

DYSLIPIDEMIA FACT SHEET IN KOREA 2024

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Welcome Message

It is with great pleasure that the Korean Society of Lipid and Atherosclerosis (KSoLA) presents the Dyslipidemia Fact Sheet 2024. Cardiovascular and cerebrovascular diseases continue to be leading causes of death in Korea, and since these diseases are closely linked to dyslipidemia and atherosclerosis, understanding and managing dyslipidemia is critical for improving public health.

Since 2015, KSoLA has been providing key insights into the current trends of dyslipidemia in Korea. This latest edition is another important step in addressing this ongoing health challenge.

This Fact Sheet provides the following analysis. We present an analysis of dyslipidemia trends using data from the Korea National Health and Nutrition Examination Survey (KNHANES) from 2007 to 2022, revealing evolving patterns in cardiovascular health. Additionally, we offer new insights on cardiovascular disease among dyslipidemia patients, based on National Health Insurance Service (NHIS) data. These findings provide valuable information for the treatment and prevention of dyslipidemia and atherosclerosis.

We hope that this Fact Sheet helps raise awareness about dyslipidemia and atherosclerosis, supports public health policies, and becomes a valuable resource for both researchers and healthcare professionals. We sincerely thank everyone who contributed to this publication, and we appreciate your ongoing interest and support in our efforts to improve cardiovascular health in Korea.



President, Ick-Mo Chung

Chairman, Jaetaek Kim

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Data source and analysis

Data source

2007-2022 Korea National Health and Nutrition Examination Survey (KNHANES)

Definition

- Hypercholesterolemia: total cholesterol \geq 240 mg/dL or taking a lipid-lowering drug
- Awareness: self-reported physician-diagnosed hypercholesterolemia or dyslipidemia
- Treatment: self-reported use of a lipid-lowering drug
- Control: total cholesterol <200 mg/dL
- Dyslipidemia 1: hyper-LDL-cholesterolemia, hypertriglyceridemia, or hypo-HDL-cholesterolemia (<40 mg/dL in both men and women)
- Dyslipidemia 2: hyper-LDL-cholesterolemia, hypertriglyceridemia, or hypo-HDL-cholesterolemia (<40 mg/dL in men; <50 mg/dL in women)
- Hyper-LDL-cholesterolemia: LDL-cholesterol \geq 160 mg/dL or taking a lipid-lowering drug
- Hypertriglyceridemia: triglyceride \geq 200 mg/dL
- Hypo-HDL-cholesterolemia 1: HDL-cholesterol <40 mg/dL in both men and women
- Hypo-HDL-cholesterolemia 2: HDL-cholesterol <40 mg/dL in men; <50 mg/dL in women

Age-standardization

• The age-standardized prevalence was calculated using age- and sex-specific structures of the estimated population based on the 2005 population projections for Korea

Data source

2002-2019 National Health Insurance Service – National Sample Cohort (NHIS-NSC) in Korea NHIS claim data: patients aged 20 and older with dyslipidemia among the eligible population for health insurance

Definition

- Dyslipidemia: Cases where dyslipidemia medication was claimed with ICD-10 code E78
- Ischemic heart disease: Cases where a patient was hospitalized with ICD-10 codes I20-I25
- Ischemic stroke: Cases where a patient was hospitalized with ICD-10 codes I63 or I64 and a brain CT or MRI was also claimed
- Heart failure: Cases where a patient was hospitalized with ICD-10 code I50
- Cardiovascular disease: Cases where the patient was diagnosed with at least one of the following conditions: ischemic heart disease, ischemic stroke, or heart failure

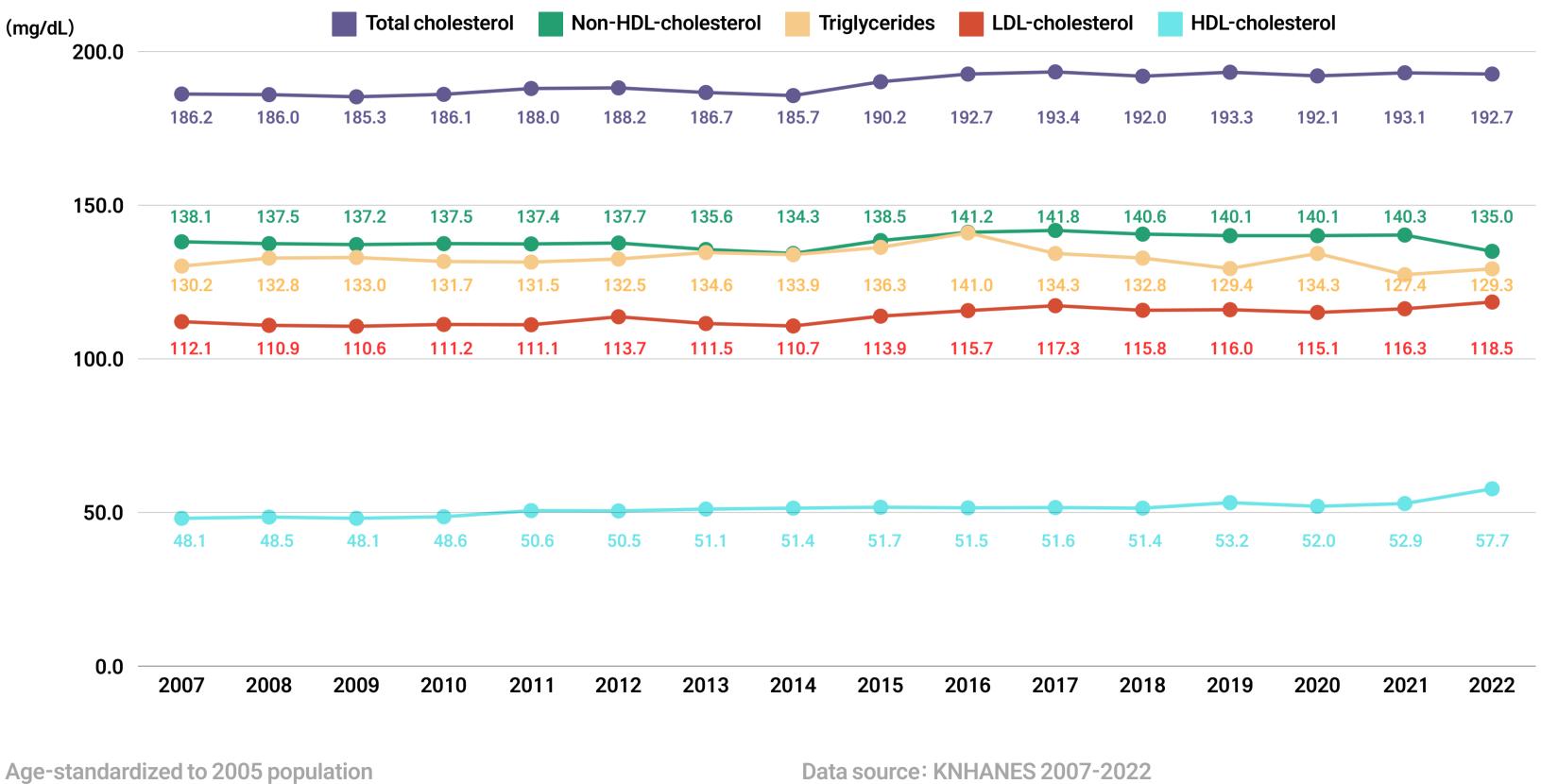
Age-standardization

• The age- and sex-standardized incidence rate of cardiovascular diseases per 1,000 population are based on data from the 2010 Korean dyslipidemia population

