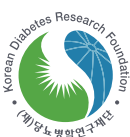


Diabetes Fact Sheet in Korea 2016



* N Seoul Tower on Namsan Mountain Autumn View



Diabetes Fact Sheet in Korea 2016

Summary

- About 4.8 million Koreans (13.7%), aged 30 years or older, had diabetes in 2014. In addition, nearly a quarter of Korean adults had prediabetes (impaired fasting glucose).
- However, three out of 10 persons with diabetes were not aware of their condition. Nearly half persons with diabetes were obese or hypertensive, and one third had hypercholesterolemia. Nearly one-third of persons with diabetes had albuminuria or decreased renal function.
- Although most persons with diabetes (89.1%) were under medical treatment—mostly being treated with oral hypoglycemic agents (80.2%), but 10.8% of those had remained untreated.
- With respect to the overall glycemic control, 43.5% reached the target of HbA1c < 7.0%, whereas 23.3% reached the target when the standard was set to HbA1c < 6.5%, according to the Korean Diabetes Association (KDA) guideline.

Data source

The estimated percentages and the total number of persons over the age of 30 with diabetes and prediabetes were determined from data from the 2013–2014 Korea National Health and Nutritional Examination Survey (KNHANES) conducted by the Korea Centers for Disease Control and Prevention (KCDC) and the Korean Ministry of Health and Welfare, applied to National Population Census in 2014 (34.1 million Koreans were ages 30 years or older; 16.7 million men and 17.4 million women).

SUMMARY of DIABETES FACT SHEET IN KOREA

Year	2012	2013	2015	2016
Data source	KNHANES 2007–2010	KNHANES 2011	NHIS 2002–2013	KNHANES 2013–2014
Year applied to Korean census	2010	2011	2006–2013*	2014
Co-working Institute	CDC	CDC	NHIS	CDC
Prevalence of diabetes (%), n [§]	10.1% (3.2 M)	12.4% (4.0 M)	8.0% (2.7 M)	13.7% (4.8 M)
Prevalence of IFG (%), n	19.9% (6.2 M)	19.3% (6.1 M)	25%	24.8% (8.3 M)
Awareness of diabetes (%)	73.4%	72%	•	70.7%
No treatment for diabetes (%)	14.1%	11%	•	10.8%
Treatment with insulin (%)	7.4%	11%	16.4%	8.9%
Glycemic control (< 6.5%, %)	29.5%	27.9%	•	23.3%
Hypertension (%) ^{§§}	•	54.6%	62.5%	54.7%
Hypertension control (%) ^{§§}	37%	39.5%	•	69.1%
Dyslipidemia (%) [†]	•	79.6%	49.5%	31.6%
Dyslipidemia control (%) [†]	•	17.4%	•	49.8%
Albuminuria (%) [†]	•	27.3%	•	23.9%
Chronic kidney disease (%) [†]	•	10.0%	•	12.5%
Diabetes in ESRD (%) ^{††}	•	•	38.8%	•
Diabetic neuropathy (%) ^{††}	•	33.5%	•	•
Diabetic retinopathy (%) [‡]	•	18.6%	15.9%	•
Prevalence of obesity (%) ^{‡‡}	74.7%	44.4%	•	48.6%

Available at <http://www.diabetes.or.kr/>

NHIS, national health insurance service; M, million; IFG, impaired fasting glucose; ESRD, end-stage renal disease.

