
EQ-VAS score			
<2 h/day	-1.468 (0.491)	-2.433–-0.503	0.003
≥2 h/day	-3.631 (0.814)	-5.229–-2.033	<0.001

HRQOL: health-related quality of life. SHS: second-hand smoke, CI: confidence interval.

*Adjusted for age, sex, body mass index, education, employed status, individual economic status, any alcohol use, marital status, and any comorbid condition (diabetes mellitus, hypertension, depression, stroke, osteoarthritis, asthma).

† Calculated using polynomial ordinal logistic regression analysis, evaluating the variable estimate (β coefficient) for higher problem level in each dimension.

CONCLUSION

- **Exposure to SHS** was associated with **lower HRQOL** measured using the *EQ-5D index* and *EQ-VAS score* in a **dose-response** manner.
- These results will help guide policy recommendations on public health and tobacco control in South Korea and other countries.

BMJ Open Association between secondhand smoke exposure and hypertension in never smokers: a cross-sectional survey using data from Korean National Health and Nutritional Examination Survey V, 2010–2012

Young Sik Park,¹ Chang-Hoon Lee,¹ Yu-Il Kim,² Chul Min Ahn,³ Ju Ock Kim,⁴ Ju-Heon Park,⁵ Sang Haak Lee,⁶ Jae Yeol Kim,⁷ Eun Mi Chun,⁸ Tae-Hoon Jung,⁹ Kwang-Ha Yoo¹⁰

BMJ Open 2018;8:e021217

INTRODUCTION

- Although the positive relationship between SHS exposure and hypertension has been reported, some studies did not confirm this relationship.
- In Korea, the adult smoking rate was **24.1%** in 2013
 - 42.1% in men and 6.2% in women
 - Women are more vulnerable to SHS exposure
- Association between SHS exposure and HTN in never smokers

METHODS

- Using KNHANES V 2010–2012
 - Adult(>20 years old)
 - Never smokers with secondhand smoking history available
 - Definition of SHS exposure : categorized by exposure time
 - group I : none
 - group II : <2 hour/day
 - group III : ≥2 hour/day
- Definition of hypertension
 - Diagnosed by physician
 - Using antihypertensive medications
 - SBP ≥140 mmHg and DBP ≥90 mmHg

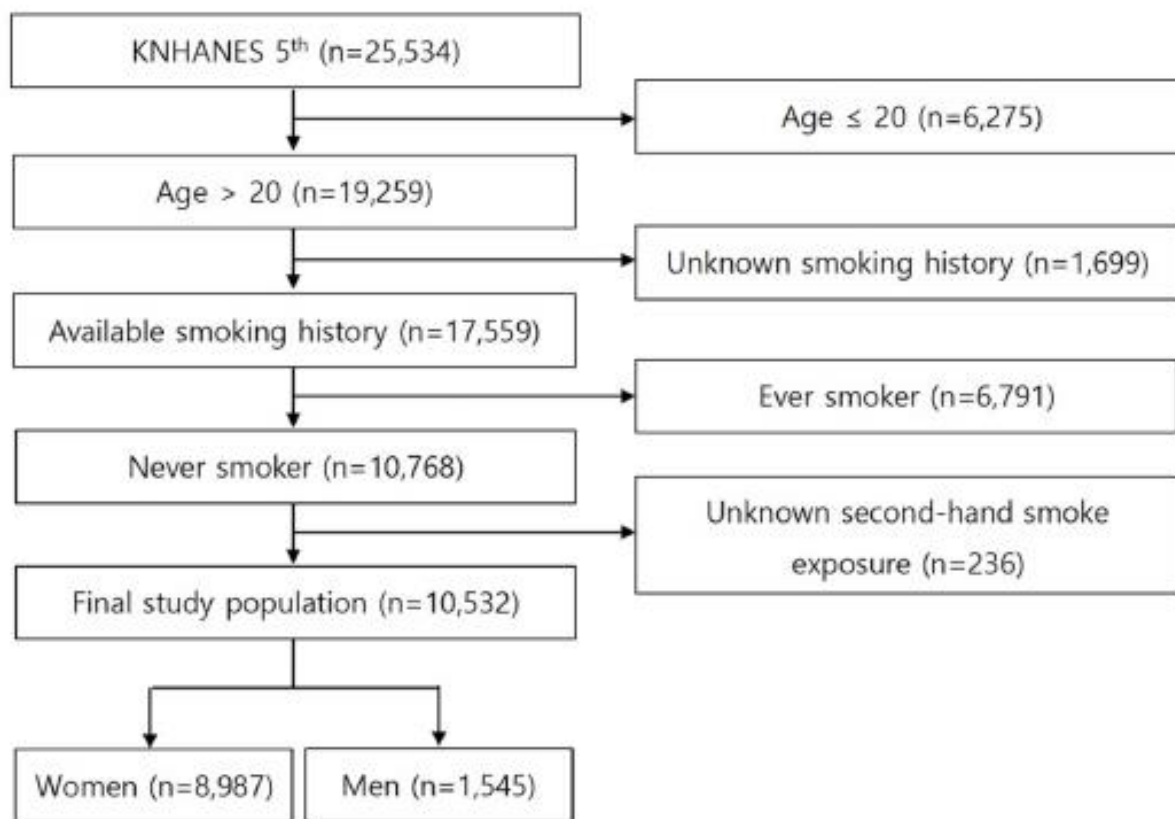


Figure 1 Flow diagram of study population. KNHANES, Korean National Health and Nutrition Examination Survey.

Table 1 Baseline characteristics according to the degree of secondhand smoke exposure.

