DOES CONTINUOUS DOCTOR VISITS MAKE PATIENTS WITH HYPERTENSION AND DIABETES STOP SMOKING AND DRINKING?

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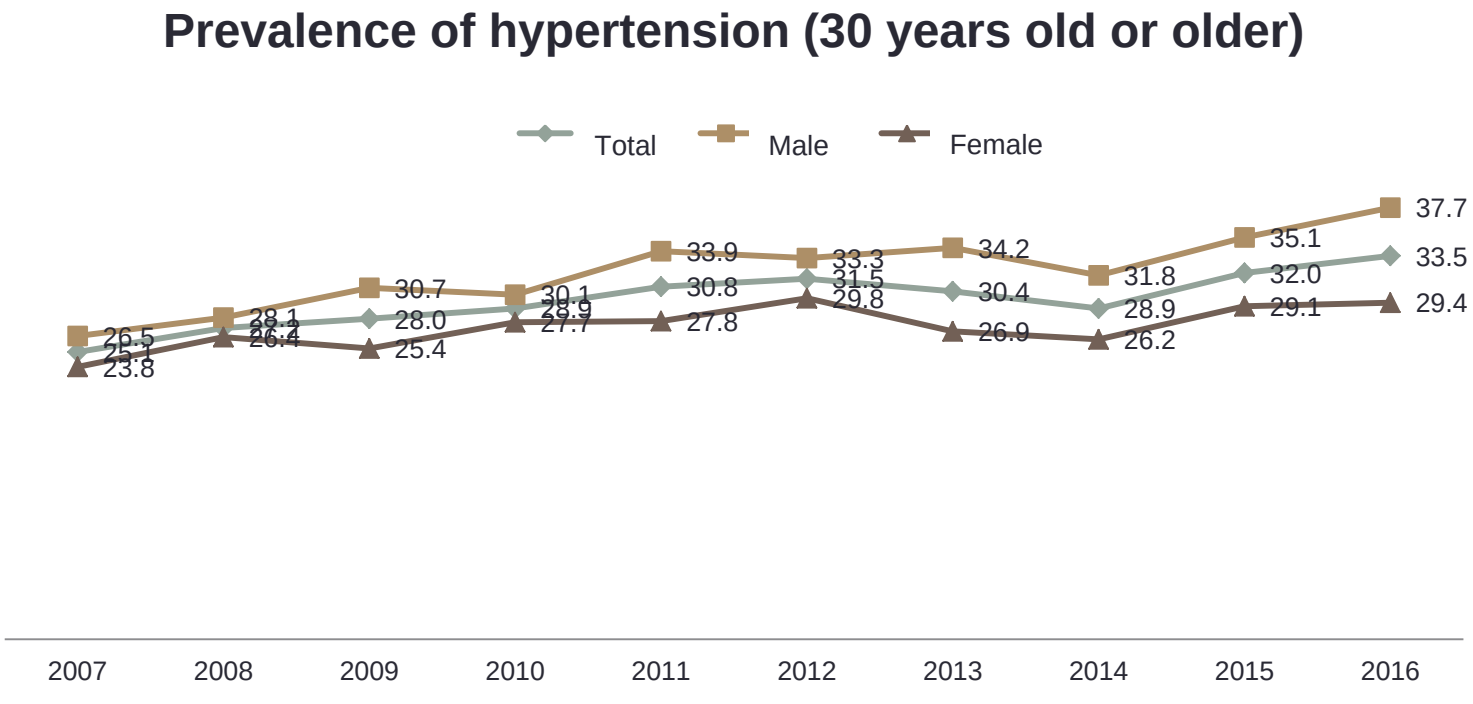
Background and purpose