*From the National Health Information Database from January 2002 through to December 2013. [§]Diagnostic of diabetes, based on fasting plasma glucose (≥ 126 mg/dL), current taking of anti-diabetic medication, or previous diagnosis in 2012, and addition of HbA1c $\geq 6.5\%$ in 2013 and 2016. In 2015, based on ICD-10 code (E11–E14) and prescription of antidiabetic medications. ^{§§}Definition and control rate of hypertension (systolic and diastolic blood pressure, mmHg), $\geq 140/90$ or taking anti-hypertensive medication and $< 130/80$ in 2012 and 2013, ICD-10 code and taking anti-hypertensive medication in 2015, $\geq 140/90$ or taking anti-hypertensive medication(s) and $< 140/85$ in 2016. [†]Definition and control rate of dyslipidemia, one or more than of following; hypercholesterolemia (total cholesterol ≥ 240 mg/dL or medication(s)), hypertriglyceridemia (TG) (≥ 150 mg/dL), hyper-low density lipoprotein (LDL)-cholesterolemia ≥ 160 mg/dL, hypo-high density lipoprotein (HDL)-cholesterolemia (< 40 mg/dL for men; < 50 mg/dL for women), or taking medication, and all of all following; < 100 mg/dL for LDL-C, < 150 mg/dL for TG, and > 40 mg/dL (men)/50 mg/dL (women) for HDL-C in 2015; hypercholesterolemia (total cholesterol ≥ 240 mg/dL) and < 100 mg/dL for LDL-C in 2016. ^{††}The definition of albuminuria or chronic kidney disease in person with diabetes are increased albuminuria determined by albumin-creatinine ratio > 30 ug/mg of creatinine or estimated glomerular filtration rate (eGFR) < 60 mL/min/1.73 m². GFR (mL/min/1.73 m²) = $175 \times (S_{Cr})^{-1.154} \times (\text{Age})^{-0.202} \times (0.742 \text{ if female})$, respectively. [‡]Definition of ESRD, ICD-10 code of renal failure (N18, N19) or treated with renal replacement therapy. ^{‡‡}Diabetic neuropathy, Questionnaire (Michigan Neuropathy Screening Instrument, score ≥ 3) and 10 g monofilament exam. ^{‡‡‡}Diabetic retinopathy, presence of at least one definite retinal blot hemorrhage and/or microaneurysm with or without more severe lesions (hard exudates, soft exudates, intraretinal microvascular abnormalities, venous bleeding, new retinal vessels, fibroproliferations) Based on the diagnosis in the more severely affected eye in 2013. ^{‡‡‡}Body mass index, 23.0–24.9 kg/m² for overweight and ≥ 25.0 kg/m² for obesity, overweight and obese in 2012, and obese in 2013 and 2016.

※ Citation: Ko SH et al, *Medicine (Baltimore)* 2016; Lee YH et al, *Diabetes Metab J* 2016; Jeon JY et al, *Diabetes Metab J* 2014; Ahn JH et al, *Diabetes Metab J* 2014; Ko SH et al, *Diabetes Metab J* 2014; Kim CS et al, *Diabetes Metab J* 2014; Roh E et al, *Diabetes Metab J* 2013; Jeon JY et al, *Diabetes Metab J* 2013; Won JC et al, *Diabet Med* 2012.

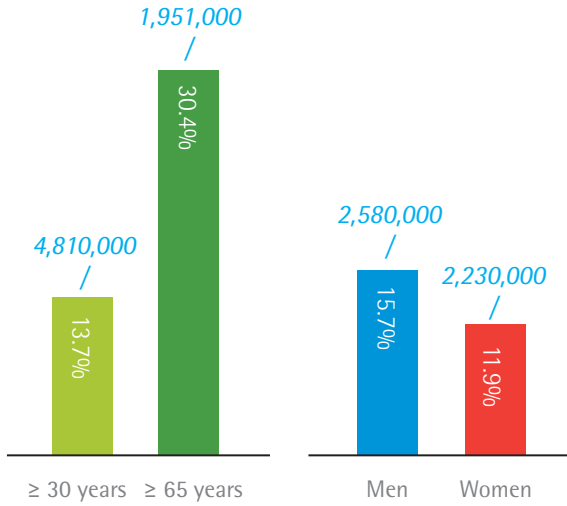
Prevalence of Diabetes

The prevalence of diabetes among adults 30 years or older is 13.7% (4.8 Million).