Variables	Women				Men			
	Secondhand smoke exposure			P values	Secondhand smoke exposure			P values
	None	<2 hour/day	≥2 hour/day		None	<2 hour/day	≥2 hour/day	
% of total	68.1	24.2	7.7		53.3	39.4	7.2	
Age (years)	49.6±0.3	42.9±0.4	45.2±0.6	<0.001*	41.7±0.7	37.4±0.6	40.2±1.4	<0.001*
Weight (kg)	57.5±0.2	57.5±0.3	59.2±0.5	<0.001*	70.1±0.5	71.4±0.6	72.7±1.4	0.032*
Height (cm)	156.6±0.1	157.9±0.2	157.8±0.3	<0.001*	171.4±0.3	172.2±0.3	170.6±0.8	0.783
Waist circumference (cm)	78.7±0.2	76.9±0.3	78.9±0.5	0.009*	82.9±0.4	83.0±0.5	84.8±1.1	0.231
Body mass Index (kg/m ²)	23.5±0.1	23.1±0.1	23.8±0.2	0.536	23.8±0.1	24.1±0.2	24.9±0.4	0.021*
Blood pressure (mm Hg)								
Systole	117.5±0.3	113.5±0.5	117.7±0.9	<0.001*	119.3±0.6	118.9±0.6	120.8±1.7	0.740
Diastole	74.0±0.2	73.6±0.3	75.7±0.5	0.082	77.9±0.4	79.9±0.5	79.9±1.1	0.005*
Total cholesterol (mg/dL)	190.4±0.7	186.5±1.0	192.9±1.8	0.453	183.±1.6	182.7±1.8	186.5±3.8	0.666
High density lipoprotein (mg/dL)	55.2±0.3	55.6±0.6	57.7±1.1	0.068	51.0±0.9	50.3±1.2	50.4±2.5	0.583
Triglyceride (mg/dL)	115.0±1.8	104.7±1.9	112.2±4.4	0.016*	121.8±3.5	129.6±4.7	121.4±7.2	0.339
Fasting glucose (mg/dL)	95.9±0.4	93.6±0.5	95.1±0.9	0.008*	96.6±0.9	95.7±0.8	96.6±1.8	0.658
Hypertension	29.3	19.3	25.9	<0.001*	25.2	22.0	30.6	0.197
Diabetes mellitus	14.8	9.8	10.0	<0.001*	10.0	9.2	13.1	0.527
Metabolic syndrome	25.6	17.0	18.8	<0.001*	23.2	20.2	12.9	0.325
Alcohol Intake								
Never drinker	21.7	11.2	18.5	<0.001*	11.3	7.3	7.4	<0.001*
Former drinker	18.0	13.9	16.5		13.5	6.1	5.9	
Light drinker (≤1/week)	53.9	66.8	57.3		56.7	66.5	53.8	
Moderate drinker (2-3/week)	5.1	7.1	6.2		13.9	16.5	22.4	
Heavy drinker (≥4/week)	1.3	1.0	1.5		4.7	3.6	10.5	
Marital status	88.8	76.9	84.1	<0.001*	58.0	59.0	59.0	0.955
Educational level								
Below middle school	30.4	18.2	26.8	<0.001*	9.9	2.9	7.7	<0.001*
Middle school	9.8	9.9	10.2		6.2	6.4	9.0	
High school	29.8	39.9	33.1		43.0	40.3	47.6	
Above high school	30.1	31.9	30.0		40.9	50.5	35.8	
Socioeconomic status								
1Q	25.3	25.3	27.3	0.144	30.2	21.8	30.5	0.116
2Q	26.8	25.7	21.2		21.2	24.4	20.0	
3Q	25.3	25.9	23.7		25.6	25.5	26.8	
4Q	22.6	23.1	27.9		23.0	28.3	22.7	
Occupation								
Manager or professional	11.0	15.6	11.8	<0.001*	21.8	28.6	12.5	<0.001*
Office worker	5.0	14.3	13.3		7.6	15.5	15.6	
Service	9.0	22.3	42.4		7.1	15.0	13.8	
Farmer worker or fisherman	6.0	5.6	5.0		7.6	6.2	1.3	
Technician	2.3	4.8	4.2		9.1	21.5	39.5	
Labour worker	8.0	12.8	11.6		5.3	5.8	9.2	
Unemployed (outside house)	58.8	24.7	17.4		41.6	7.6	8.2	

HTN is associated with SHS exposure in women

- In women, **HTN was significantly associated with SHS exposure** (group III)
 - adjustment for age (model 1, adjusted OR 1.49, 95% CI 1.14 to 1.93, p=0.003)
 - adjustment for age, height, weight, waist circumference, serum triglyceride, fasting glucose, education, occupation, alcohol intake and marital status (model 2, adjusted OR 1.50, 95% CI 1.10 to 2.04, p=0.011, table 2).
- But in men, no statistically significant differences were seen.

Table 2 Association between secondhand smoke (SHS) exposure and hypertension.

For hypertension	Women						Men					
	Model 1*			Model 2†			Model 1*			Model 2†		
	Adjusted OR	95% CI	P values	Adjusted OR	95% CI	P values	Adjusted OR	95% CI	P values	Adjusted OR	95% CI	P values
SHS exposure												
None	1			1			1			1		
<2 hour/day	1.06	0.90 to 1.25	0.487	1.01	0.91 to 1.33	0.314	1.07	0.78 to 1.47	0.664	0.87	0.60 to 1.25	0.435
≥2 hour/day	1.49	1.14 to 1.93	0.003**	1.50	1.10 to 2.04	0.011‡	1.52	0.89 to 2.61	0.128	0.93	0.52 to 1.68	0.818