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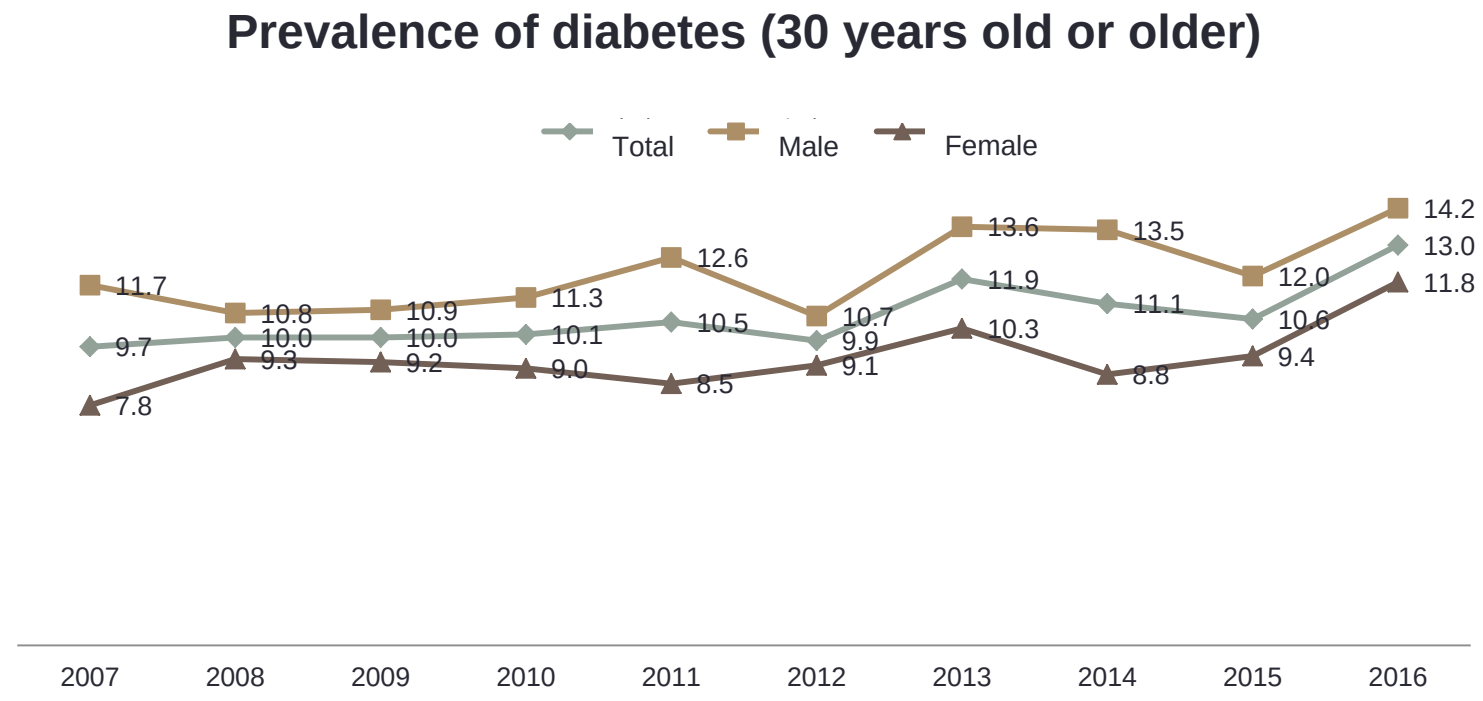
Background and purpose



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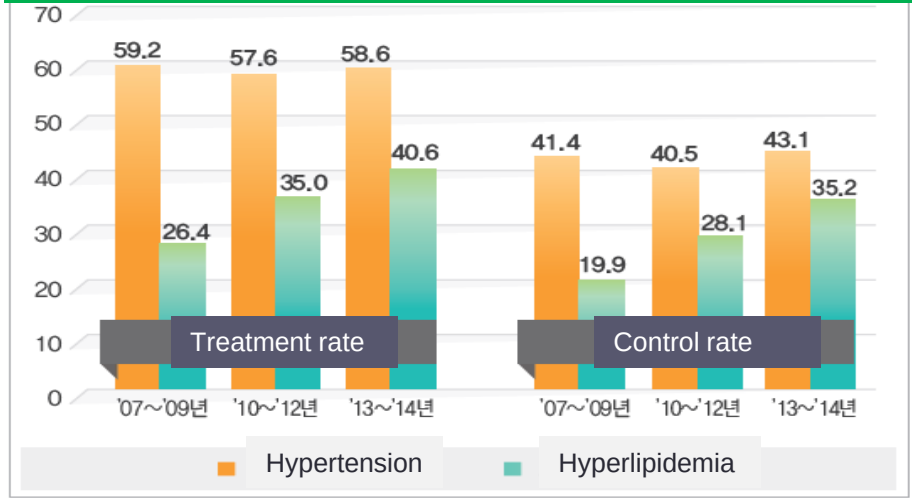
Background and purpose