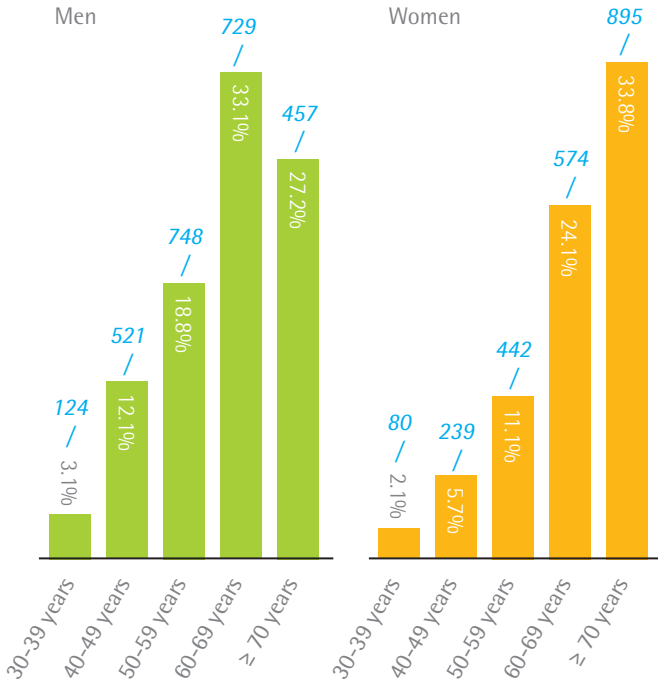


"Nearly 1 of 7 Korean adults have diabetes"

"More than 30% of persons aged ≥ 65 years have diabetes"

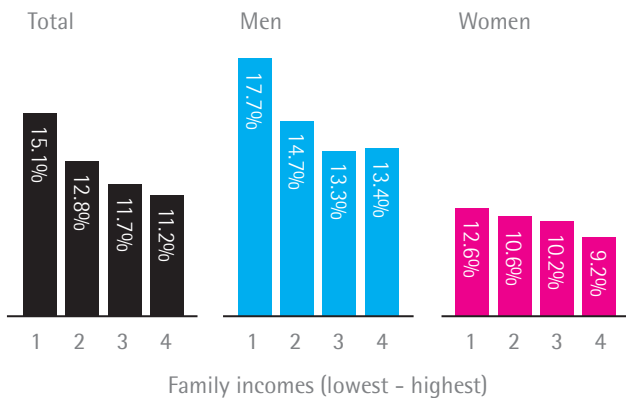


"While the prevalence of diabetes get reach the highest at age of 60~69 in men, it is constantly increasing along the age in women"



Persons (1,000)

"The prevalence of diabetes is 1.4 times more common in persons with the lowest quartile of family incomes compared with those with the highest quartile"



Family incomes (lowest - highest)

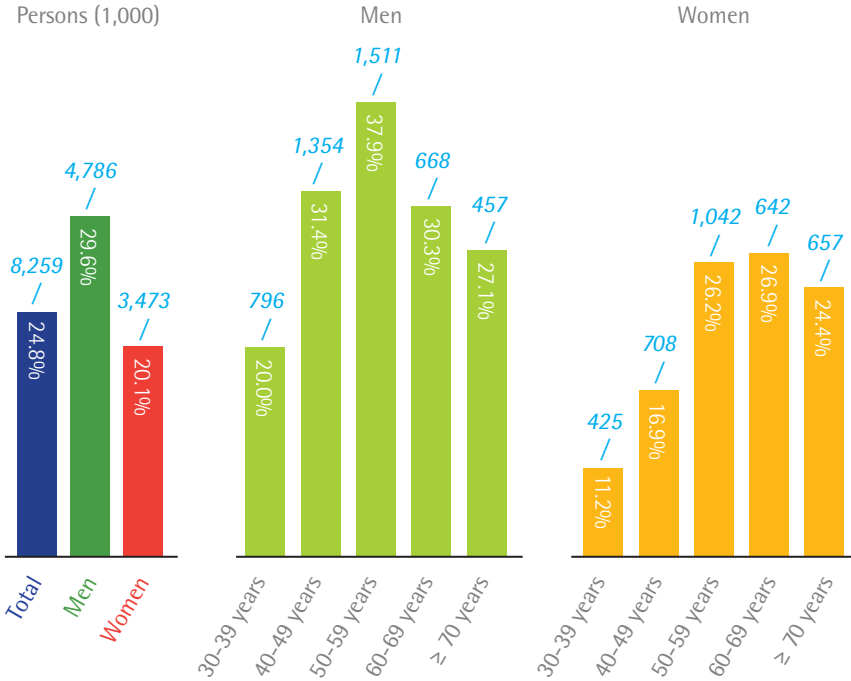
Diabetes is defined by fasting plasma glucose ≥ 126 mg/dL, HbA1c ≥ 6.5%, current anti-diabetes medication(s), or previous diagnosis.