*ICD-10: International Classification of Disease, 10th Revision

Prevalence and Management of Hypercholesterolemia in Korean Adults

Age-standardized mean concentration of blood lipid

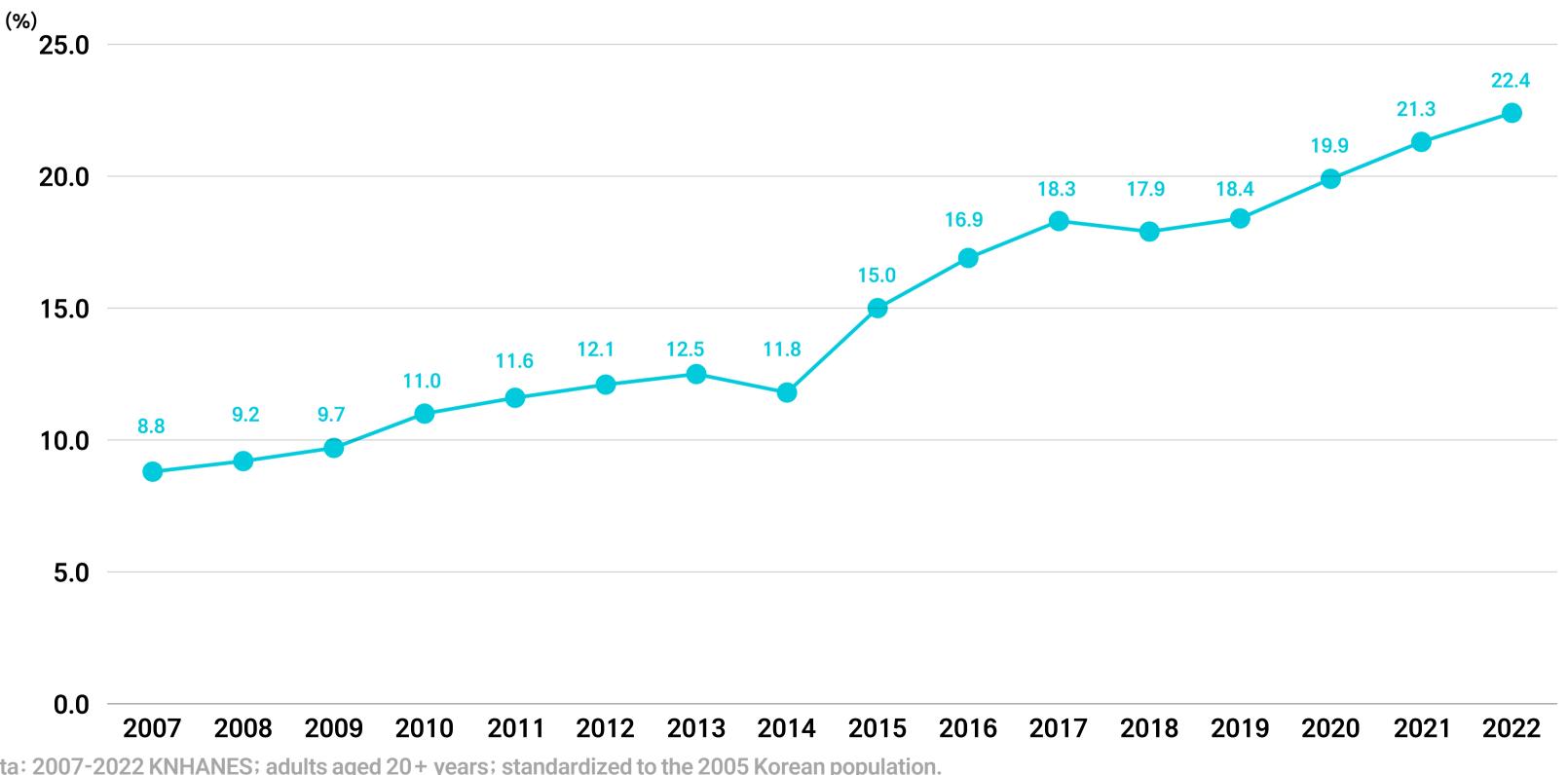


Subjects: Adults aged 20 + years

9

Age-standardized prevalence of hypercholesterolemia

The age-standardized prevalence of hypercholesterolemia more than 2.5x from 2007 to 2022.

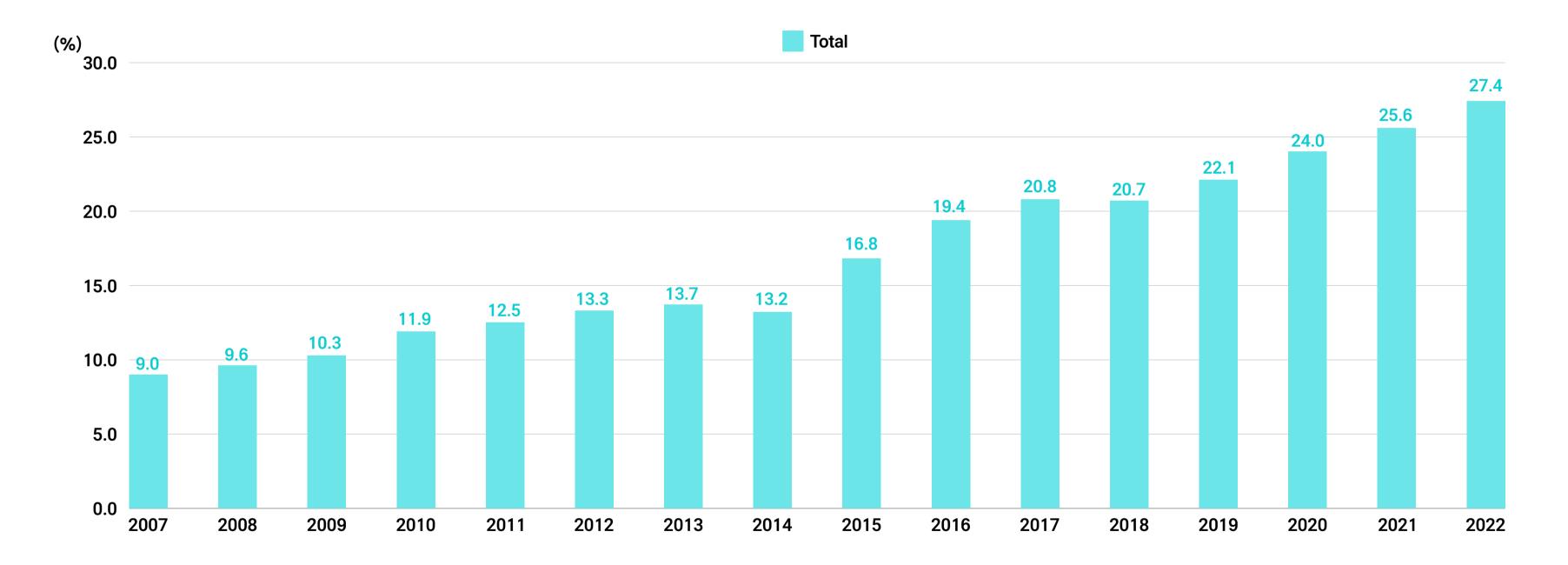


Data: 2007-2022 KNHANES; adults aged 20 + years; standardized to the 2005 Korean population. Hypercholesterolemia: total cholesterol \geq 240 mg/dL or taking a lipid-lowering drug. 10

2007-2022 trend

Crude prevalence of hypercholesterolemia

Hypercholesterolemia is steadily increasing. Nearly 1 out of 4 adults has hypercholesterolemia.