- Importance of hypertension and diabetes in Korea
  - Hypertension is a major risk factor of cardiovascular diseases and proper control of blood pressure using anti-hypertensive drugs and others can reduce the mortality from cardiovascular diseases by 50% (WHO, 2007)
  - High mortality and hospitalizations from diabetes
    - Diabetes was 6th cause of deaths in 2016
    - Hospitalizations from diabetes per 100,000 : 281.0 in Korea, OECD average 137.2 (OECD, 2017)

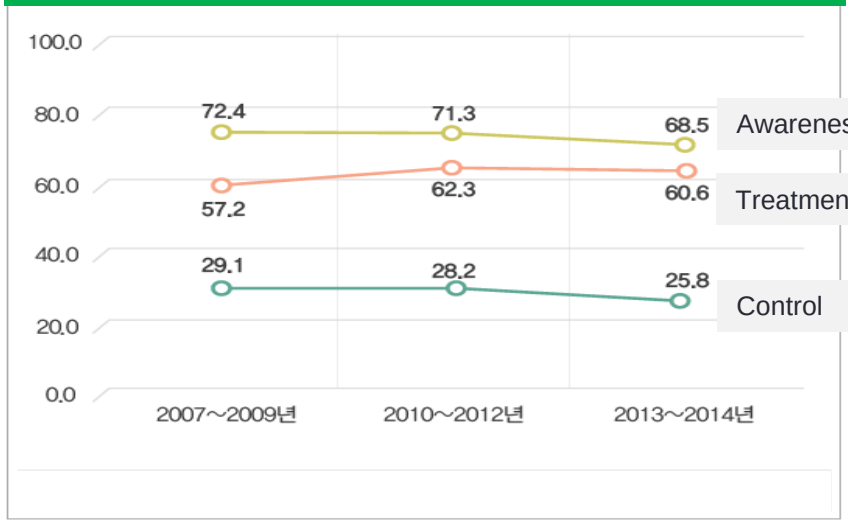
Background and purpose

- Management of hypertension and diabetes

Treatment rate and control rate of hypertension and hyperlipidemia (30 yrs old +)



Awareness, treatment, and control rates of diabetes (30 yrs old +)



Source: Korea Center for Disease Control. 2016 Facts and Issues in Chronic Diseases: Chronic Disease FACTBOOK.

Background and purpose

- Hypertension and Diabetes Appropriateness Assessment by the Health Insurance Review and Assessment (HIRA)
  - Outpatient services for hypertension or diabetes in terms of ▲continuity of care ▲ appropriateness of prescriptions ▲ tests for prevention and management of complications
  - Most of the patients continually receive care from one medical facility
    - Prescription days for hypertension in 2016-2017 was 330 days (90.4%) and % of patients getting continuous prescription (80% of the days or more) was 84.8%
    - Prescription days for diabetes in 2016-2017 was 329.6 days (90.3%), 85.8% of patients made one or more doctor visits by quarter

Source: News Release of Health Insurance Review & Assessment: Hypertension and diabetes, obtain continuous medical services from your near clinic. March 27, 2018.

Background and purpose

Evaluation indicators (Hypertension)

Domains	Indicators		Descriptions	Interpretation
Px continuity	% of prescription days		% of days that a patient received anti-hypertensive drugs	The higher, the better
	% of continuous prescription		% of patients whose % of prescription days is 80% or higher	
Prescription	% of duplicate prescription within the same ingredient		% of prescriptions that duplicated anti-hypertensive drugs within the same component group	The lower, the better
	Without comorbid conditions	Diuretics prescription rate	% of prescriptions including diuretics among those prescriptions with 3 or more component groups	The higher, the better
		% of Un-recommended combined therapy	% of prescriptions including un-recommended mix of use among those prescriptions from 2 component groups	The lower, the better

Source: News Release of Health Insurance Review & Assessment: Hypertension and diabetes, obtain continuous medical services from your near clinic. March 27, 2018.