Prevalence of IFG

The prevalence of IFG among adults 30 years or older is 24.8% (8.3 Million).



“Nearly 1 of 4 Korean adults have IFG”



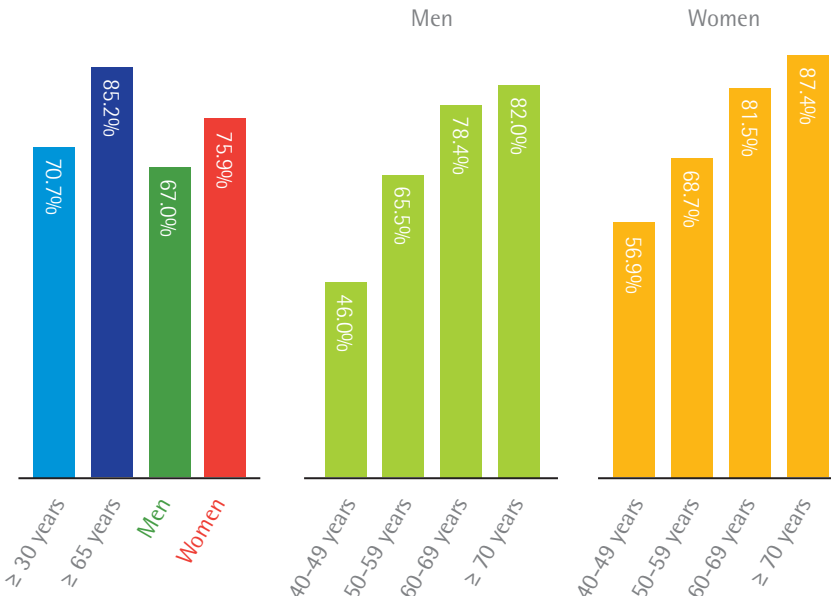
Impaired fasting glucose (IFG) was defined by fasting plasma glucose with 100~125 mg/dL in person without diabetes.

Diabetes Awareness

Three out of 10 persons with diabetes are not aware of their condition, and two of 5 persons with diabetes (diagnosed and undiagnosed) are not taking any treatment for their condition. Diabetes awareness is lowest at age of 40~49 in both sexes.



“Diabetes awareness among adults 30 years or older is 70.7%”

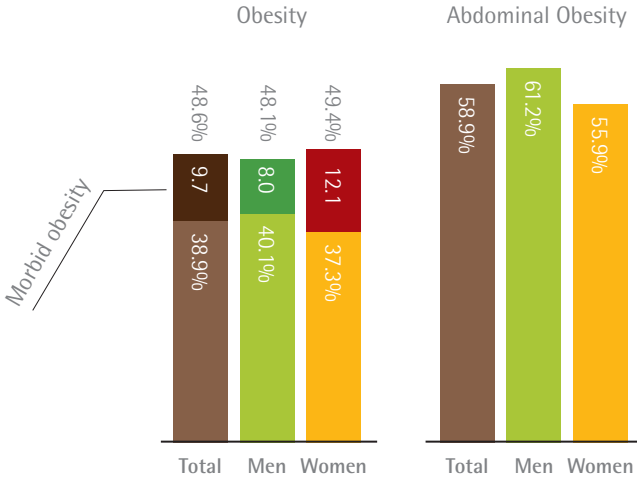


Obesity in Diabetes

The prevalence of obesity and abdominal obesity in persons with diabetes are 48.6% and 58.9%, respectively.