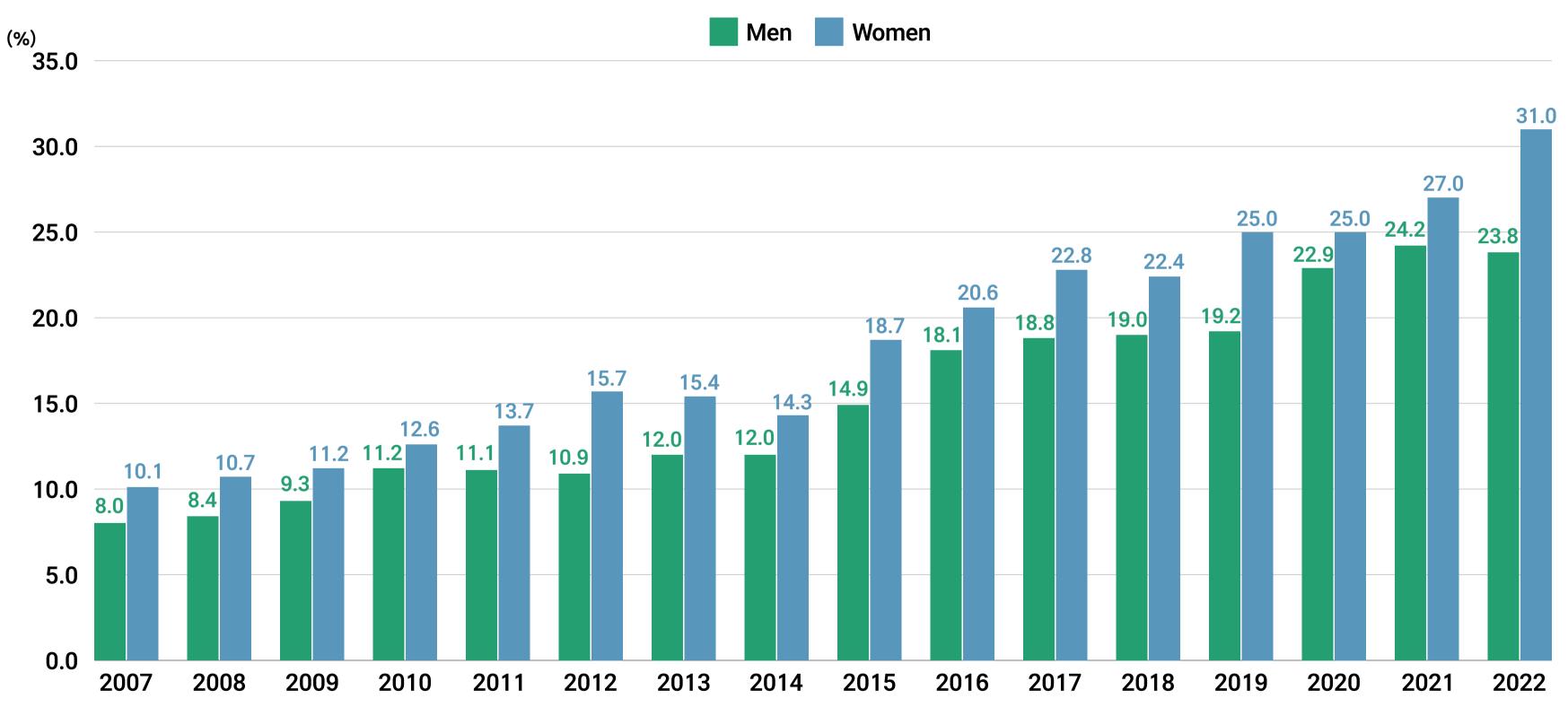


Data: 2007-2022 KNHANES; adults aged 20+ years Hypercholesterolemia: total cholesterol ≥240 mg/dL or taking a lipid-lowering drug.

2007-2022 trend

Crude prevalence of hypercholesterolemia by sex

The prevalence of hypercholesterolemia has steadily increased in both men and women.



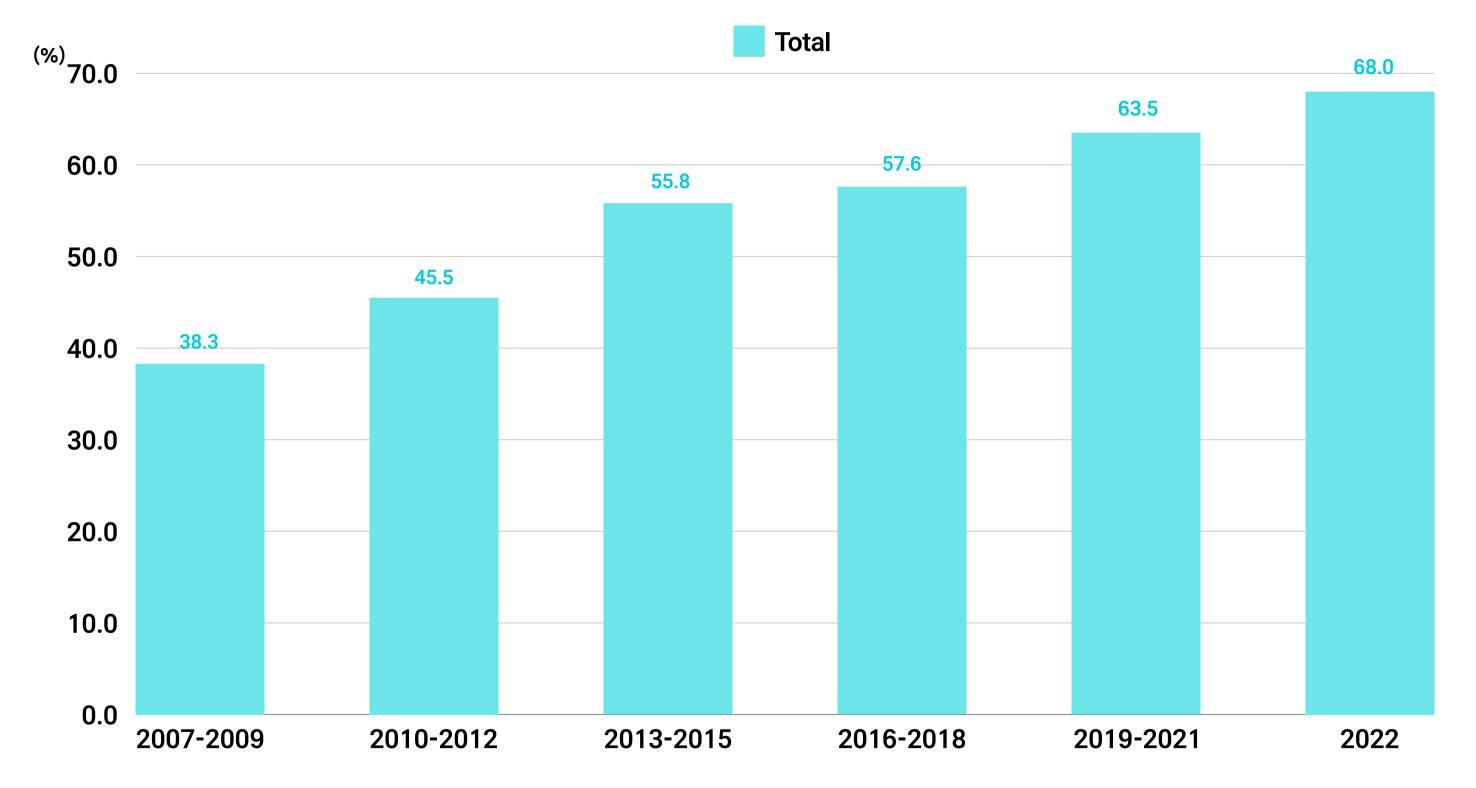
Data: 2007-2022 KNHANES; adults aged 20+ years

¹² Hypercholesterolemia: total cholesterol \geq 240 mg/dL or taking a lipid-lowering drug.

2007-2022 trend

Awareness rate of hypercholesterolemia

The awareness rate of hypercholesterolemia has steadily increased. One-third of adults with hypercholesterolemia are unaware of their condition.