Background and purpose

Evaluation indicators (Diabetes)

Domains		Indicators	Descriptions	Interpretation
Continuity of care	OP visits	1 or more visits per quarter	% of patients who make 1 or more visits per quarter	The higher, the better
	Px continuity	No of prescription days	% of days when oral glucose lowering drugs are prescribed	
Prescription		Duplicate prescriptions	% of prescriptions that duplicated the same component group	The lower, the better
		4 or more components	% of prescriptions that included 4 or more component groups	
Tests		HbA1C	% of patients who received HbA1C test	The higher, the better
		Cholesterols	% of patients who received cholesterol test	
		Funduscopy	% of patients who received funduscopy examination	

Source: News Release of Health Insurance Review & Assessment: Hypertension and diabetes, obtain continuous medical services from your near clinic. March 27, 2018.

Background and purpose

- According to the clinical guidelines,
  - Hypertension

1. General Principle

Recommendations	Rate	Level
• Primary care physicians should educate patients for their improvement of lifestyles	I	A

Evidence is clear (1 or more RCT's or meta analysis or systematic review)

Evidence level(A)and benefits are evident and highly practical

Source: Korea Medical Association, Korea Center for Disease Control. (2018). Summary of the Evidence-based Recommendations on Hypertension for Primary Care

Background and purpose

Evidence level(A)and benefits are evident and highly practical

Evidence is clear (1 or more RCT's or meta analysis or systematic review)

2. Anti-smoking

Recommendations	Rate	Level
• Advise complete quitting smoking	I	A
• Ask all hypertension patients about smoking, recommend stopping smoking, assess will of quitting smoking and nicotine dependency, and provide necessary counseling and prescriptions	I	A
• Consider medication therapy for those who smoke 10 cigarettes per day, moderate or higher nicotine dependency, or past failures of quitting	IIa	D
• Provide motivation counseling for preventing relapses and use long-term medication therapy if necessary	IIa	D
• Educate patients that smoking is a cause of stroke, cardiac arrest, cancer, COPD, and atherosclerosis and smoking accelerates their developments and aggravates them	I	A

Source: Korea Medical Association, Korea Center for Disease Control. (2018). Summary of the Evidence-based Recommendations on Hypertension for Primary Care

Background and purpose

Evidence is based upon expert opinions

3. Drinking temperance

Recommendations	Rate	Level
• <= 2-3 glasses (20-30mg of alcohol) for males and <=1-2 glasses (10-20 mg of alcohol) for females per day	I	D
• Maintain total alcohol consumption at 140 g for males and 80 g for females per week	I	D
• Ask about drinking habits and identify patients with problematic drinking and consider providing motivation counseling	IIa	D
• Educate patients that alcohol use and blood pressure are commensurate and quitting smoking and drinking temperance is important	I	D
• No drinking is good. In inevitable cases, <= 1 glass (10 mg) per day is recommended when blood pressure is well controlled.	I	B

Evidence is reliable (1 or more well-designed non-randomized clinical trials such as case-control or cohort study)

Source: Korea Medical Association, Korea Center for Disease Control. (2018). Summary of the Evidence-based Recommendations on Hypertension for Primary Care