“Nearly half of persons with diabetes are obese”



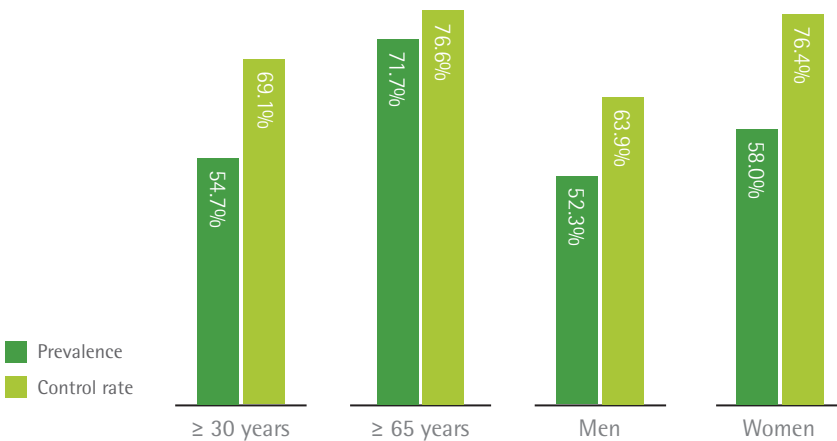
- BMI, body mass index
- Obesity: BMI ≥ 25.0 kg/m², morbid obesity: BMI ≥ 30.0 kg/m²
- Abdominal obesity is defined by using waist circumference ≥ 90 cm for men and ≥ 85 cm for women.

Hypertension in Diabetes

The prevalence and control rate of hypertension in persons with diabetes are 54.7% and 69.1%, respectively.



“In men aged 40~49 years with diabetes, fewer than half do not reach the blood pressure goal of < 140/85 mmHg”



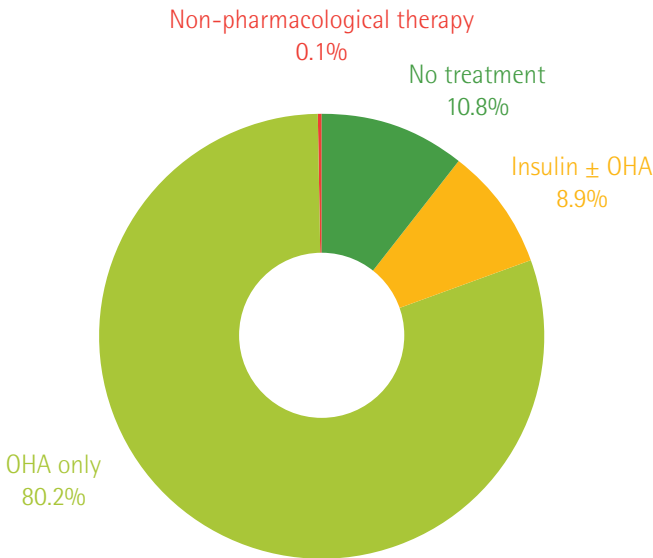
Hypertension is defined by systolic/diastolic blood pressure $\geq 140/90$ mmHg and/or antihypertensive medications, and control rate is defined by blood pressure less than 140/85 mmHg based on the KDA guideline.

Treatment of Diabetes

Most persons with diabetes (80.2%) are treated with oral hypoglycemic agents, but 10.8% of them have remained untreated.



