HEALTH POLICY
AND TECHNOLOGY

Gender differences in heart diseases: Evidence from Turkey

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Tekin Kose

TED University, Department of Economics, Ankara, Turkey

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A B S T R A C T

Objectives: This study examines gender differences in heart disease experiences of individuals in Turkey by employing individual level data from a nationally representative survey.
Methods: By using Turkish Health Survey, this study constructs a binary indicator for heart disease experiences of individuals, which accounts for heart problems such as myocardial infarction, coronary heart disease and angina pectoris. Binary logistic regression models are estimated for quantification of associations between prevalence of heart diseases, gender and other risk factors.
Results: Empirical results imply that females are significantly less likely to experience heart diseases in Turkey. Age and hypertension issues are directly correlated with heart problems for both males and females. Perceived health status is negatively associated with probability of experiencing heart diseases for both males and females in Turkey. Having diabetes is a positive significant predictor of heart disease experiences for Turkish females. Females with higher household income level are less likely to have heart diseases. Finally, education level and lifestyle indicators such as smoking, physical activity, fruit, vegetable and alcohol consumption display mixed results.
Conclusions: This study suggests that there are gender differences in prevalence and risk factors of heart diseases in Turkey. Complementing the earlier literature, findings of this study imply that gender specific health interventions would be effective in coping with heart related diseases.

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Introduction

Heart diseases are the most frequent cause of death in the world. According to World Health Organization (WHO) [33], 31% of global deaths are resulted from cardiovascular diseases (CVDs) in 2016. More than 75% of CVDs related deaths occur in middle and low income countries [33]. Many cardiovascular diseases may be prevented by policy measures which address health behaviors, lifestyles and other risk factors of individuals.

Cardiovascular diseases are associated with socioeconomic, demographic, behavioral and biological factors. Researchers find that age is correlated with probability of having a cardiovascular disease and women experience CVDs at older ages than men [14,20]. Earlier findings indicate that coronary heart diseases are correlated with gender and educational attainment. Males are more likely to experience coronary heart disease whereas higher education level is associated with lower risks of cardiovascular diseases [7,10,12,13,22,25,32]. Marital obligations and work stress levels are positively associated with coronary heart disease in women [21]. Additionally, earlier studies report significant negative associations between different income measures and prevalence of CVDs [5,26].

Considering health indicators of individuals, some researchers point out that obesity is positively correlated with CVDs [6,31]. However, a branch of literature suggests that overweight and obese individuals with established CVDs may have better health measures compared to non-obese patients [11]. Evidence from different countries indicate that self-rated health status of individuals is a predictor of heart diseases [2,17]. Chronic conditions such as diabetes and hypertension are associated with higher risks of CVDs [24,30]. Some studies show that diabetes lead to higher risks of heart diseases in female samples [9].

Earlier research suggest that lifestyles are linked with CVDs. Healthy life styles such as being a non-smoker and being physically active are associated with lower incidence of heart diseases [1,3,4,16,19]. Earlier studies provide mixed evidence for associations of eating vegetables and fruits with risks of CVDs. Some studies suggest that healthy eating behaviors significantly reduce likelihood of having heart diseases whereas others find nonsignificant results [3,4,19]. Finally, alcohol consumption is associated with risks of CVDs. Lower levels of alcohol consumption may be negatively associated with risks of CVDS whereas higher alcohol consumption levels lead to higher heart disease prevalence [8,15,18,23].

Similar to global figures, the leading cause of deaths is circulatory system diseases in Turkey. According to Turkish Statistical

E-mail address: tekin.kose@tedu.edu.tr

Institute (TSI) [29], 39.7% of deaths in Turkey are caused by circulatory system diseases in Turkey during 2017. Total share of heart diseases (ischemic heart diseases, heart failures, etc.) in circulatory system related deaths corresponds to 81.8% % for males and 75.7% for females during 2017 in Turkey [29]. This study aims to investigate associations of heart diseases with gender in a developing country, Turkey. Most recent waves (2014 and 2016) of a nationally representative data set, Health Survey of Turkey, are employed to estimate probability models for incidence of heart diseases at individual level. Empirical models include control variables for behavioral and socioeconomic factors such as age, income, employment, marital status, alcohol use, smoking and chronic illnesses. Logistic regression models are estimated for the entire sample and for sub-samples to compare determinants of heart disease incidents across gender. Exploration of gender differences in prevalence of heart diseases in Turkey would provide insights for public health intervention policies on prevention of heart diseases in developing regions of the world.