SBP and DBP are increasing according to SHS exposure

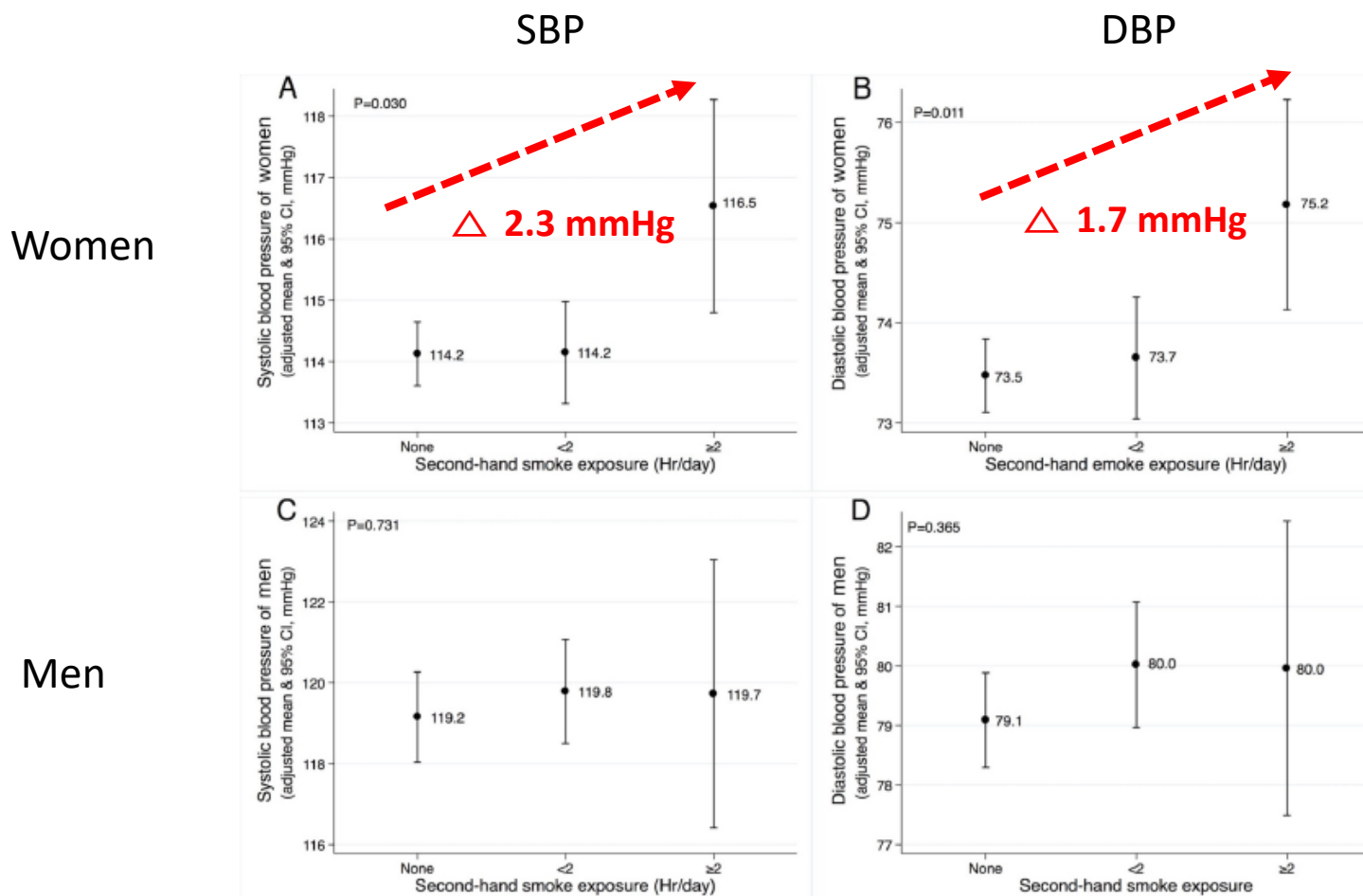


Figure 2 Adjusted means of systolic and diastolic blood pressure according to secondhand smoke exposure in women (A and B) and men (C and D) population without antihypertensive treatment. The mean values are adjusted for age, height, weight, waist circumference, serum triglyceride, fasting glucose, education, occupation, alcohol intake and marital status.

CONCLUSION

- We found that SHS exposure was significantly associated with HTN in Korean women never smokers
- Both systolic and diastolic blood pressures were significantly elevated in the SHS exposed population.

RESEARCH ARTICLE

Factors associated with stage of change in smoker in relation to smoking cessation based on the Korean National Health and Nutrition Examination Survey II-V

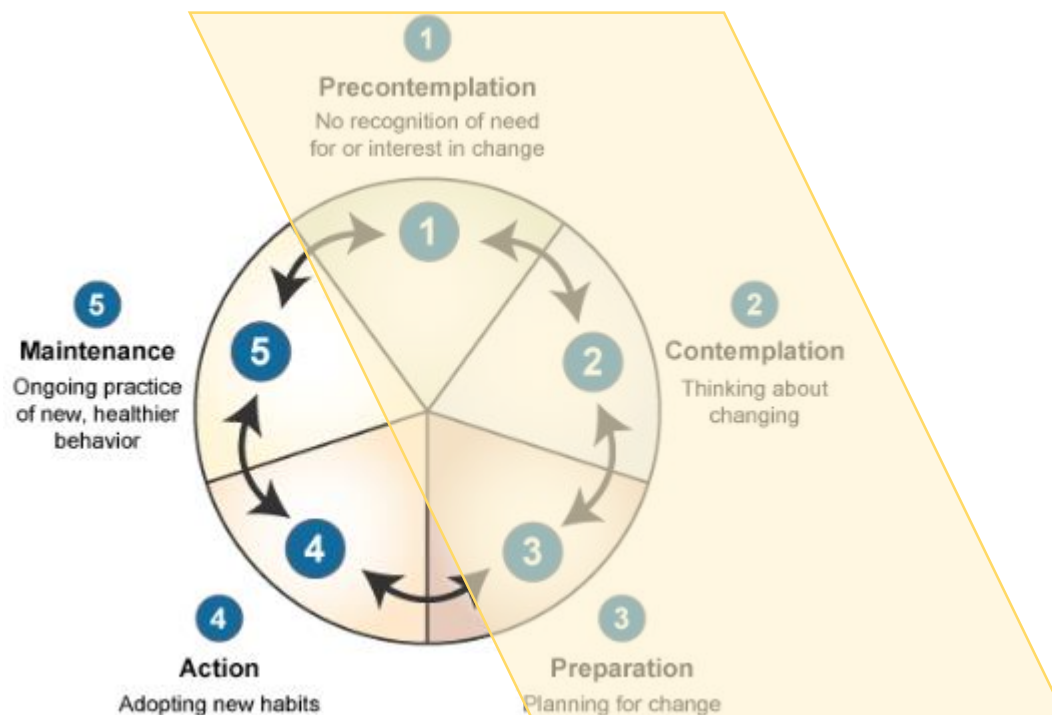
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INTRODUCTION