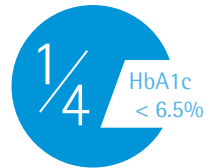
“Only one out of 11 persons with diabetes is using insulin therapy for glycemic control”



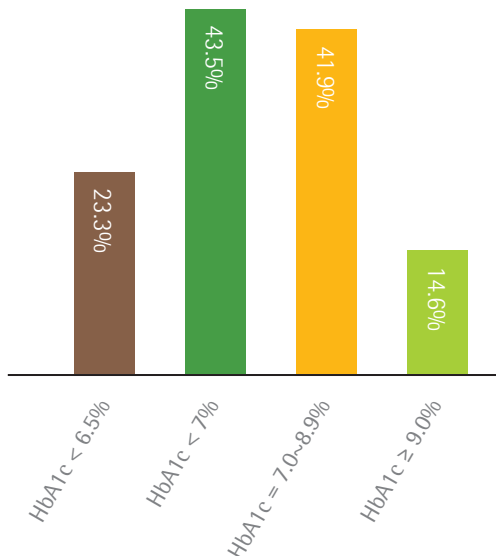
*In persons with diagnosed diabetes. OHA, oral hypoglycemic agent(s)

Control Rate of Diabetes

The control rate of glycemia among the persons with diagnosed diabetes is 23.3% for target goal of HbA1c < 6.5% or 43.5% for < 7.0%. However, 14.6% of persons with diabetes have HbA1c ≥ 9.0%.



“Only one of 4 persons with diabetes gets the glycemic target”



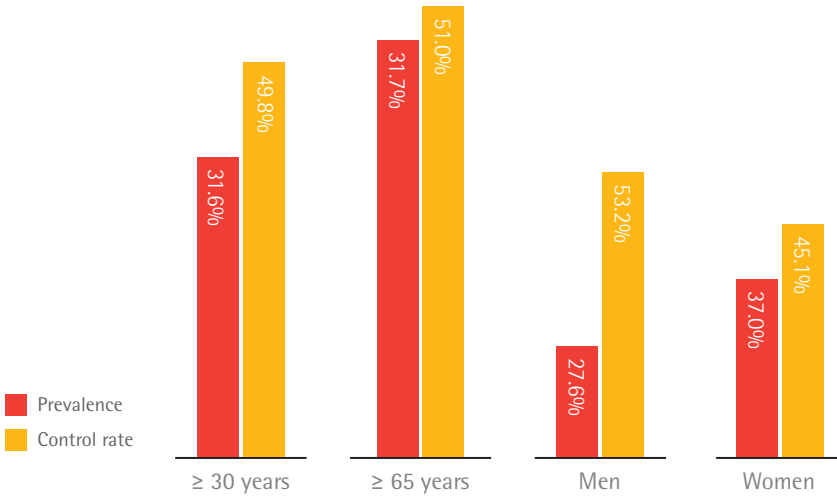
In persons with diagnosed diabetes

Hypercholesterolemia in Diabetes



The prevalence and control rate of hypercholesterolemia in persons with diabetes are 31.6% and 49.8%, respectively.

“More than half of persons with diabetes do not reach the LDL-C goal of < 100 mg/dL”



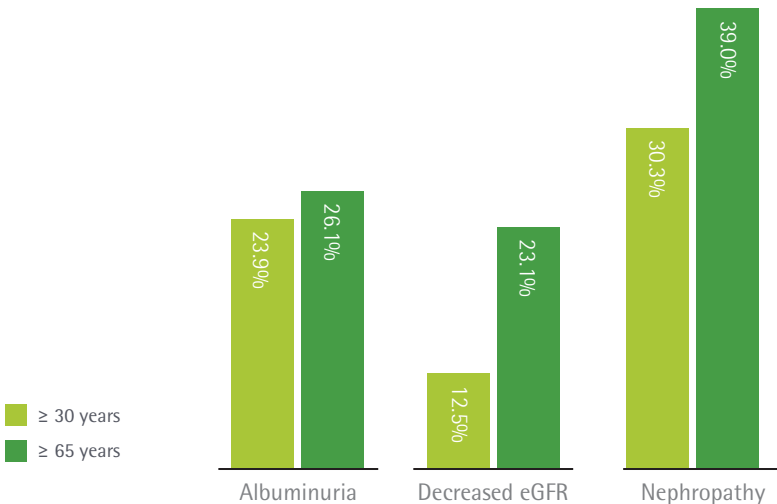
Hypercholesterolemia is defined by total cholesterol \geq 240 mg/dL or medication(s) and control rate is defined by low-density lipoprotein cholesterol (LDL-C) < 100 mg/dL based on KDA guideline.