Methods

This study uses 2014 and 2016 waves of Turkish Health Survey (THS), which is conducted by TSI [27,28]. THS is an individual level nationally representative survey and it collects various health information of individuals such as health status, accidents, diseases, use of health services and health related habits. This study considers respondents who are 15 or older, the operating samples of the study consists of 17,242 individuals for 2016 and 19,129 individuals for 2014.

In order to measure heart disease experiences of Turkish respondents, this study constructs a binary indicator which is based on following survey questions:

1) During the past 12 months, have you had myocardial infarction (heart attack) or chronic consequences of myocardial infraction? 1-Yes 2-No
2) During the past 12 months, have you had coronary heart disease or angina pectoris? 1-Yes 2-No

If an individual experienced one or both of heart related problems in the last year, then binary indicator for heart disease is equal to one, otherwise zero. Independent variables of empirical analysis include demographics, socioeconomic variables and measures for health related behaviors of individuals. Descriptions of all variables are given by Table A1 for 2014 and 2016. Descriptive statistics for the full sample of 2016 are summarized in Table 3. Frequency distributions of all variables for male and female subsamples of 2016 are provided in Table 1. Descriptive analysis for 2014 wave are provided in Tables A2 and A4.

Due to binary nature of dependent variable, logistic regressions are employed to quantify risk factors for heart disease. Each individual's heart disease experience (h_i) may be defined by the following model:

$$h_i^* = \theta X_i + \omega_i$$
$$h_i = 1 \text{ if } h_i^* > 0 \text{ and } h_i = 0, \text{ otherwise}$$

where h_i^* is the latent variable for individual's heart disease condition; X_i represents vector of independent variables including individual's demographics and other characteristics; θ is the vector of parameters for the model; ω_i is the random error term with logistic distribution.

Given the sample of observations, parameter vector, θ, of this non-linear probability model is estimated by maximum likelihood methodology. Based on estimates of parameters, odds ratios for explanatory variables are computed. All empirical estimations and additional computations are conducted by STATA 14 software. Regression models are estimated for males, females and the full sample.

Results

First, detailed discussions on empirical findings for wave of 2016 are presented in this section. Then, empirical findings from 2014 wave are briefly discussed due to space limitations.

Estimation results of binary logistic models for 2016 are presented in Table 2. All empirical models are estimated with robust standard errors and odds ratios are provided for each model. First, Wald test statistics indicate that all models are overall significant at 1% level. Coefficient of determination measures indicate that models explain more than 21% of the variation in probabilities of heart disease experiences for whole sample and sub-samples of females and males in Turkey. According to Table 2, there are gender differences in heart disease experiences of Turkish individuals. Empirical results indicate that Turkish females are 21% less likely to experience a heart disease than Turkish males. Namely, cardiovascular disease risk rates are more prominent for men in Turkey. Overall, empirical models indicate that age is positively associated with probability of having a heart disease in Turkey. Compared to middle age groups, older age groups are more likely to experience a heart disease for both male and female samples.

The relationships between educational attainment and heart disease experiences of individuals are not significant for the full sample in 2016. However, female and male samples display different results for associations of education level with probability of experiencing a heart disease in Turkey. Compared to primary school graduates, females with bachelor's degree are 50% less likely to have a heart disease in Turkey. Thus, higher education is correlated with reduction of heart disease prevalence among women in Turkey. On the other hand, Turkish males with an associate degree are 59.8% more likely to experience a heart disease compared to male primary school graduates. This result is not in line with the common finding that education and heart disease display negative correlations. One may speculate that life stressors (such as employment, income and marital status) for Turkish men with associate degree may be different than those with lower and higher education levels. Males with lower educational status may participate in low-skilled labor market whereas higher education levels may create opportunities for being employed in skilled labor market. However, males with associate degree may find it difficult to fit in low and high skilled labor markets due to skills mismatch and underemployment. Thus, they may also experience mismatch issues in marriage markets. Experiencing such difficulties in economic and social life, Turkish males with associate degree may face with higher stress levels and risk factors which may be correlated with prevalence of heart diseases. However, the exploration of causal pathways between education level and CVDs are beyond the scope of this study.