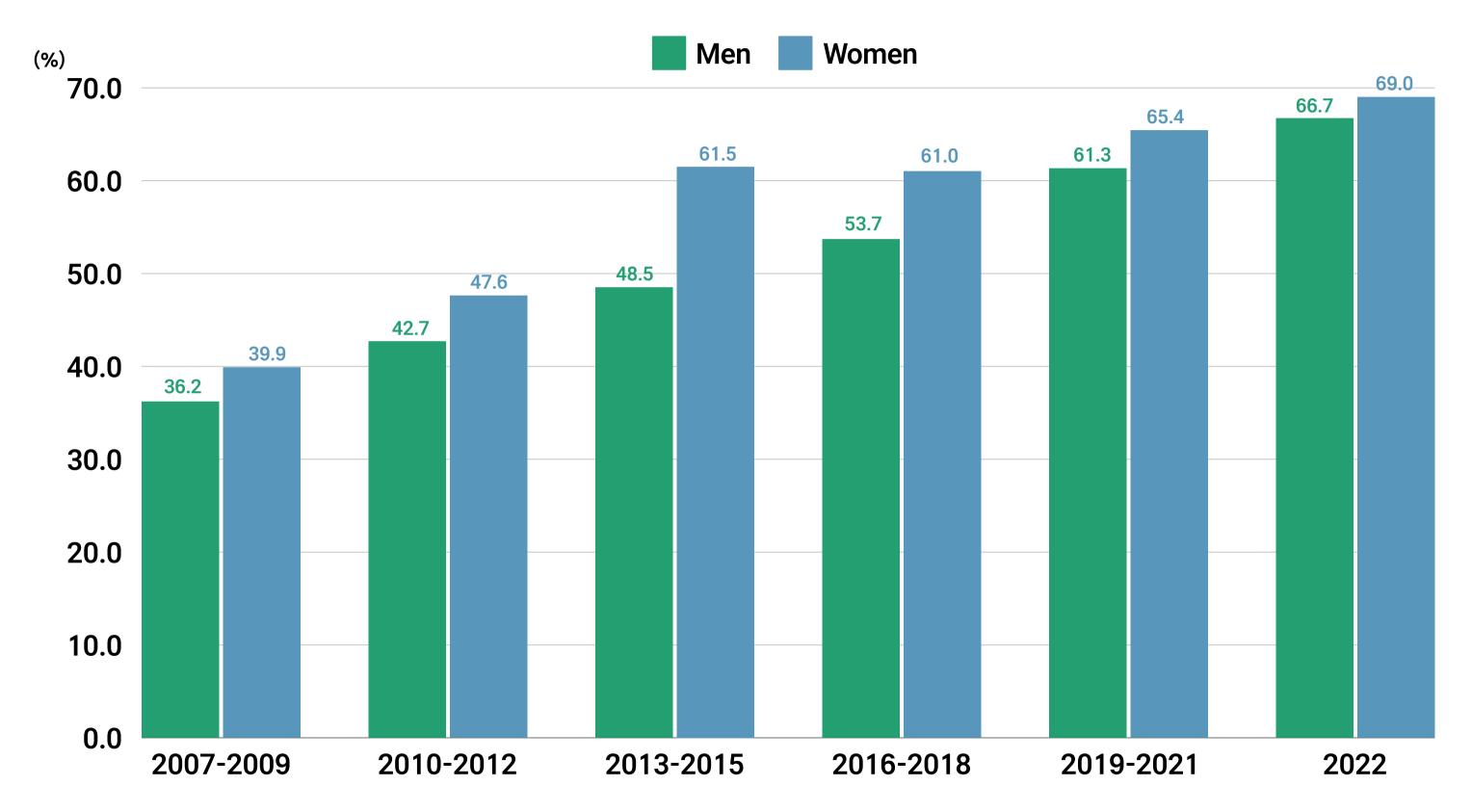


Data: 2007-2022 KNHANES; adults aged 20+ years with hypercholesterolemia

13 Awareness: self-reported physician-diagnosed hypercholesterolemia or dyslipidemia.

2007-2022 trend

Awareness rate of hypercholesterolemia by sex



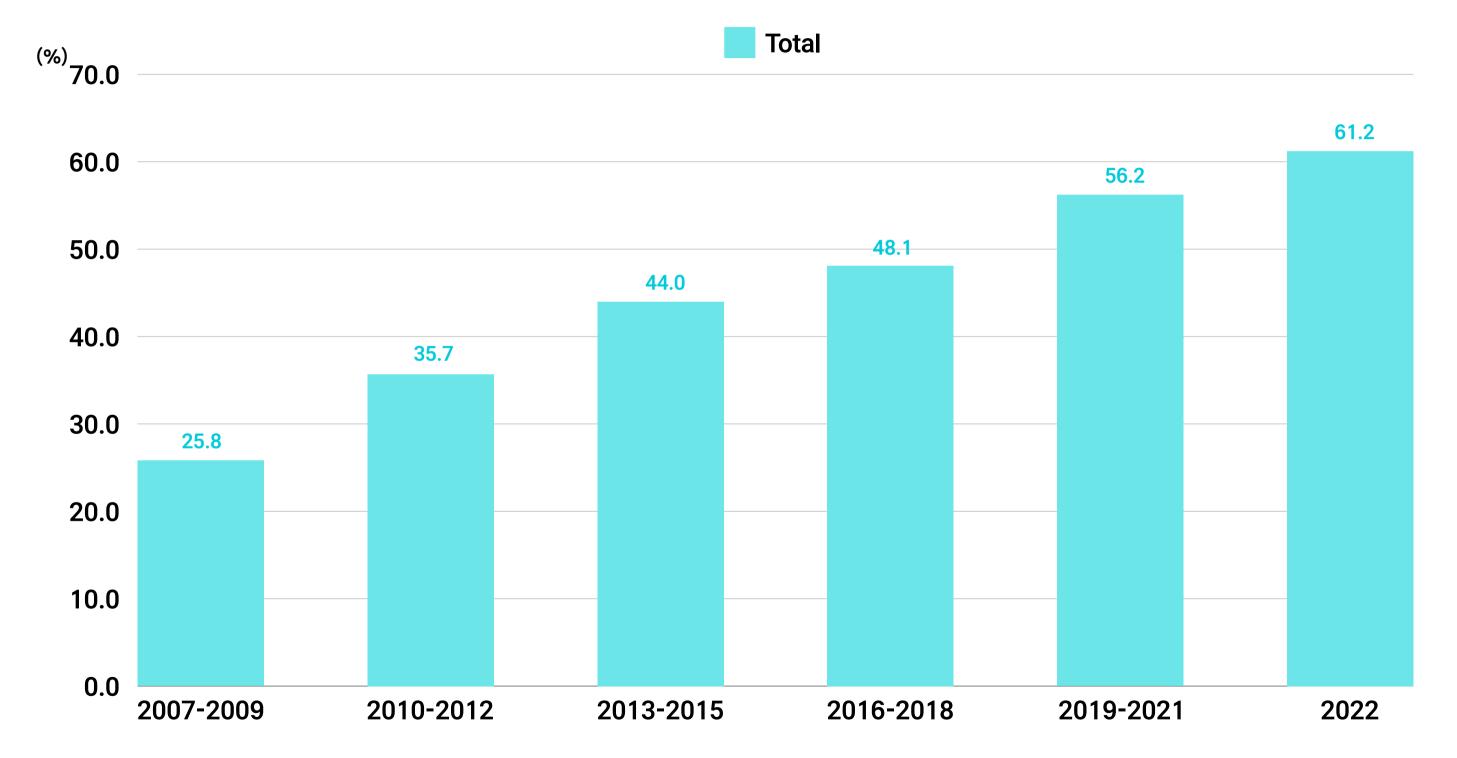
Data: 2007-2022 KNHANES; adults aged 20+ years with hypercholesterolemia

14 Awareness: self-reported physician-diagnosed hypercholesterolemia or dyslipidemia.

2007-2022 trend

Treatment rate of hypercholesterolemia

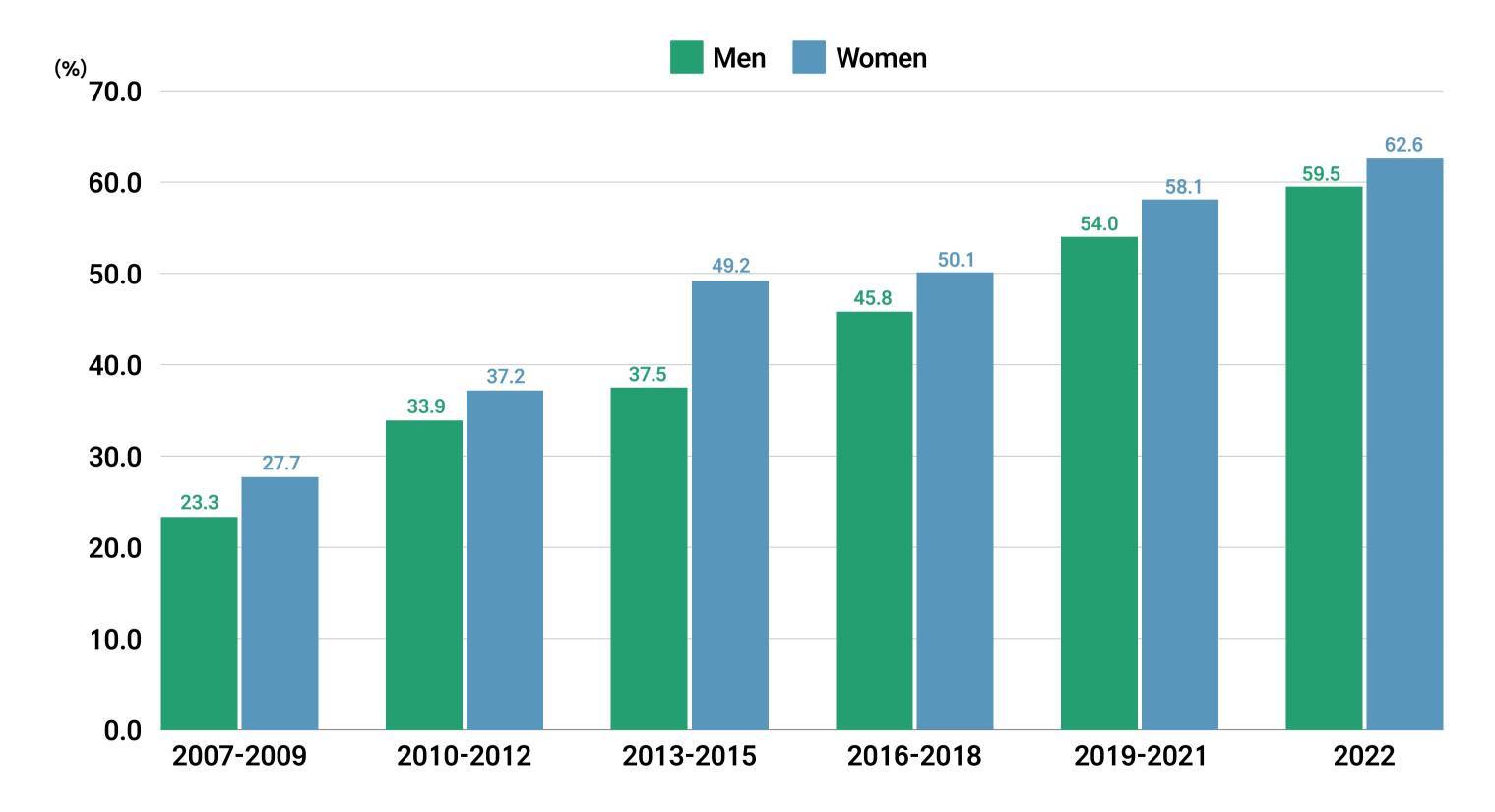
The treatment rate of hypercholesterolemia has steadily increased. More than half of adults with hypercholesterolemia take medications.