- According to the Transtheoretical Model (TTM), smokers are classified into one of three stages of change : **pre-contemplation, contemplation, or preparation.**



METHODS

- **11,924 smokers** from KNHNE II±V were analyzed.
- Stages of change in smoking cessation
 - ✓ **Pre-contemplation**
 - ✓ **Contemplation**
 - ✓ **Preparation**
- Baseline characteristics, socioeconomic factors, quality of life, psychological status, and smoking-related factors were compared between groups.

MEASURES

Q1. Have you made a 24-hour quit attempt in the previous 12 month?

1) Yes

2) No

Preparation

Q2. Are you planning to quit smoking within the next 1 to 6 months?

1) Thinking of quitting smoking within the next month

2) Thinking of quitting smoking within the next 6 months

Contemplation

3) Thinking of quitting smoking at some point, but not within the next 6 months

4) Absolutely not thinking of quitting smoking

Pre-contemplation

RESULTS

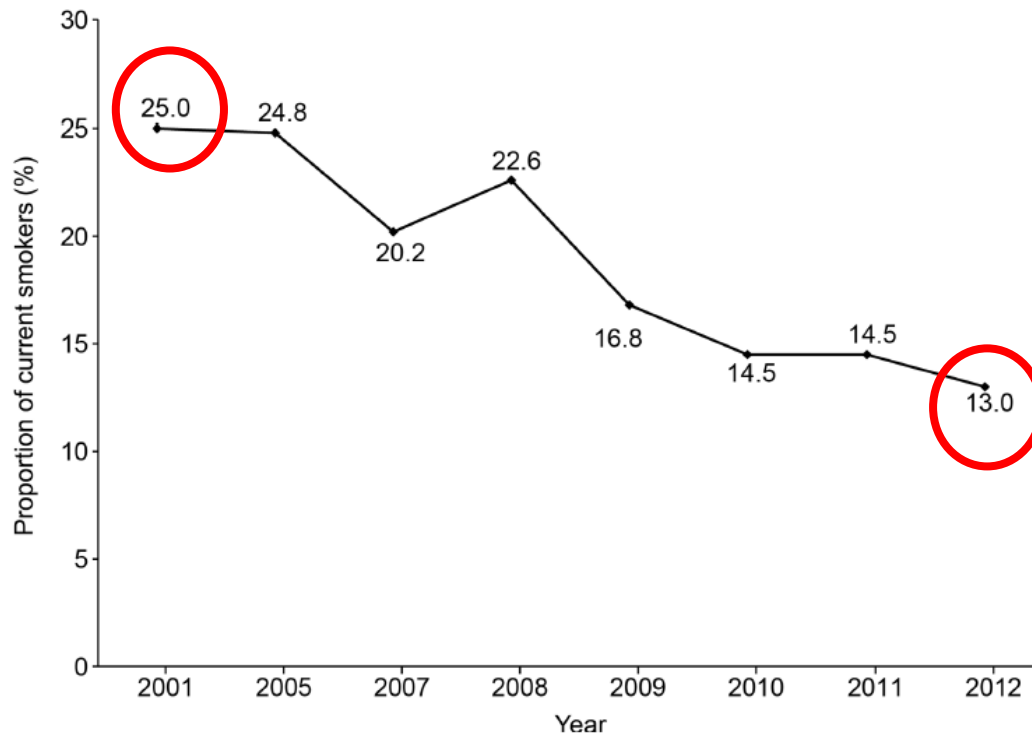


Fig 1. Annual percentages of current smokers in each year from 2001 to 2012.

The study included **11,924 smokers** and the proportion of **current smokers decreased** from 2001 to 2012 (from **25.0%** to **13.0%**; Fig 1).