Nephropathy in Diabetes



The prevalence of diabetic nephropathy (albuminuria or decreased eGFR) is 30.3%.

“Three among 10 persons with diabetes have albuminuria or decreased renal function”



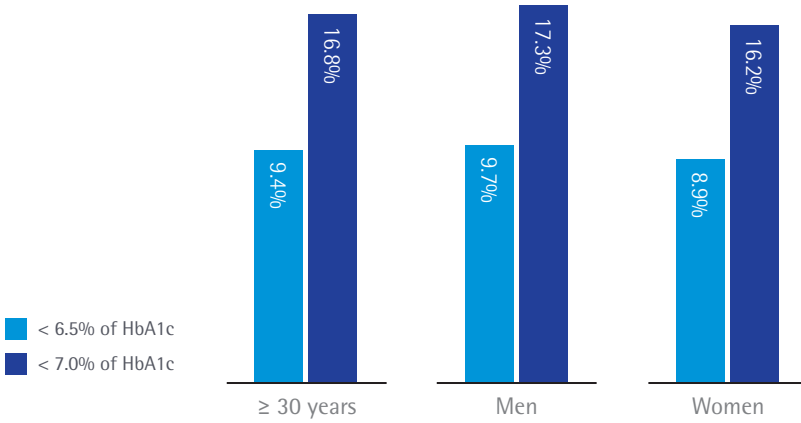
The definition of nephropathy is increased albuminuria determined by albumin-creatinine ratio > 30 ug/mg of creatinine and/or estimated glomerular filtration rate (estimated GFR, eGFR) < 60 mL/min/1.73 m². GFR (mL/min/1.73 m²) by MDRD equation = $175 \times (S_{Cr})^{-1.154} \times (\text{Age})^{-0.203} \times (0.742 \text{ if female})$.

Comprehensive Management of Diabetes



The percentage of comprehensive management in persons with diabetes is 9.4%.

“Only one among 10 persons with diabetes gets a comprehensive management for diabetes and associated co-morbidities”



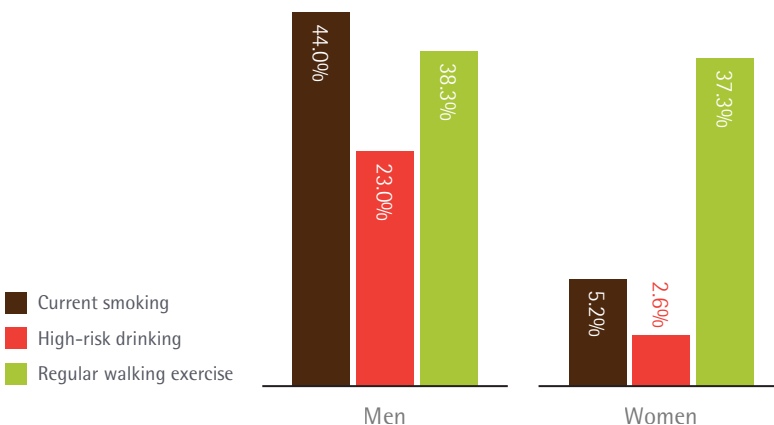
The comprehensive management is defined by HbA1c < 6.5% or < 7.0%, systolic/diastolic blood pressure < 140/85 mmHg, and LDL-C < 100 mg/dL in persons with diagnosed diabetes based on KDA guidelines.

Health Behaviors in Diabetes



Among persons with diabetes, 27.4% are smokers and 21.9% are high-risk drinkers. And, 37.9% are taking a 30-min walking exercise regularly.

“In men aged 30 ~ 49 years with diabetes, more than half are current smoker and fewer than half are regular exercisers”



Current smoking (percentage of adults who had smoked at least 5 packs of cigarettes (100 cigarettes) during their lifetime and who are currently smokers), high-risk drinking (more than seven glasses in men or five glasses in women on the same occasion on each of 2 or more a week), regular walking exercise activity (5 days or more per week and for 30 minutes or more per activity)