Data: 2007-2022 KNHANES; adults aged 20+ years with hypercholesterolemia Treatment: self-reported use of a lipid-lowering drug

2007-2022 trend

Treatment rate of hypercholesterolemia by sex



Data: 2007-2022 KNHANES; adults aged 20+ years with hypercholesterolemia

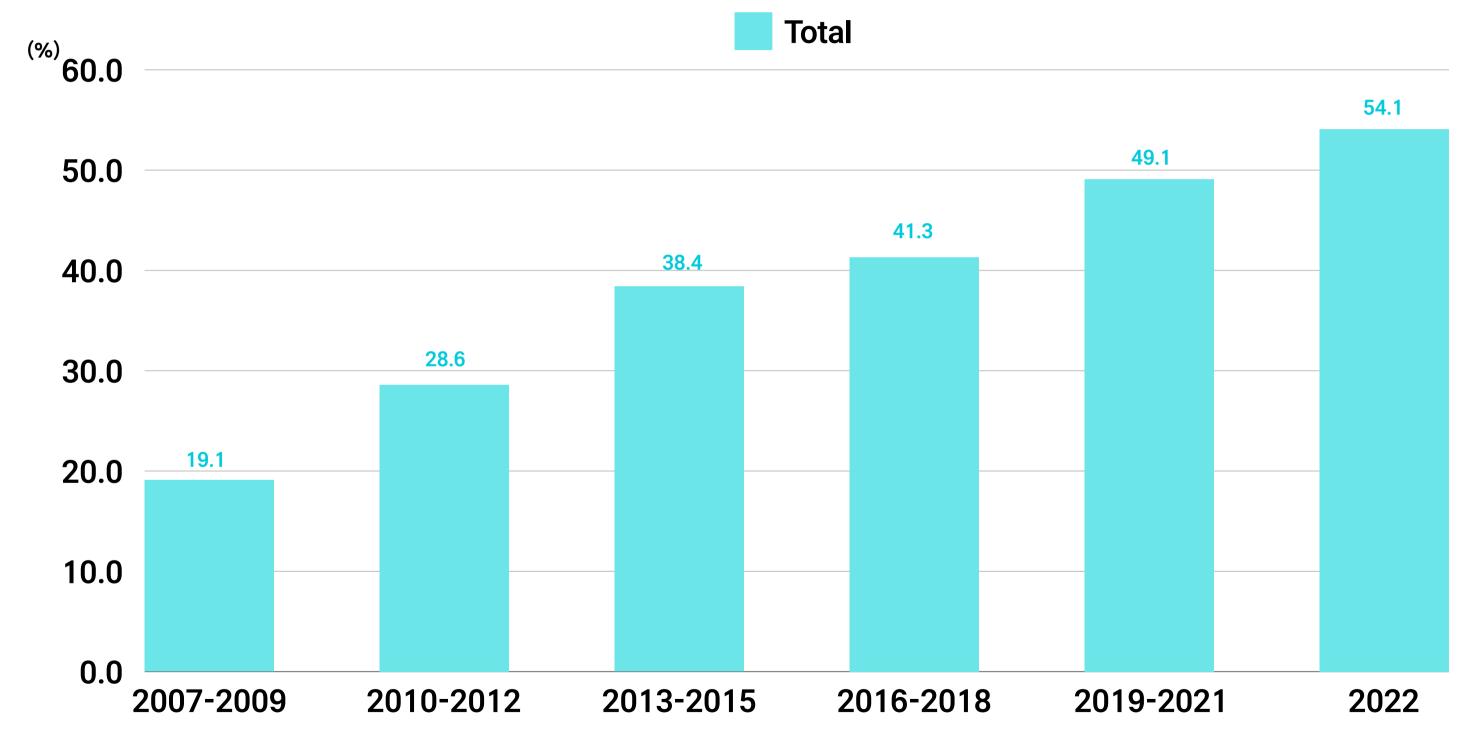
16 Treatment: self-reported use of a lipid-lowering drug.

2007-2022 trend

Control rate of hypercholesterolemia

The control rate of hypercholesterolemia has steadily increased.

More than half of adults with hypercholesterolemia maintain blood cholesterol levels below 200 mg/dL.