Employment status does not correlate with probability of having heart diseases for both males and females. However, full sample model reveals that employed Turkish individuals are 16.8% less likely to have a heart disease. Marital status is not significantly correlated with heart disease prevalence of Turkish individuals. Household income level is negatively correlated with probability of heart disease experience in Turkey for the whole sample and female sample. A level change in household income level is associated with a 5.8% decrease in heart disease probability of females on average. Household income level is not significantly associated with heart disease experiences of Turkish males.

Empirical findings imply that BMI figures of Turkish individuals are mostly not significantly associated with heart disease experiences in Turkey. However, estimation results of full sample suggest that individuals who are in obesity class 2 are 27.6% more likely to have a heart disease compared to normal weight category. Self-rated health statuses of Turkish individuals are negatively correlated with likelihood of experiencing a heart disease. Having

Table 1
Frequency distributions of variables for 2016.

Variables		Males		Females	
		N	%	N	%
Heart Disease		572	7.46	846	8.84
Age Level:	15–24	1344	17.53	1561	16.30
	25–34	1269	16.55	1737	18.14
	35–44	1508	19.67	1936	20.22
	45–54	1373	17.91	1634	17.07
	55–64	1055	13.76	1313	13.71
	65–74	702	9.15	843	8.81
	75+	417	5.44	550	5.74
Education Level:	Illiterate	211	2.75	1483	15.49
	No Official Diploma	274	3.57	680	7.10
	Primary School	2623	34.21	3325	34.73
	Secondary School	1559	20.33	1417	14.80
	High School	1656	21.60	1450	15.15
	Associate Degree	416	5.43	395	4.13
	Bachelor's Degree	798	10.41	726	7.58
	Graduate Degree	131	1.71	98	1.02
Employed		4399	57.37	2058	21.50
Married		5417	70.64	6495	67.84
Household Income:	0–1264 TL	1430	18.65	2241	23.41
	1265–1814 TL	2115	27.58	2592	27.07
	1815–2540 TL	1426	18.60	1726	18.03
	2541–3721 TL	1381	18.01	1563	16.33
	3722 + TL	1316	17.16	1452	15.17
Body Mass Index (BMI):	Underweight: BMI < 18.50	181	2.36	451	4.71
	Normal weight: 18.50 ≤ BMI < 25	3116	40.64	3633	37.95
	Overweight: 25 ≤ BMI < 30	3090	40.30	3014	31.48
	Obesity Class 1: 30 ≤ BMI < 35	1034	13.48	1690	17.65
	Obesity Class 2: 35 ≤ BMI < 40	205	2.67	586	6.12
	Obesity Class 3: BMI ≥ 40	42	0.55	200	2.09
Self-Rated Health Status:	Very Bad	82	1.07	133	1.39
	Bad	587	7.66	1265	13.21
	Fair	1906	24.86	2995	31.28
	Good	4204	54.83	4516	47.17
	Very Good	889	11.59	665	6.95
Diabetes		664	8.66	1214	12.68
Hypertension		1051	13.71	2218	23.17
Smoking Status:	Non-Smoker	4370	56.99	7797	81.44
	Smoker	3298	43.01	1777	18.56
Alcohol Use		3159	41.20	1068	11.16
Walking		6566	85.63	7405	77.34
Vegetable Consumption:	Never	58	0.76	51	0.53
	Less than once a week	237	3.09	210	2.19
	1 to 3 times a week	1309	17.07	1377	14.38
	4 to 6 times a week	1470	19.17	1869	19.52
	Once or more a day	4594	59.91	6067	63.37
Fruit Consumption:	Never	115	1.50	159	1.66
	Less than once a week	449	5.86	559	5.84
	1 to 3 times a week	1828	23.84	2109	22.03
	4 to 6 times a week	1311	17.10	1557	16.26
	Once or more a day	3965	51.71	5190	54.21

Source: TSI (2016).

diabetes and hypertension decrease the probability of having heart disease problems for the full sample and females in Turkey. A female with diabetic conditions is 32.4% more likely to experience a heart disease than a female without diabetes. On the other hand, having diabetes is not significantly associated with heart disease experiences of Turkish males. Additionally, Turkish males with hypertension problems are approximately 3 times (283.3%) more likely to have a heart disease compared to other Turkish males.