Table

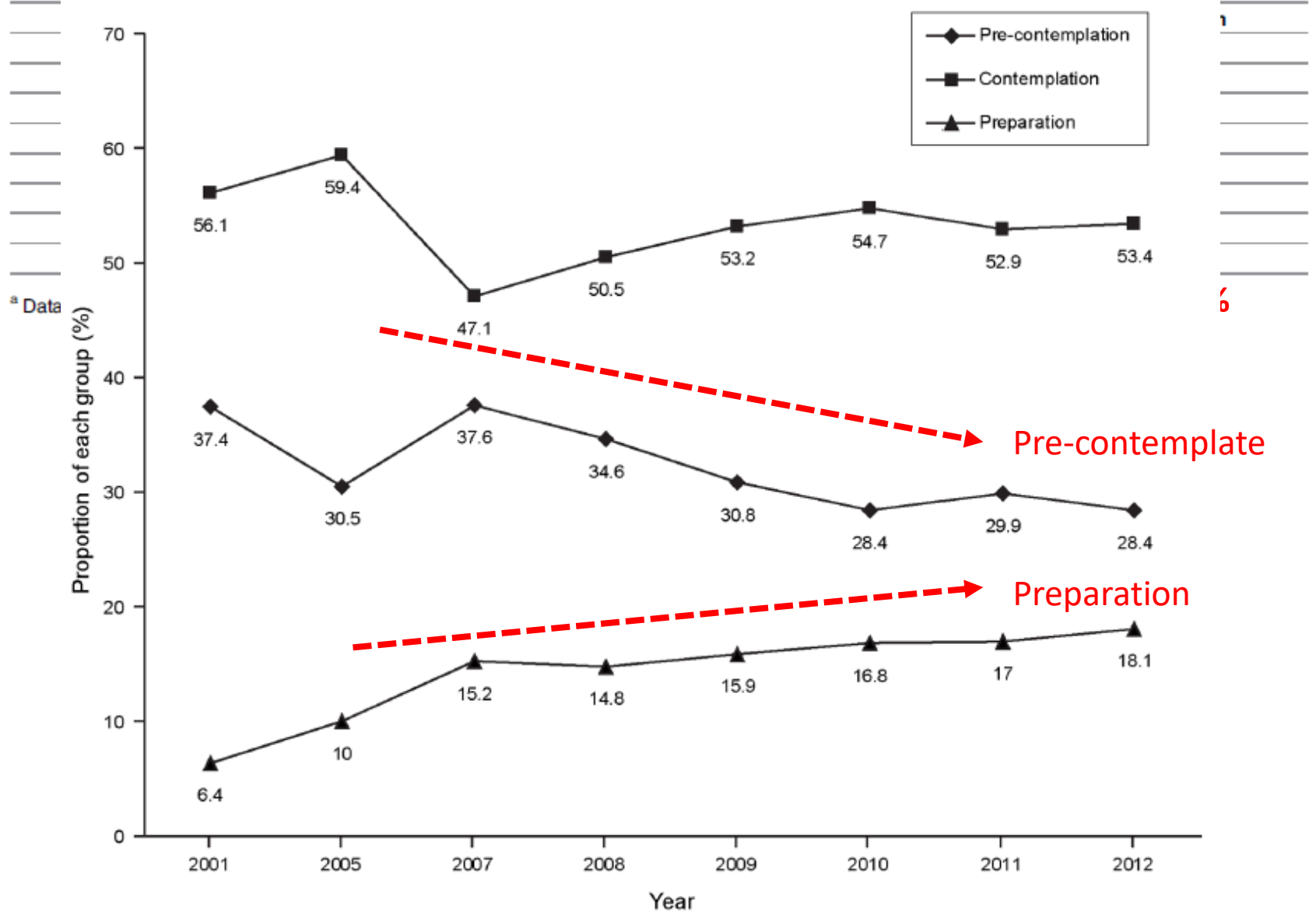


Fig 2. Annual percentages of the pre-contemplation, contemplation, and preparation groups in each year from 2001 to 2012.

Table 2. Baseline characteristics of the pre-contemplation, contemplation, and preparation groups^a.

Baseline characteristics	Total No. (n = 11924)	Pre-contemplation (n = 3864)	Contemplation (n = 6491)	Preparation (n = 1569)	P-value
Age, yrs		48.4±16.2	42.2±13.9	44.4±15.3	<0.001
<45	6584	1747 (45.2)	3955 (60.9)	882 (56.2)	<0.001
45–64	3808	1341 (34.7)	1991 (30.7)	476 (30.3)	
≥65	1532	776 (20.1)	545 (8.4)	211 (13.5)	
Sex					0.02
Male	10338	3316 (85.8)	5679 (87.4)	1343 (85.6)	
Female	1586	548 (14.2)	812 (12.6)	226 (14.4)	
BMI, kg/m² ^b		23.5±3.4	23.7±3.3	23.8±3.3	0.005
Household income					<0.001
1st quartile (lowest)	2260	951 (25.4)	1043 (16.5)	266 (17.3)	
2nd quartile	3172	1024 (27.4)	1722 (27.1)	426 (27.5)	
3rd quartile	3165	912 (24.5)	1811 (28.6)	442 (28.7)	
4th quartile (highest)	3022	850 (22.7)	1782 (27.8)	410 (26.5)	
Education					<0.001
Elementary school or lower	2051	1028 (26.9)	802 (12.4)	221 (14.2)	
Middle school	1350	511 (13.4)	680 (10.6)	159 (10.2)	
High school	4855	1439 (37.6)	2789 (42.9)	647 (41.4)	
College/university or higher	3585	849 (22.1)	2200 (34.1)	536 (34.2)	
Occupation					<0.001
White collar job ^c	4606	1228 (32.0)	2728 (42.3)	650 (41.7)	
Blue collar job ^c or unemployed	7243	2620 (68.0)	3726 (57.7)	907 (58.3)	
Marriage					0.001
Single ^a	2840	973 (26.5)	1552 (25.6)	315 (21.6)	
Married	8361	2699 (73.5)	4518 (74.4)	1144 (78.4)	
Underlying disease^d					
Hypertension	1403	507 (17.3)	680 (13.3)	216 (15.4)	<0.001
Dyslipidemia	554	144 (4.9)	313 (6.1)	97 (6.8)	0.071
Cerebral vascular accident	160	66 (2.2)	73 (1.4)	21 (1.4)	0.083
Cardiovascular disease	178	58 (1.9)	78 (1.5)	42 (2.9)	0.001
Pulmonary tuberculosis	497	163 (5.5)	250 (4.9)	84 (5.9)	0.489
Asthma	391	136 (4.6)	199 (3.9)	56 (3.9)	0.583
Diabetes mellitus	689	242 (8.2)	320 (6.2)	107 (7.8)	0.017
Chronic renal failure	25	8 (0.2)	15 (0.2)	2 (0.1)	0.855
Bronchiectasis	17	3 (0.1)	11 (0.3)	3 (0.3)	0.423
Depression	1048	329 (8.5)	552 (8.5)	167 (10.6)	0.02
Pulmonary function test					<0.001
FEV ₁ /FVC <70%	848	326 (22.4)	386 (16.1)	136 (17.8)	
FEV ₁ /FVC ≥70%	3767	1128 (77.6)	2010 (83.9)	629 (82.2)	