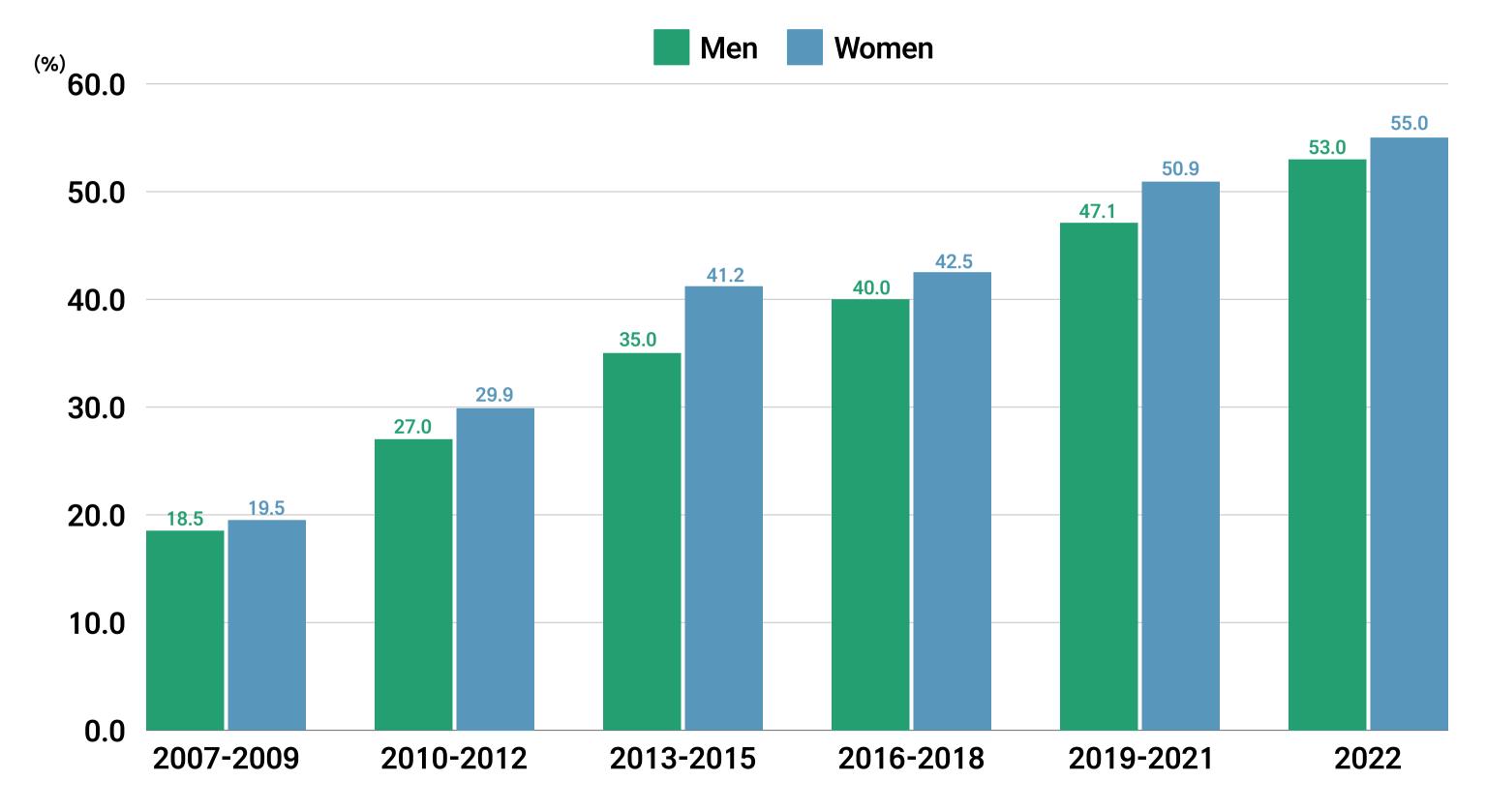


Data: 2007-2022 KNHANES; adults aged 20+ years with hypercholesterolemia

17 Control: total cholesterol <200 mg/dL

2007-2022 trend

Control rate of hypercholesterolemia by sex



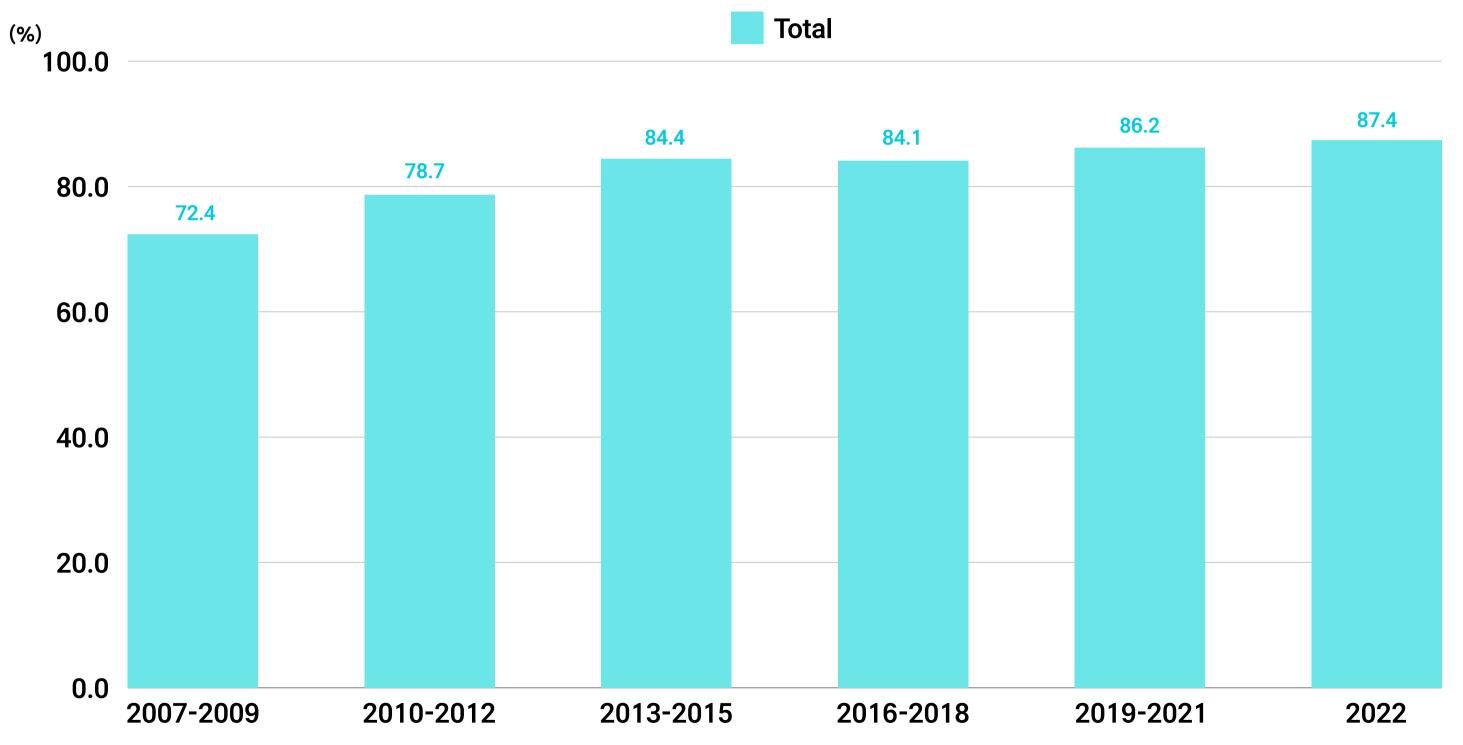
Data: 2007-2022 KNHANES; adults aged 20+ years with hypercholesterolemia

18 Control: total cholesterol <200 mg/dL.

2007-2022 trend

Control rate among adults treated for hypercholesterolemia

The control rate among adults receiving treatment for hypercholesterolemia has slightly increased. 87% of lipid-lowering drug users maintain blood cholesterol levels below 200 mg/dL.

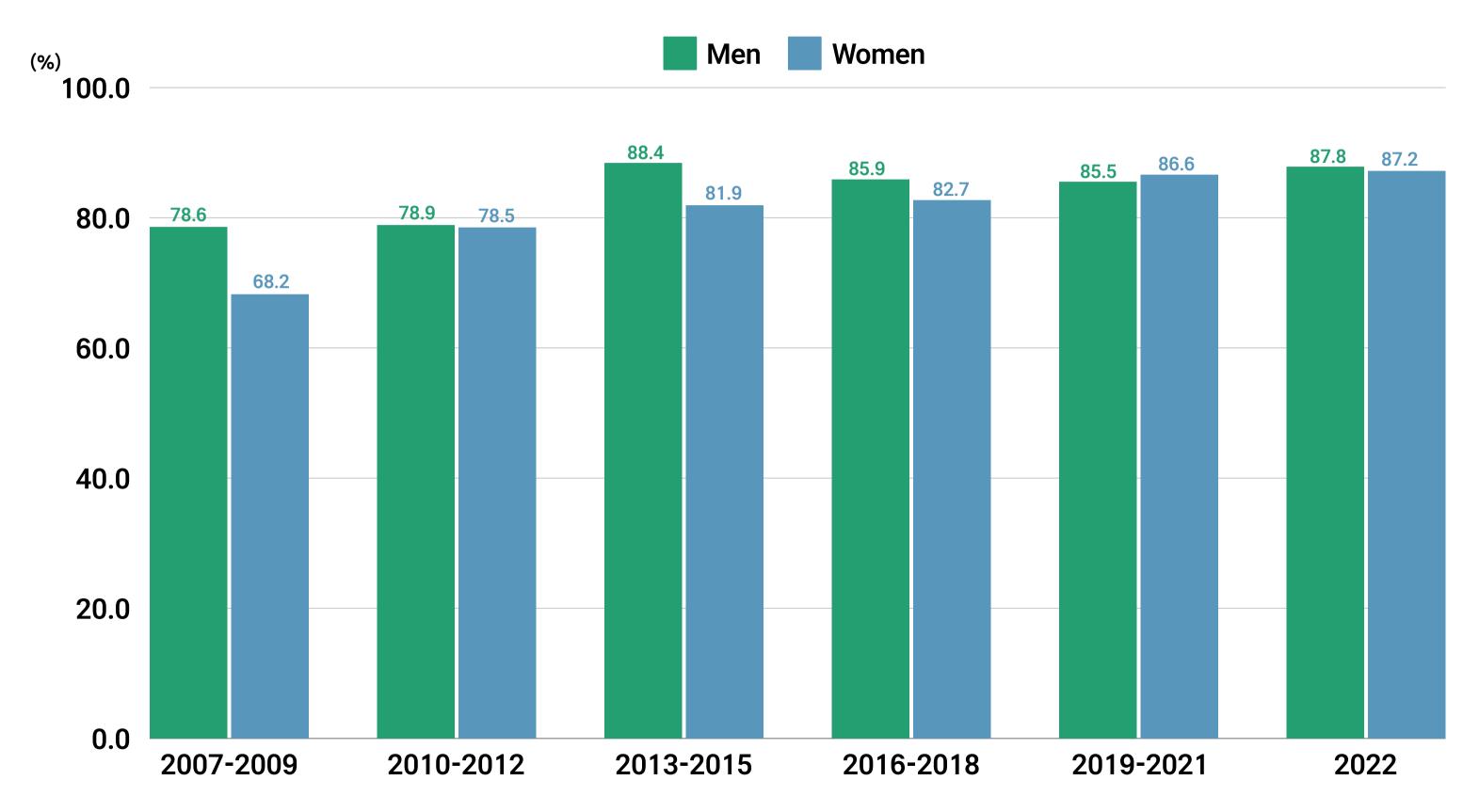


Data: 2007-2022 KNHANES; adults aged 20+ years who are treated for hypercholesterolemia

¹⁹ Control: total cholesterol <200 mg/dL.