Background and purpose

- Diabetes

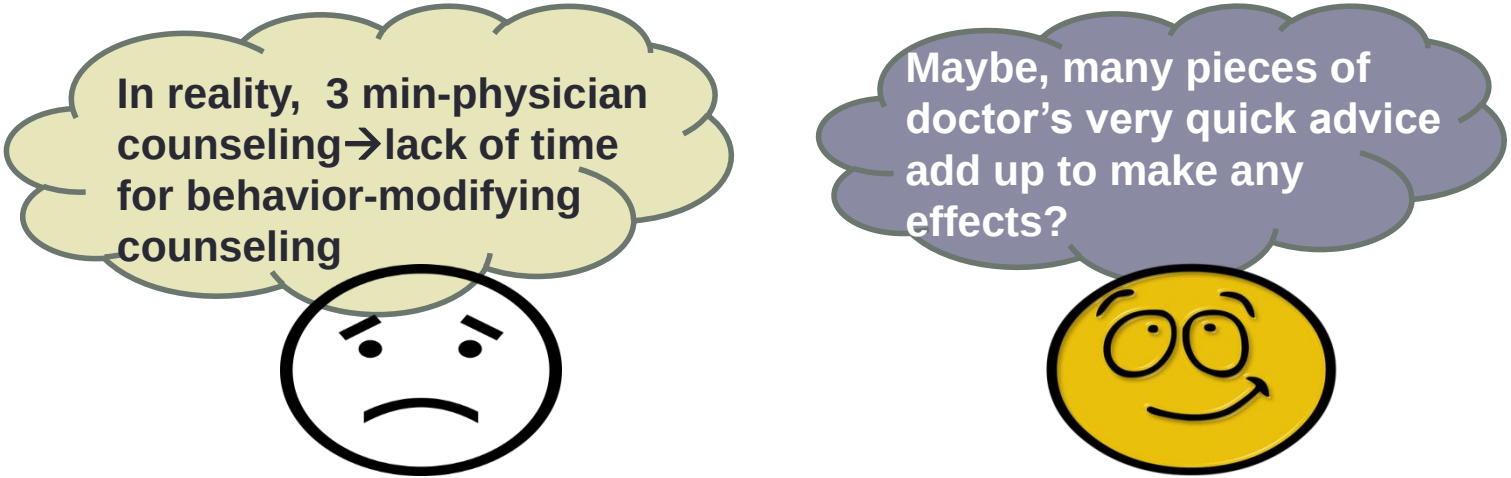
At every visit	Exam by interview and basic tests	Height/weight/BMI/waist circumference	Objectives: 5-10% reduction (BMI >=25) WC 90cm (males)/85cm (females)
		Blood sugar after fasting/at 2 hrs after meal	Objectives: fasting glucose 70-130 mg/dL blood sugar at 2 hrs after meal 90-180 mg/dL
		Blood pressure	Objective: < 140/85 mmHg Medication tx is recommended for diagnosed hypertension or when the objective after 3-month of remedial lifestyle modifications not met
	Check and advise on self-care	Lifestyle improvement	No smoking, no drinking, exercise, balanced eating
		Self-care Patient education	Self-care journal

Source: Korea Medical Association, Korea Center for Disease Control. (2014). Checklist for Self-Care of Diabetes Patients.

Background and purpose

- Medical professionals whom we meet at an outpatient visit

physician → nurse → pharmacist



Background and purpose

- Study purpose

To find out if continuous doctor visits of patients with hypertension and/or diabetes are related to lower rates of smoking or drinking

Methods

- Data
  - 2016 Korea Health Panel Survey
  - Datasets for household, household members, Chronic disease, health behavior, outpatient use were used
  - Adult males who were 30 years old or older and had either diagnosed hypertension or diabetes in 2016 (n=5,431)
  - Sample size: hypertension (n=1,541), diabetes (n=679), both hypertension and diabetes (n=420)
  - Prevalence: hypertension 36.1%, diabetes 20.2%

Methods

- Variables
  - Dependent variables
    - Smoking (1=current smoking, 0=past smoking or non-smoking)
    - Drinking (1=current drinking, 0=past drinking or non-drinking)
  - Independent variable
    - Continuous visits for hypertension (diabetes)=4 or more outpatient visits in 2016 (※ HIRA's definition of 'Continuity of care' = one or more visits per quarter)
  - Control variables
    - Socioeconomic factors, self-rated health, health behavior

- Analysis
  - Descriptive statistics
    - Mean and median number of outpatient visits for hypertension and diabetes
    - Sample characteristics by disease group (hypertension, diabetes, both hypertension and diabetes)
  - Logistic regression
    - Regression analysis by disease group
  - Missing cases were not replaced and survey weights were not applied
  - Stata SE version 12.1

Results

- Distributions of outpatient visits

No of outpatient visits	Hypertension	Diabetes
Less than 4	269(17.46%)	98(14.43%)
4 or more	1,272(82.54%)	581(85.57%)
Max	58	106
Min	0	0
Mean	6.68	3.32

Results

- Characteristics of the sample

Unit: n (%)