Table 5. Multivariate analysis for factors associated with stage of change in smoking cessation*.

Variables	Pre-contemplation (n = 2025)	Contemplation (n = 3338)
Demographic factors		
Age, yr		
45-64 (vs. <45)	1.10 (0.90-1.34)	1.02 (0.85-1.23)
>65 (vs. <45)	1.40 (1.03-1.89)	0.77 (0.58-1.03)
Sex (male vs. female)		
	0.83 (0.64-1.07)	0.79 (0.63-0.99)
Underlying diseases		
Chronic disease ^a (vs. none)	0.76 (0.63-0.93)	0.82 (0.68-0.98)
Depression (vs. none)	0.81 (0.61-1.08)	1.03 (0.79-1.35)
Social factors		
Household income		
1st quartile (vs. 4th quartile)	1.03 (0.78-1.36)	0.94 (0.72-1.22)
2nd quartile (vs. 4th quartile)	0.93 (0.75-1.17)	0.84 (0.69-1.03)
3rd quartile (vs. 4th quartile)	0.86 (0.69-1.07)	0.91 (0.75-1.10)
Education		
Elementary school or lower (vs. college/university or higher)	1.93 (1.42-2.63)	0.93 (0.70-1.25)
Middle school (vs. college/university or higher)	1.44 (1.07-1.94)	0.87 (0.66-1.15)
High school (vs. college/university or higher)	1.24 (1.01-1.53)	0.94 (0.79-1.13)
Occupation		
White collar job ^b (vs. blue collar job ^c or unemployed)	0.96 (0.79-1.16)	0.94 (0.79-1.11)
Marital status		
Single ^d (vs. married)	1.38 (1.12-1.70)	1.26 (1.04-1.53)
Smoking and alcohol related factors		
No. of cigarettes smoked per day		
10-19 (vs. <10)	2.59 (2.10-3.20)	2.21 (1.84-2.65)
>20 (vs. <10)	4.75 (3.82-5.93)	2.98 (2.46-3.62)
Never-drinker (vs. ever drinker ^e)	1.38 (0.91-2.10)	1.32 (0.88-1.99)
Life style factors		
Suicidal ideation within past 1 yr (vs. none)		
	1.20 (0.95-1.52)	1.08 (0.87-1.35)
Smoking cessation education experience within past 1 yr (vs. none)		
	0.44 (0.34-0.56)	0.70 (0.57-0.86)
Number of days of walking exercise (per week)		
None (vs. 1 day or more)	1.38 (1.11-1.72)	1.01 (0.82-1.25)
Number of days of strengthening exercise ^f (per week)		
None (vs. 1 day or more)	1.61 (1.35-1.91)	1.42 (1.22-1.66)
EQ-5D		
Mobility, problems ^g (vs. no problems)		
	0.91 (0.67-1.23)	0.92 (0.69-1.24)
Self-care, problems ^h (vs. no problems)		
	0.85 (0.54-1.32)	0.93 (0.60-1.43)
Usual activities, problems (vs. no problems)		
	1.04 (0.71-1.52)	0.96 (0.67-1.39)
Pain/discomfort, problems (vs. no problems)		
	1.06 (0.84-1.33)	1.05 (0.84-1.30)
Anxiety/depression, problems (vs. no problems)		
	0.75 (0.56-0.99)	0.81 (0.62-1.05)

CONCLUSION

- **Pre-contemplation group** was older, less educated, more often single and smoked more heavily, and had a lower level of physical activity and a higher prevalence of HTN, DM
 - Smokers without smoking cessation education experience within past 1 year were less willing to quit smoking.
- **Contemplation group** contained more women, heavy smokers, and single individuals.
 - Fewer smokers in the contemplation group had *chronic diseases*, were physically active, and experienced smoking cessation education within past 1 year.
- **Future interventions** to encourage smokers to move from the pre-contemplation to contemplation and preparation stages should take these factors into consideration.

Dietary vitamin C intake protects against COPD: the Korea National Health and Nutrition Examination Survey in 2012

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On behalf of the Korean Smoking Cessation Study Group

Background: Vitamin C, as an antioxidant, has recently been suggested to provide protection against COPD; however, only few national cohort studies have investigated these effects. We aimed to confirm the protective effects of vitamin C against COPD in Korean patients.

Patients and methods: We analyzed the data of 3,283 adults aged ≥ 40 years (representing 23,541,704 subjects) who underwent pulmonary function tests and responded to questionnaires on smoking history and vitamin C intake, with stratification variables and sampling weight designated by the Korea 2012 National Health and Nutrition Examination Survey.