2007-2022 trend

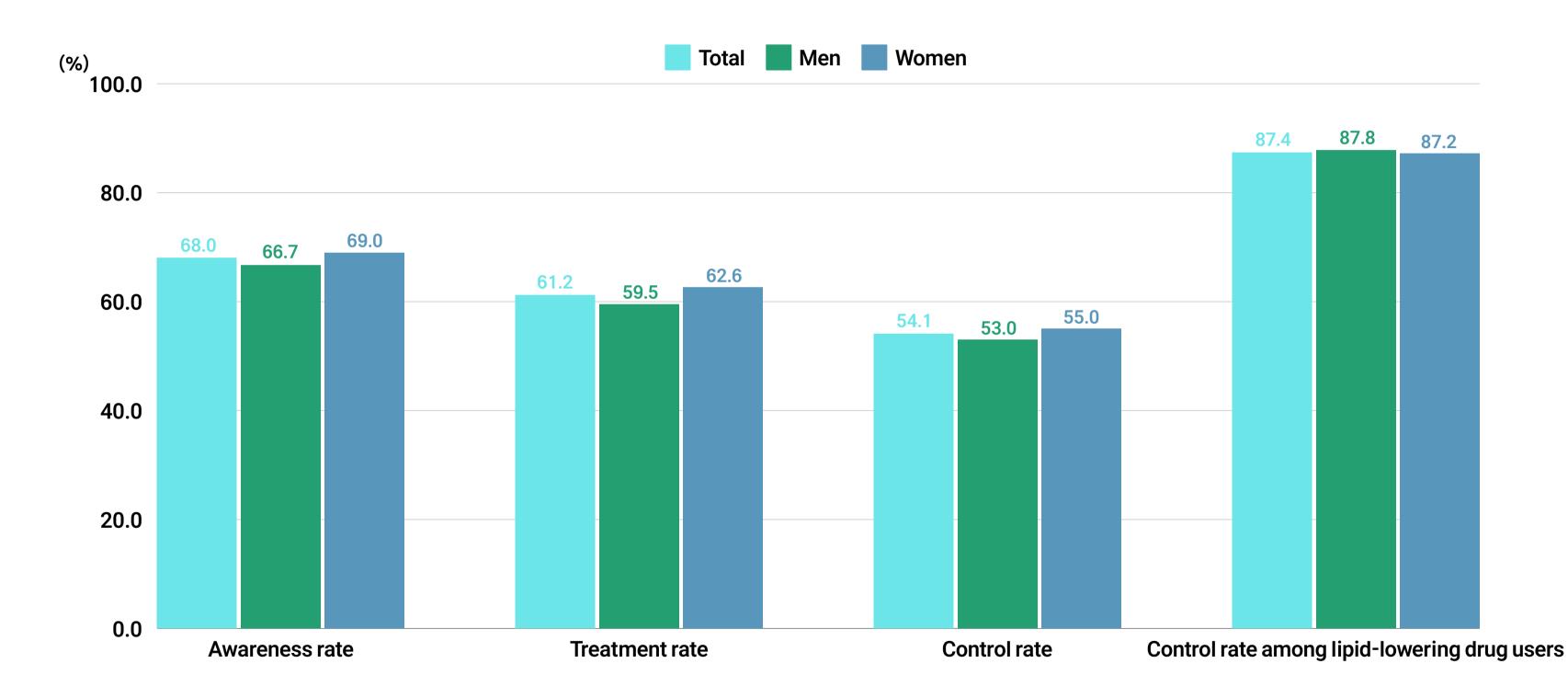
Control rate among adults treated for hypercholesterolemia by sex



Data: 2007-2022 KNHANES; adults aged 20+ years who are receiving treatment for hypercholesterolemia 20 Control: total cholesterol <200 mg/dL.

2007-2022 trend

Summary of management of hypercholesterolemia



Data: 2019-2022 KNHANES; adults aged 20+ years with hypercholesterolemia Hypercholesterolemia: total cholesterol ≥240 mg/dL or taking a lipid-lowering drug. Awareness: self-reported physician-diagnosed hypercholesterolemia or dyslipidemia

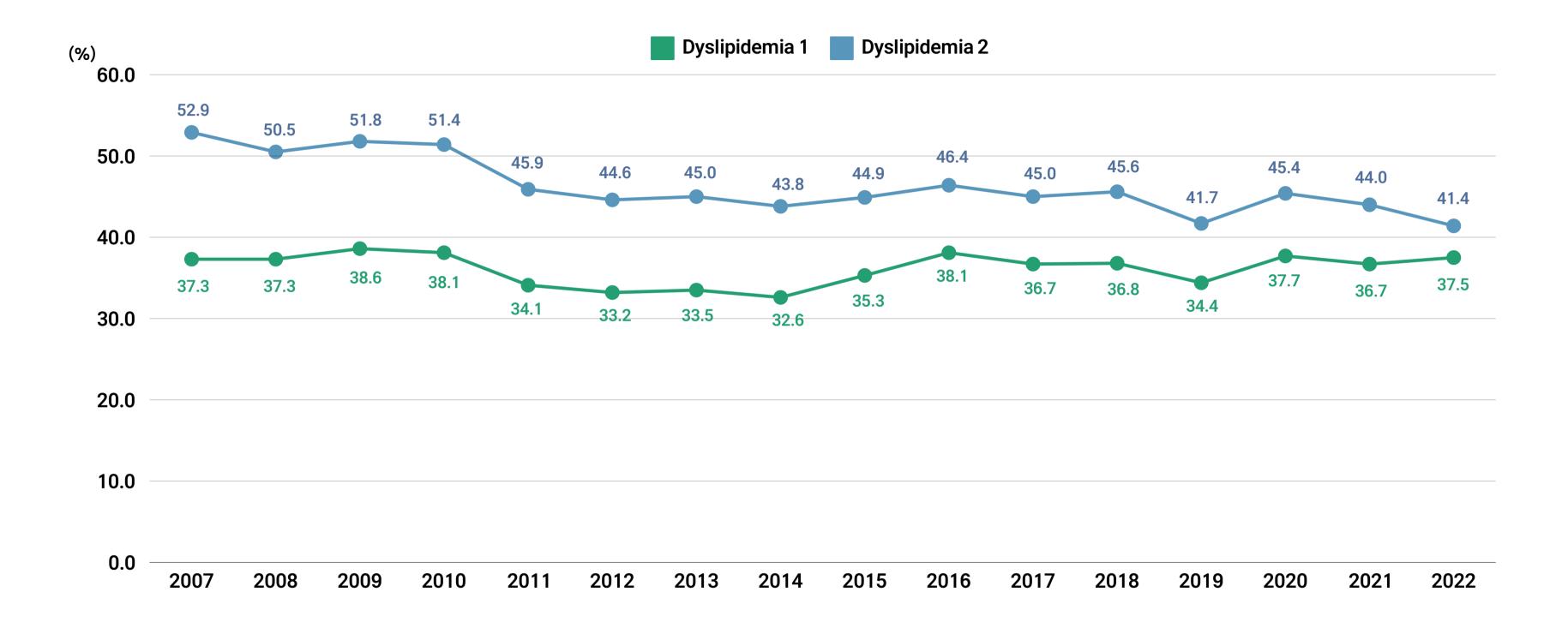
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Treatment: self-reported use of a lipid-lowering drug. Control: total cholesterol <200 mg/dL.

2019-2022 average

Prevalence of Dyslipidemia in Korean Adults

Age-standardized prevalence of dyslipidemia



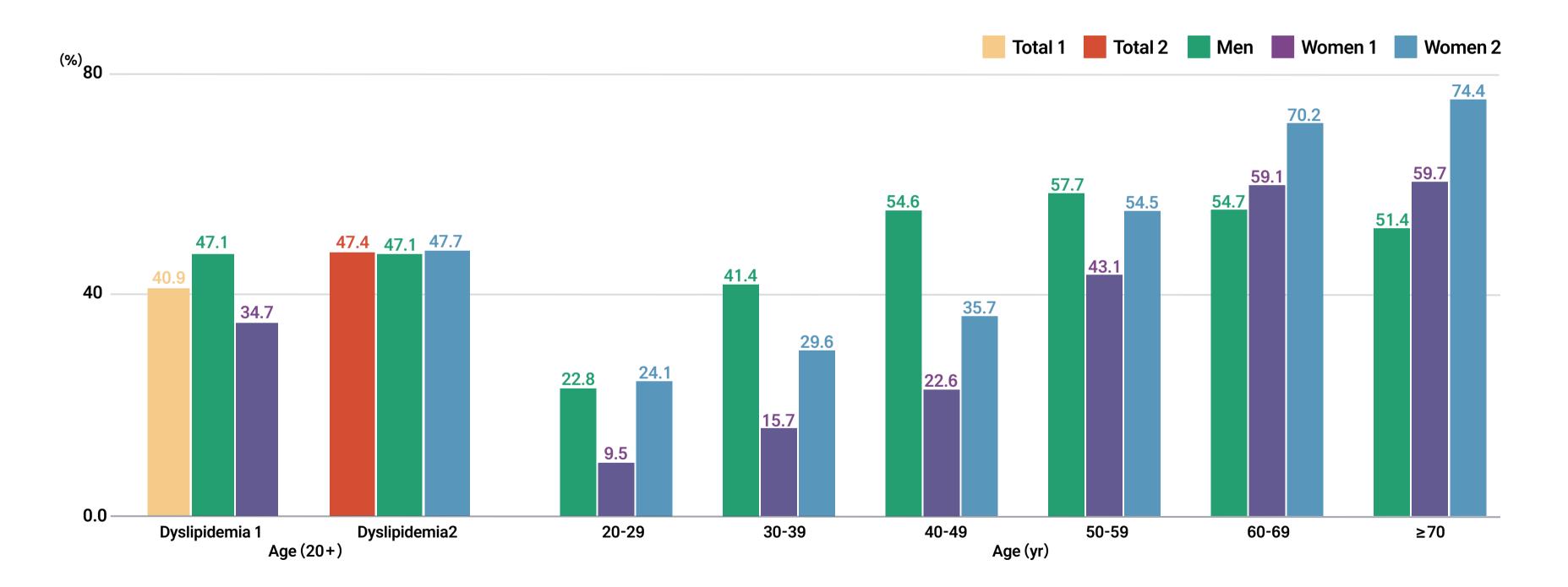
Data: 2007-2022 KNHANES; adults aged 20+ years; standardized to the 2005 Korean population

Dyslipidemia 1: hyper-LDL-cholesterolemia, hypertriglyceridemia, or hypo-HDL-cholesterolemia (<40 mg/dL in both men and women). Dyslipidemia 2: hyper-LDL-cholesterolemia, hypertriglyceridemia, or hypo-HDL-cholesterolemia (<40 mg/dL in men; <50 mg/dL in women).