Estimation results indicate that smoking habits are significantly associated with heart disease experiences of Turkish individuals. For the female sample, current non-smokers are significantly less likely to have a heart disease compared to current smokers. For instance, current smoker females are 34.5% more likely to experience a heart disease compared to current non-smoker females on average. Although current smokers are 21.6% more likely to have a heart disease in the full sample, there are no significant differences between current non-smokers and smokers in male sample. Alcohol using males are 19.9% more likely to experience heart diseases compared to males who do not consume alcohol. Alcohol consumption does not have significant correlations with heart disease experiences for females. Empirical results exhibit that there are no significant associations of heart disease experiences with vegetable consumption in Turkey. However, fruit consumption reduces the probability of experiencing a heart disease for the female sample and the full sample. Although physical activity (walking) reduces probability of having heart diseases for Turkish females, this result is not observed for the full sample and males. Turkish females who walk more than 10 min in a day are 14.1% less likely to have a heart disease compared to physically inactive females.

Finally, robustness of findings is checked by conducting additional empirical analysis for 2014 wave of THS. Regression estimation results for 2014 wave are provided in the Table A3. Empirical findings for 2014 indicate that Turkish females are less likely to experience heart diseases compared to Turkish males. Age level is negatively correlated with probabilities of CVDs. Being employed is associated with lower probabilities of heart diseases for males

Table 2
Logistic regression estimation results for heart disease for 2016.

Variables		Full sample Odds ratio	Female sample Odds ratio	Male sample Odds ratio
Female		0.790***	–	–
Age Level:	15–24	0.691**	0.597**	0.908
	25–34	0.579***	0.742	0.409***
	35–44	0.840	0.872	0.805
	(Base Category) 45–54	–	–	–
	55–64	1.394***	1.344**	1.508**
	65–74	1.510***	1.381**	1.688***
	75+	1.560***	1.560***	1.507*
Education Level:	Illiterate	0.912	0.930	0.892
	No Official Diploma	1.149	1.139	1.224
	(Base Category) Primary School	–	–	–
	Secondary School	1.009	0.927	1.121
	High School	0.865	0.886	0.885
	Associate Degree	1.196	0.801	1.598**
	Bachelor's Degree	0.784	0.501**	1.014
	Graduate Degree	1.125	1.157	1.169
Employed		0.832**	0.843	0.887
Married		0.963	0.869	1.143
Household Income Level		0.949**	0.942*	0.960
Body Mass Index (BMI):	Underweight: BMI < 18.50	0.816	0.807	0.794
	(Base Category) Normal weight: 18.50 ≤ BMI < 25	–	–	–
	Overweight: 25 ≤ BMI < 30	1.018	0.950	1.100
	Obesity Class 1: 30 ≤ BMI < 35	1.061	1.065	1.022
	Obesity Class 2: 35 ≤ BMI < 40	1.276*	1.206	1.484
	Obesity Class 3: BMI ≥ 40	1.044	1.071	0.888
Self-Rated Health Level		0.436***	0.469***	0.389***
Diabetes		1.259***	1.324***	1.121
Hypertension		2.748***	2.678***	2.833***
Smoking		1.216***	1.345**	1.158
Alcohol Use		1.102	0.870	1.199*
Walking		0.902	0.859*	0.992
Vegetable Consumption Frequency		1.020	1.019	1.018
Fruit Consumption Frequency		0.926**	0.913**	0.953
Pseudo R^2		0.213	0.215	0.217
Wald χ^2		1911.54***	1087.75***	823.76***
Number of Observations		17,242	9574	7668

Source: TSI (2016). Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
All models are estimated with robust standard errors.

Table 3
Descriptive statistics for 2016.