Results: Among all the subjects, 512 (representing 3,459,679 subjects; 15.6%) were diagnosed as having COPD based on pulmonary function test results. Male gender, old age, residence in suburban/rural regions, low household income, low educational level, an occupation in construction or fabricator, and heavy smoking were significantly associated with COPD. Low

INTRODUCTION

- **Antioxidant deficiency** contributes to develop and aggravate various *chronic diseases, including COPD* which is sensitive to oxidative stress.
- **Vitamin C improves** antioxidant status in **COPD**
 - Protective effects on COPD
 - Symptom-relieving effects on COPD AE
 - Improves pulmonary function in COPD

METHODS

- Analyzed the data of 3,283 adults
 - aged ≥ 40 years
 - Underwent pulmonary function tests
 - Responded to questionnaires on smoking history and vitamin C intake
 - From 2012 KNHANES

Table 1 Demographic characteristics according to the diagnosis of COPD

Variables	Enrolled number	Representing number	Non-COPD	COPD	P-value
Total number	3,283	23,541,704	2,771 (representing 20,082,025)	512 (representing 3,459,679)	
Sex					<0.001
Male	1,376	11,252,028	8,604,056 (76.5%)	2,647,971 (23.5%)	
Female	1,907	12,289,677	11,477,969 (93.4%)	811,708 (6.6%)	
Age (mean ± SD)			54.5±0.4	64.2±0.7	<0.001
Resident district					0.006
Urban	2,556	18,092,613	15,766,726 (87.1%)	2,325,887 (12.9%)	
Suburban/rural	727	5,449,091	4,315,299 (79.2%)	1,133,792 (20.8%)	
Type of residence					<0.001
General type	1,836	17,367,741	14,484,857 (83.4%)	2,882,884 (16.6%)	
Apartment	1,447	6,173,963	5,597,168 (90.7%)	576,795 (9.3%)	
Household income					<0.001
Lowest quartile (Q1)	670	4,438,281	3,381,821 (76.2%)	1,056,459 (23.8%)	
Low-middle quartile (Q2)	837	6,259,228	5,302,125 (84.7%)	957,103 (15.3%)	
High-middle quartile (Q3)	787	5,895,330	5,113,119 (86.7%)	782,211 (13.3%)	
Highest quartile (Q4)	949	6,651,449	6,017,045 (90.5%)	634,404 (9.5%)	
Educational level					<0.001
Below elementary	1,068	6,840,173	5,289,636 (77.3%)	1,550,537 (22.7%)	
Middle school	495	3,255,797	2,688,555 (82.6%)	567,242 (17.4%)	
High school	1,008	8,268,662	7,323,906 (88.6%)	944,756 (11.4%)	
Above university	707	5,137,213	4,740,069 (92.3%)	397,144 (7.7%)	
Marital status					0.261
Married	3,241	23,120,165	19,703,137 (85.2%)	3,417,028 (14.8%)	
Unmarried	41	419,691	378,888 (90.3%)	40,803 (9.7%)	
Occupation					<0.001
Professional job	344	2,899,674	2,676,419 (92.3%)	223,255 (7.7%)	
Office job	169	1,262,324	1,101,149 (87.2%)	161,175 (12.8%)	
Service and sales	408	3,387,293	3,184,801 (94.0%)	202,491 (6.0%)	
Agriculture and fisheries	339	2,181,427	1,636,043 (75.0%)	545,384 (25.0%)	
Technician	303	2,984,528	2,485,055 (83.3%)	499,473 (16.7%)	
Laborer	348	2,500,599	2,068,775 (82.7%)	431,824 (17.3%)	
Jobless	1,363	8,256,867	6,874,613 (83.3%)	1,382,254 (16.7%)	
Smoking history					<0.001
Never smoker	2,012	13,162,867	12,119,987 (92.1%)	1,042,880 (7.9%)	
Light smoker	625	5,155,829	4,295,088 (83.3%)	860,741 (16.7%)	
Medium smoker	446	3,837,658	2,908,730 (75.8%)	928,928 (24.2%)	
Heavy smoker	200	1,385,350	758,220 (54.7%)	627,130 (45.3%)	

RESULTS : Comparison of nutritional status according to COPD

Table 2 Comparison of nutritional status according to the COPD

Nutritional status	Non-COPD (representing number =20,082,025)	COPD (representing number =3,459,679)	P-value
Food intake (g)	1,462.3±23.6	1,320.4±37.9	0.001*
Protein intake (g)	69.4±1.1	67.8±2.4	0.560
Fat intake (g)	36.6±0.9	34.6±2.4	0.407
Carbohydrate intake (g)	322.9±4.2	333.5±7.5	0.180
Calcium intake (mg)	514.0±10.6	492.1±30.2	0.490
Potassium intake (mg)	3,200.0±58.9	2,915.4±85.9	0.005*
Vitamin A intake (µgRE)	1,006.8±65.1	797.3±82.2	0.040*
Carotene intake (µg)	5,392.4±391.3	4,044.9±418.8	0.015*
Retinol intake (µg)	93.4±6.5	63.8±4.9	<0.001*
Vitamin C intake (mg)	122.1±4.0	93.2±3.9	<0.001*

Note: *P<0.05 between non-COPD and COPD group obtained by independent sample t-test.

Abbreviation: RE, retinol equivalent.