Variables	Categories	Both (n=420))	Hypertension (n=1,541)	Diabetes (n=679)
Household income quintile	1st	72(17.14)	248(16.09)	106(15.61)
	2nd	79(18.81)	263(17.07)	121(17.82)
	3rd	60(14.29)	214(13.89)	102(15.02)
	4th	51(12.14)	205(13.30)	89(13.11)
	5th	46(10.95)	208(13.50)	88(12.96)
	missing	112(26.67)	403(26.15	173(25.48)
Age	30-49	22(5.24)	143(9.28)	64(9.43)
	50-59	51(12.14)	247(16.03)	110(16.20)
	60-69	121(28.81)	411(26.67)	198(29.16)
	70-79	162(38.57)	518(33.61)	220(32.40)

Variables	Categories	Both (n=420))	Hypertension (n=1,541)	Diabetes (n=679)
Education	None	27(6.43)	73(4.74)	34(5.01)
	Elementary	95(22.62)	326(21.16)	139(20.47)
	Middle	212(50.48)	790(51.27)	359(52.87)
	High	71(16.90)	298(19.34)	124(18.26)
	College+	15(3.57)	54(3.50)	23(3.39)
Marital status	Married	369(87.86)	1,364(88.51)	590(86.89)
	Separated, divorced	22(5.24)	64(4.15)	34(5.01)
	Widowed	19(4.52)	71(4.61)	33(4.86)
	Single	10(2.38)	42(2.73)	22(3.24)
Health insurance type	NHI(employed)	256(60.95)	1,024(66.45)	414(60.97)
	NHI(self-employed)	122(29.05)	391(25.37)	205(30.19)
	Medical Aid	24(5.71)	71(4.61)	34(5.01)
	Other	18(4.29)	55(3.57)	26(3.83)
Working	Yes	213(50.71)	617(40.04)	385(56.70)
	No	207(49.29)	924(59.96)	24(43.30)

Variables	Categories	Both (n=420))	Hypertension (n=1,541)	Diabetes (n=679)
Continuous visits for hypertension	Yes	363(86.43))	1,272(82.54)	-
	No	57(13.57)	269(17.46)	-
Continuous visits for diabetes	Yes	366(87.14)	-	581(85.57)
	No	54(12.86)	-	98(14.43)
Self-rated health	Very good	7(1.67)	35(2.27)	13(1.91)
	Good	87(20.71)	394(25.57)	145(21.35)
	Fair	189(45.00)	723(46.92)	324(47.72)
	Bad	104(24.76)	276(17.91)	137(20.18)
	Very bad	10(2.38)	37(2.40)	18(2.65)
	missing	23(5.48)	76(4.93)	42(6.19)
Obesity	Yes	158(37.62)	563(36.53)	232(34.17)
	No	262(62.38)	978(63.47)	447(65.83)

- Logistic regression analysis results

Variables	Categories	Hypertension		Diabetes		Both	
		Smoking	Drinking	Smoking	Drinking	Smoking	Drinking
Household income	(1st)	-	-	-	-	-	-
	2nd	1.58	1.17	1.25	1.35	1.37	1.26
	3rd	1.30	0.89	1.25	1.06	0.95	0.65
	4th	1.30	1.73*	1.45	3.91**	1.20	5.87**
	5th	1.13	1.39	1.42	1.10	2.31	0.91
Age	(30-49)	-	-	-	-	-	-
	50-59	0.73	0.25**	0.28**	0.53	0.34	0.16
	60-69	0.31***	0.23**	0.21**	0.23*	0.23	0.15
	70-79	0.25***	0.10***	0.14***	0.18**	0.19*	0.10*
	80+	0.16***	0.04***	0.10***	0.08***	0.16*	0.04**

Variables	Categories	Hypertension		Diabetes		Both	
		Smoking	Drinking	Smoking	Drinking	Smoking	Drinking
Education	(None)	-	-	-	-	-	-
	Elementary	1.60	0.96	1.06	0.75	0.93	1.41
	Middle	1.46	0.90	0.67	0.68	0.71	0.91
	High	1.20	0.83	0.78	0.54	1.64	0.79
	College+	0.59	0.31*	0.17	0.74	0.10	0.83
Marital status	(Married)	-	-	-	-	-	-
	Separated, divorced	1.81	0.58	1.33	0.47	1.87	0.38
	Widowed	1.00	1.03	1.19	0.93	0.85	1.50
	Single	0.95	0.59	0.89	0.26	2.32	0.30
Health insurance type	(NHI: employed)	-	-	-	-	-	-
	NHI: self-employed	0.80	0.69*	0.56*	1.11	0.44*	1.34
	Medical Aid	2.16*	0.57	1.22	0.62	1.20	0.63
	Other	1.09	0.80	0.69	0.66	1.06	2.08