Variable	N	Mean	Standard deviation	Min	Max
Heart Disease	17,242	0.082	0.275	0	1
Female	17,242	0.555	0.497	0	1
Age Level	17,242	3.431	1.758	1	7
Education Level	17,242	2.842	1.674	0	7
Employed	17,242	0.374	0.484	0	1
Married	17,242	0.691	0.462	0	1
Household Income	17,242	2.793	1.377	1	5
Body Mass Index (BMI)	17,242	26.40	5.145	12.487	66.406
Self-Rated Health Status	17,242	3.554	0.847	1	5
Diabetes	17,242	0.109	0.312	0	1
Hypertension	17,242	0.190	0.392	0	1
Smoking	17,242	0.294	0.456	0	1
Alcohol Use	17,242	0.245	0.430	0	1
Walking	17,242	0.810	0.392	0	1
Vegetable Consumption	17,242	3.392	0.884	0	4
Fruit Consumption	17,242	3.138	1.057	0	4

Source: TSI (2016).

and the full sample. Having higher household income is associated with lower odds of experiencing heart diseases for females. Having diabetes and using alcohol display positive relationships with probability of heart disease for all samples. Similar to 2016 wave results, having hypertension increases probability of heart disease for females and the full sample in 2014. Unlike results of 2016 wave, high school education and having a bachelor's degree lowers the risks of experiencing a heart disease in Turkey. Being married is positively associated with heart diseases in 2014 wave. Smoking behavior and walking activities are not significantly related with

heart diseases in 2014. Vegetable consumption and fruit consumption reduce probability of heart disease for females and males, respectively in 2014.

Conclusions

Gender differences in health behaviors and outcomes are frequently documented. Biological covariates, demographics, socioeconomic factors and intersectionality of these variables are to lead differences in health measures at individual and aggregate

levels in many countries. This study provides an empirical analysis of gender differences in heart diseases experiences of Turkish individuals.

Utilizing nationally representative data sets, this article uses binary logistic regression framework to estimate covariates of heart disease experiences for male and female samples. Empirical analysis indicates that there are gender differences in heart diseases experiences of Turkish individuals. In line with previous research, findings indicate that females are less likely to have a heart disease in Turkey. Household income level has a negative correlation with likelihood of heart problems for females. Lower levels of self-rated health status, being older and having hypertension are positively associated with heart disease experiences of both females and males. However, having diabetes is a risk factor for only female heart disease experiences. Education level and lifestyle indicators such as smoking, physical activity, fruit, vegetable and alcohol consumption displays mixed results across time and sub-samples of the survey.

Findings of this article imply that policy makers should consider formation of health interventions which specifically target female and male sub-populations in the society. One-fit-all type policy applications usually disregard essential differences across sub-groups and fail to reduce health disparities. Thus, gender specific health interventions may help women with access and utilization of health related resources. The case of Turkey may provide insights for other developing countries which experience gender differences in health outcomes.

Finally, this study has specific limitations and its results should be considered accordingly. First, most studies focus on heart disease mortality as the main variable of interest whereas the current study use a self-reported measure of heart disease experiences at individual level. Second, the empirical analysis of this study reveals only correlations among variables of interest rather than causa-tions. Third, biological covariates and other objective measures of health status are not included in empirical analysis due to survey data limitations. Similar to all surveys, the data sets of this study is also prone to reporting bias and measurement errors due to properties of self-reported data. Lastly, this study is based on cross-sectional surveys and it cannot account for panel data dimensions of health measures and other variables of interest.

Competing interests

None declared.

Ethical approval

Not required.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.hlpt.2019.02.002.

Appendix Tables

Table A1
Description of variables for 2014 and 2016.