RESULTS : Prevalence of COPD according to smoking history and vitamin C intake

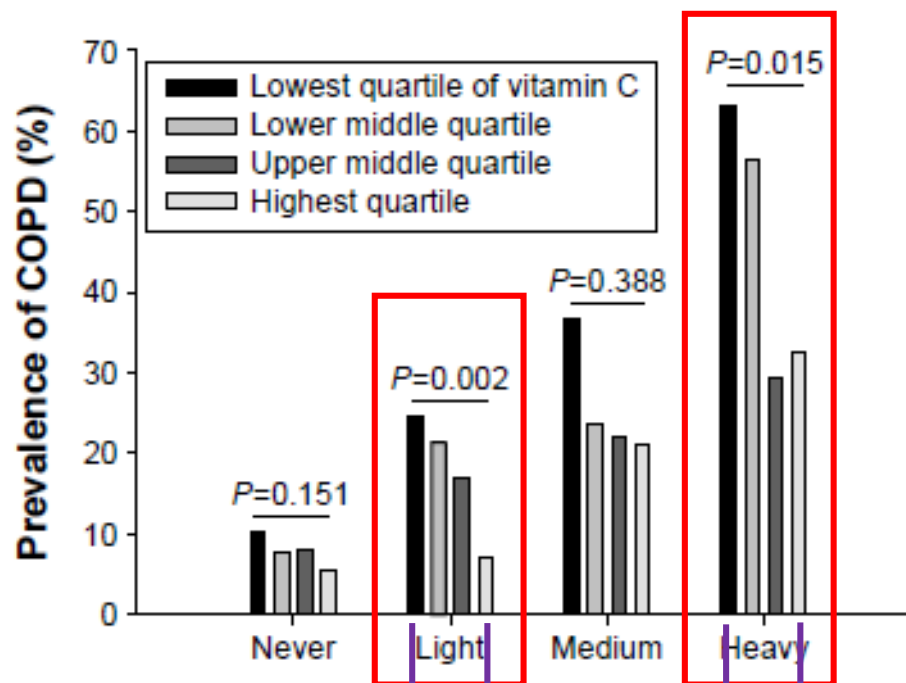


Figure I Correlation of the prevalence of COPD with the amount of smoking.

24.7%

7.0%

63.0%

32.6%

Table 3 Univariate and multivariate analysis for COPD

Variables	Univariate analysis			Multivariate analysis		
	OR	95% CI	P-value	OR	95% CI	P-value
Sex			<0.001			<0.001*
Male	Reference			Reference		
Female	0.230	0.173–0.306		0.234	0.144–0.378	
Age	1.080	1.067–1.094	<0.001	1.089	1.068–1.110	<0.001*
Resident district			0.006			0.601
Urban	Reference			Reference		
Suburban/rural	1.781	1.181–2.685		1.137	0.701–1.845	
Type of residence			<0.001			0.387
General type	Reference			Reference		
Apartment	0.518	0.379–0.707		0.855	0.598–1.222	
Household income			<0.001			
Lowest quartile (Q1)	Reference			Reference		0.806
Low-middle quartile (Q2)	0.578	0.425–0.785		0.931	0.622–1.392	
High-middle quartile (Q3)	0.490	0.335–0.716		1.137	0.709–1.823	
Highest quartile (Q4)	0.338	0.225–0.507		1.043	0.633–1.718	
Educational level			<0.001			0.354
Below elementary	Reference			Reference		
Middle school	0.720	0.524–0.988		0.873	0.550–1.386	
High school	0.440	0.308–0.629		0.810	0.512–1.280	
Above university	0.286	0.192–0.424		0.601	0.346–1.046	
Occupation			<0.001			0.529
Professional job	Reference			Reference		
Office job	1.755	0.786–3.918		2.009	0.906–4.455	
Service and sales	0.762	0.342–1.697		0.805	0.322–2.012	
Agriculture and fisheries	3.996	2.015–7.927		1.153	0.504–2.641	
Technician	2.401	1.213–4.785		1.242	0.573–2.694	
Laborer	2.502	1.309–4.784		1.230	0.538–2.814	
Jobless	2.410	1.365–4.256		1.092	0.534–2.233	0.001*
Smoking history			<0.001			
Never smoker	Reference			Reference		
Light smoker	2.329	1.641–3.305		1.435	0.925–2.227	
Medium smoker	3.711	2.528–5.450		2.192	1.305–3.680	
Heavy smoker	9.612	6.368–14.511		2.894	1.641–5.102	
Nutrition						0.648
Retinol intake (µg)	0.998	0.996–0.999	0.005	1.000	0.998–1.001	0.001*
Vitamin C intake (mg)	0.996	0.995–0.998	<0.001	0.998	0.996–0.999	

RESULTS : Vitamin C intake is protective against COPD in heavy smokers

Table 4 Multivariate analysis of COPD according to smoking history and amount of vitamin C intake

Smoking history	Vitamin C intake (mg)	Multivariate analysis		
		OR	95% CI	P-value
Never smoker	Lowest quartile (Q1, <48.50)	Reference		0.802
	Low-middle quartile (Q2, 48.50–84.38)	0.906	0.564–1.456	
	High-middle quartile (Q3, 84.38–141.63)	0.980	0.559–1.717	
	Highest quartile (Q4, >141.63)	0.738	0.377–1.447	
Light smoker	Lowest quartile (Q1, <48.50)	Reference		0.011*
	Low-middle quartile (Q2, 48.50–84.38)	1.753	0.707–4.346	
	High-middle quartile (Q3, 84.38–141.63)	1.657	0.756–3.630	
	Highest quartile (Q4, >141.63)	0.540	0.226–1.290	
Medium smoker	Lowest quartile (Q1, <48.50)	Reference		0.786
	Low-middle quartile (Q2, 48.50–84.38)	0.637	0.211–1.921	
	High-middle quartile (Q3, 84.38–141.63)	0.612	0.213–1.759	
	Highest quartile (Q4, >141.63)	0.655	0.253–1.694	
Heavy smoker	Lowest quartile (Q1, <48.50)	Reference		0.019*
	Low-middle quartile (Q2, 48.50–84.38)	0.586	0.138–2.484	
	High-middle quartile (Q3, 84.38–141.63)	0.233	0.094–0.576	
	Highest quartile (Q4, >141.63)	0.375	0.140–1.004	

CONCLUSION

- This study suggests that **dietary vitamin C intake** is **protective against COPD** independent of smoking history in the Korean general population.



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