*p<0.05, **p<0.01, ***p<0.001

Variables	Categories	Hypertension		Diabetes		Both	
		Smoking	Drinking	Smoking	Drinking	Smoking	Drinking
Working	Yes	1.27	1.05	1.27	1.16	1.76	1.23
	(No)	-	-	-	-	-	-
Continuous visits for hypertension	Yes	0.92	1.28	-	-	2.94	2.34
	(No)	-	-	-	-	-	-
Continuous visits for diabetes	Yes	-	-	0.48*	1.16	0.21**	0.75
	(No)	-	-	-	-	-	-
Self-rated health	(Very good)	-	-	-	-	-	-
	Good	2.80	0.88	0.84	0.44	0.40	0.68
	Fair	2.81	0.88	1.05	0.46	0.62	0.81
	Bad	2.92	0.41	1.10	0.26	0.54	0.42
	Very bad	2.47	0.28	omitted	0.23	omitted	0.46
Obesity	Yes	0.69*	0.82	1.01	0.70	0.87	0.95
	(No)	-	-	-	-	-	-

*p<0.05, **p<0.01, ***p<0.001

Variables	Categories	Hypertension		Diabetes		Both	
		Smoking	Drinking	Smoking	Drinking	Smoking	Drinking
Constant		0.21	25.19***	4.05	27.57*	3.43	12.06
No. of obs:		1081	1081	462	471	284	289
LR chi2(82):		91.18	176.26	57.62	71.36	48.12	55.23
Prob>chi2:		0.0000	0.0000	0.0001	0.0000	0.0036	0.0007
pseudo-R square:		0.0734	0.1351	0.1017	0.1208	0.1467	0.1458

*p<0.05, **p<0.01, ***p<0.001

Discussion and conclusions

- Many patients make continuous visits
  - 82.54% for hypertension; 85.57% for diabetes
  - National guidelines and the appropriateness assessment of HIRA are effective
- Some patients overuse outpatient services
  - Maximum number of visits for hypertension and diabetes were 58 and 106, respectively, in 2016
  - Possible explanations: no out-of-pocket payments for low-income patients (i.e., Medical Aid); free programs of Community Health Centers; induced demand of the providers
  - Future studies need to take a closer look on these high users

- Continuous visits for diabetes was related to low probability of smoking
  - Possible explanation: Doctors do give advice on anti-smoking to diabetes patients at their office
  - Future studies need to assess actual behavioral counseling activities of doctors for diabetes and hypertension patients.

- Continuous visits for hypertension was NOT related to low probability of smoking
  - Possible explanations: hypertension is relatively asymptomatic and therefore patients may perceive themselves less vulnerable to cardiovascular diseases; Four visits may not be the right threshold of continuous treatment for hypertension (Would 12 visits per year make a difference?)
  - Future research needs to consider patient's perceptions on the vulnerability, seriousness, benefits, harms, self-efficacy, etc based on Health Belief Model and to explore different thresholds of continuity of care

- No relationships between continuous visits for hypertension or diabetes and current drinking were found
  - Possible explanations: The definition of current drinking is too broad (1 or more drinking in the past year). Clinical guidelines also allow less than 1 glass per day if drinking is inevitable.
  - Future research needs to narrow the definition of drinking.

- Limitations
  1) Impossible to control the continuous visits were made to the same doctor
     - But HIRA reported that most of those patients who made continuous visits used the same provider.
  2) Behavior change is more difficult than the changes in awareness, perception, belief, or attitude
     - Can’t exclude the possibilities of the impacts of doctor visits on these cognitive and attitudinal variables
     - Consumption of smoking or drinking can also be dependent variables

- Conclusions
  - Continuous outpatient visits for diabetes was related to lower probability of smoking
  - Future studies are needed first, to understand the higher users and its relationship with their smoking and drinking, second, to find better models to examine the relationship between continuous visits for hypertension and smoking or drinking.