Variable	Description
Heart Disease	Measures if the individual experienced a heart attack or coronary heart disease or angina pectoris in last 12 months. Yes = 1 and No = 0.
Female	1 = Female; 0 = Male.
Age Level	Reported age level group of the respondent. Age levels are: 1 = 15–24; 2 = 25–34; 3 = 35–44; 4 = 45–54; 5 = 55–64; 6 = 65–74; 7 = 75+
Education Level	Reported highest educational attainment of the respondent. Education groups are: 0-Illiterate; 1-No Official Diploma; 2-Primary School; 3-Secondary School; 4-High School; 5-Associate Degree; 6 Bachelor's Degree; 7-Graduate Degree
Employed	Working status of the respondent. 1 = Employed; 0 = Otherwise
Married	Marital status of the respondent. 1 = Married; 0 = Otherwise (Single, Widowed, Divorced).
Household Income	Reported monthly household income level category of the respondent (in Turkish Liras). Income level categories for 2014 are: 1 = 0–1080 TL; 2 = 1081–1550 TL; 3 = 1551–2170 TL; 4 = 2171–3180 TL; 5 = 3181+ TL. Income level categories for 2016 are: 1 = 0–1264 TL; 2 = 1265–1814 TL; 3 = 1815–2540 TL; 4 = 2541–3721 TL; 5 = 3722+ TL.
Body Mass Index (BMI)	Continuous measure of BMI for the respondent (kg/m^2). Underweight: BMI < 18.50 Normal weight: $18.50 \leq BMI < 25$ Overweight: $25 \leq BMI < 30$ Obesity Class 1: $30 \leq BMI < 35$ Obesity Class 2: $35 \leq BMI < 40$ Obesity Class 3: $BMI \geq 40$
Self-Rated Health Status	Reported health level of the respondent. 1 = Very Bad; 2 = Bad; 3 = Fair; 4 = Good; 5 = Very Good
Diabetes	1 = The respondent had diabetes during last 12 months; 0 = Otherwise
Hypertension	1 = The respondent had hypertension during last 12 months; 0 = Otherwise
Smoking	1 = The respondent currently smokes; 0 = Otherwise
Alcohol Use	1 = The respondent ever had an alcoholic drink; 0 = Otherwise
Walking	1 = The respondent spends more than 10 min on walking; 0 = Otherwise
Vegetable Consumption Frequency	Measures frequency of eating vegetables. 0 = Never; 1 = Less than once a week; 2 = 1 to 3 times a week; 3 = 4 to 6 times a week; Once or more a day
Fruit Consumption Frequency	Measures frequency of eating fruits. 0 = Never; 1 = Less than once a week; 2 = 1 to 3 times a week; 3 = 4 to 6 times a week; Once or more a day

Source: TSI (2014); TSI (2016).

Table A2
Frequency distributions of variables for 2014.

Variables		Males N	%	Females N	%
Heart Disease		727	8.34	1102	10.59
Age Level:	15–24	1586	18.19	1802	17.31
	25–34	1658	19.01	2003	19.24
	35–44	1666	19.10	2102	20.20
	45–54	1541	17.67	1791	17.21
	55–64	1230	14.10	1325	12.73
	65–74	663	7.60	835	8.02
	75+	377	4.32	550	5.28
Education Level:	Illiterate	243	2.79	1647	15.82
	No Official Diploma	315	3.61	644	6.19
	Primary School	3196	36.65	3918	37.64
	Secondary School	1708	19.58	1495	14.36
	High School	1824	20.92	1538	14.78
	Associate Degree	489	5.61	396	3.80
	Bachelor's Degree	800	9.17	674	6.48
	Graduate Degree	146	1.67	96	0.92
Employed		5237	60.05	2178	20.93
Married		6138	70.38	7023	67.48
Household Income:	0–1080 TL	2450	28.09	3444	33.09
	1081–1550 TL	1780	20.41	2079	19.98
	1551–2170 TL	1453	16.66	1662	15.97
	2171–3080 TL	1571	18.01	1703	16.36
	3081+ TL	1467	16.82	1520	14.60
Body Mass Index (BMI):	Underweight: BMI < 18.50	225	2.58	509	4.89
	Normal weight: $18.50 \leq BMI < 25$	3594	41.21	4041	38.83
	Overweight: $25 \leq BMI < 30$	3432	39.35	3200	30.75
	Obesity Class 1: $30 \leq BMI < 35$	1215	13.93	1751	16.82
	Obesity Class 2: $35 \leq BMI < 40$	211	2.42	675	6.49
	Obesity Class 3: $BMI \geq 40$	44	0.50	232	2.23
Self-Rated Health Status:	Very Bad	87	1.00	257	1.39
	Bad	641	7.35	1341	12.88
	Fair	2192	25.13	3454	33.19
	Good	4523	51.86	4465	42.90
	Very Good	1278	14.64	891	8.56
Diabetes		714	8.19	1282	12.32
Hypertension		1139	13.06	2396	23.02
Smoking Status:	Non-Smoker	4702	53.92	8446	81.15
	Smoker	4019	46.08	1962	18.85
Alcohol Use		4783	54.84	1691	16.25
Walking		7033	80.64	7381	70.92
Vegetable Consumption:	Never	76	0.87	63	0.61
	Less than once a week	262	3.00	250	2.40
	1 to 3 times a week	1521	17.44	1562	15.01
	4 to 6 times a week	1751	20.08	1908	18.33
	Once or more a day	5111	58.61	6625	63.65
Fruit Consumption:	Never	175	2.01	265	2.55
	Less than once a week	629	7.21	772	7.42
	1 to 3 times a week	2204	25.27	2393	22.99
	4 to 6 times a week	1562	17.91	1700	16.33
	Once or more a day	4151	47.60	5278	50.71

Source: TSI (2014).

Table A3
Logistic regression estimation results for heart disease for 2014.

Variables		Full Sample Odds Ratio	Female Sample Odds Ratio	Male Sample Odds Ratio
Female		0.862**	–	–
Age Level:	15–24	0.847	1.006	0.701
	25–34	0.647***	0.741**	0.519***
	35–44	0.918	0.999	0.801
	(Base Category) 45–54	–	–	–
	55–64	1.207**	1.126	1.321**
	65–74	1.146	0.965	1.422**
	75+	1.407***	1.360**	1.382*
Education Level:	Illiterate	1.224**	1.308***	1.031
	No Official Diploma	1.095	1.143	1.069
	(Base Category) Primary School	–	–	–
	Secondary School	0.918	0.889	0.938
	High School	0.776**	0.646***	0.880
	Associate Degree	0.973	0.806	1.068
	Bachelor's Degree	0.603***	0.484***	0.620**
	Graduate Degree	0.579	0.442	0.551
Employed		0.807***	0.862	0.810**
Married		1.160**	1.091	1.182
Household Income Level		0.980	0.935**	1.055
Body Mass Index (BMI):	Underweight: BMI < 18.50	1.076	0.968	1.158
	(Base Category) Normal weight: 18.50 ≤ BMI < 25	–	–	–
	Overweight: 25 ≤ BMI < 30	0.961	0.883	1.058
	Obesity Class 1: 30 ≤ BMI < 35	0.979	0.808**	1.330**
	Obesity Class 2: 35 ≤ BMI < 40	0.975	0.954	0.888
	Obesity Class 3: BMI ≥ 40	0.950	0.819	1.600
Self-Rated Health Level		0.453***	0.467***	0.424***
Diabetes		1.271***	1.312***	1.175
Hypertension		2.554***	2.718***	2.362***
Smoking		1.057	1.180	1.003
Alcohol Use		1.333***	1.473***	1.166*
Walking		0.988	0.953	1.016
Vegetable Consumption Frequency		0.955	0.890***	1.059
Fruit Consumption Frequency		0.965	1.011	0.910**
Pseudo R^2		0.191	0.195	0.194
Wald χ^2		2108.86***	1220.89***	901.41***
Number of Observations		19,129	10,408	8721

Source: TSI (2014). Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
All models are estimated with robust standard errors.

Table A4
Descriptive statistics for 2014.

Variable	N	Mean	Standard Deviation	Min	Max
Heart Disease	19,129	0.096	0.294	0	1
Female	19,129	0.544	0.498	0	1
Age Level	19,129	3.324	1.727	1	7
Education Level	19,129	2.781	1.634	0	7
Employed	19,129	0.387	0.487	0	1
Married	19,129	0.688	0.463	0	1
Household Income	19,129	2.665	1.455	1	5
Body Mass Index (BMI)	19,129	26.32	5.208	13.271	64.932
Self-Rated Health Status	19,129	3.557	0.888	1	5
Diabetes	19,129	0.104	0.305	0	1
Hypertension	19,129	0.184	0.388	0	1
Smoking	19,129	0.313	0.464	0	1
Alcohol Use	19,129	0.338	0.473	0	1
Walking	19,129	0.753	0.430	0	1
Vegetable Consumption	19,129	3.377	0.897	0	4
Fruit Consumption	19,129	3.037	1.109	0	4

Source: TSI (2014).

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