2007-2022 trend

Crude prevalence of dyslipidemia by sex and age

If hypo-HDL-cholesterolemia is defined as <40 mg/dL in both men and women, the prevalence of dyslipidemia is 40%. If hypo-HDL-cholesterolemia is defined as <40 mg/dL in both men and <50 mg/dL in women, the prevalence of dyslipidemia is 47%.

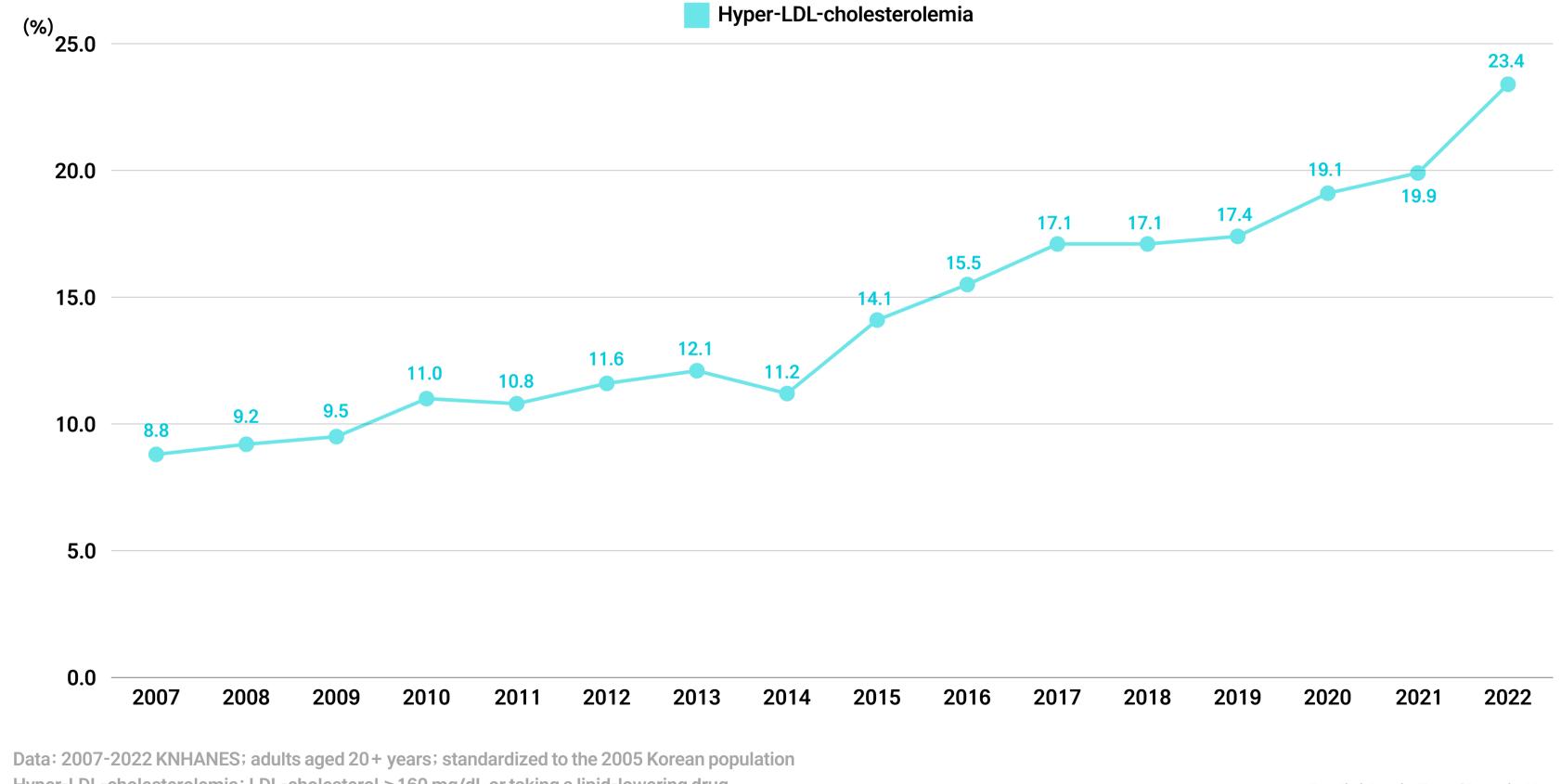


Data: 2016-2022 KNHANES; adults aged 20+ years

24 Dyslipidemia 1: hyper-LDL-cholesterolemia, hypertriglyceridemia, or hypo-HDL-cholesterolemia (<40 mg/dL in both men and women). Dyslipidemia 2: hyper-LDL-cholesterolemia, hypertriglyceridemia, or hypo-HDL-cholesterolemia (<40 mg/dL in men; <50 mg/dL in women).

2016-2022 average

Age-standardized prevalence of hyper-LDL-cholesterolemia

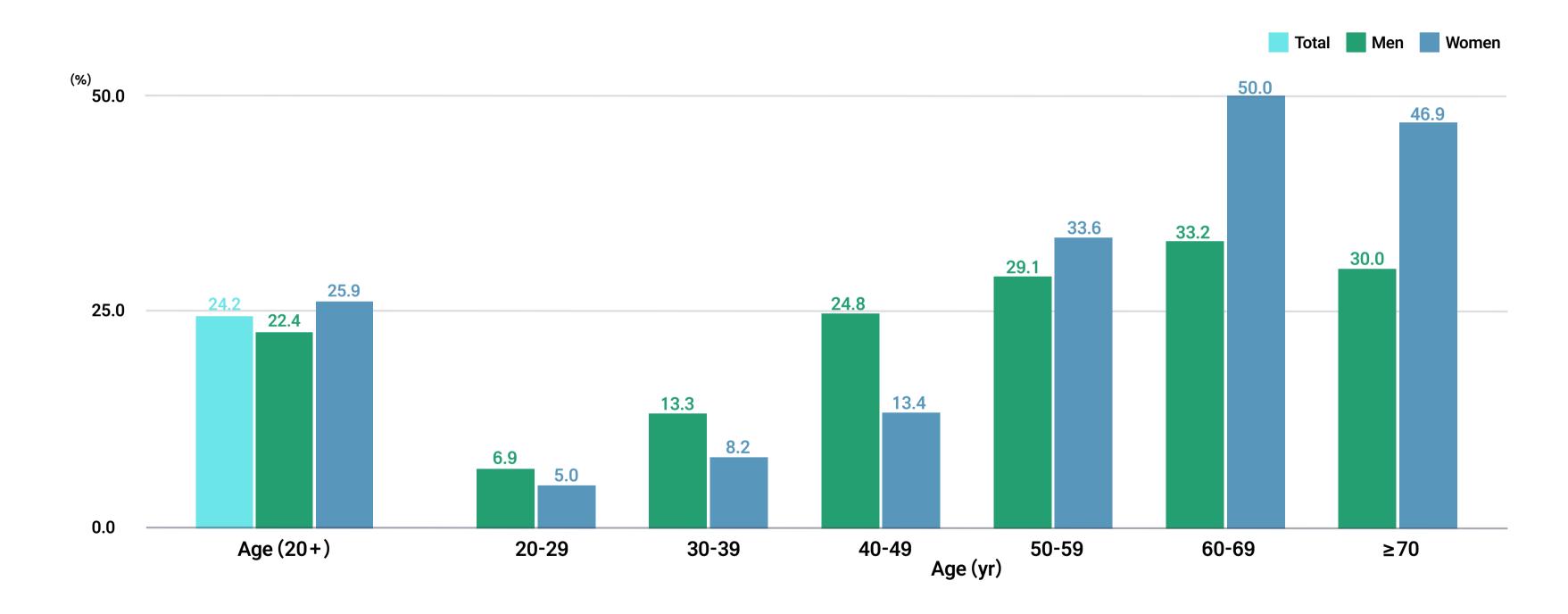


Hyper-LDL-cholesterolemia: LDL-cholesterol \geq 160 mg/dL or taking a lipid-lowering drug

2007-2022 trend

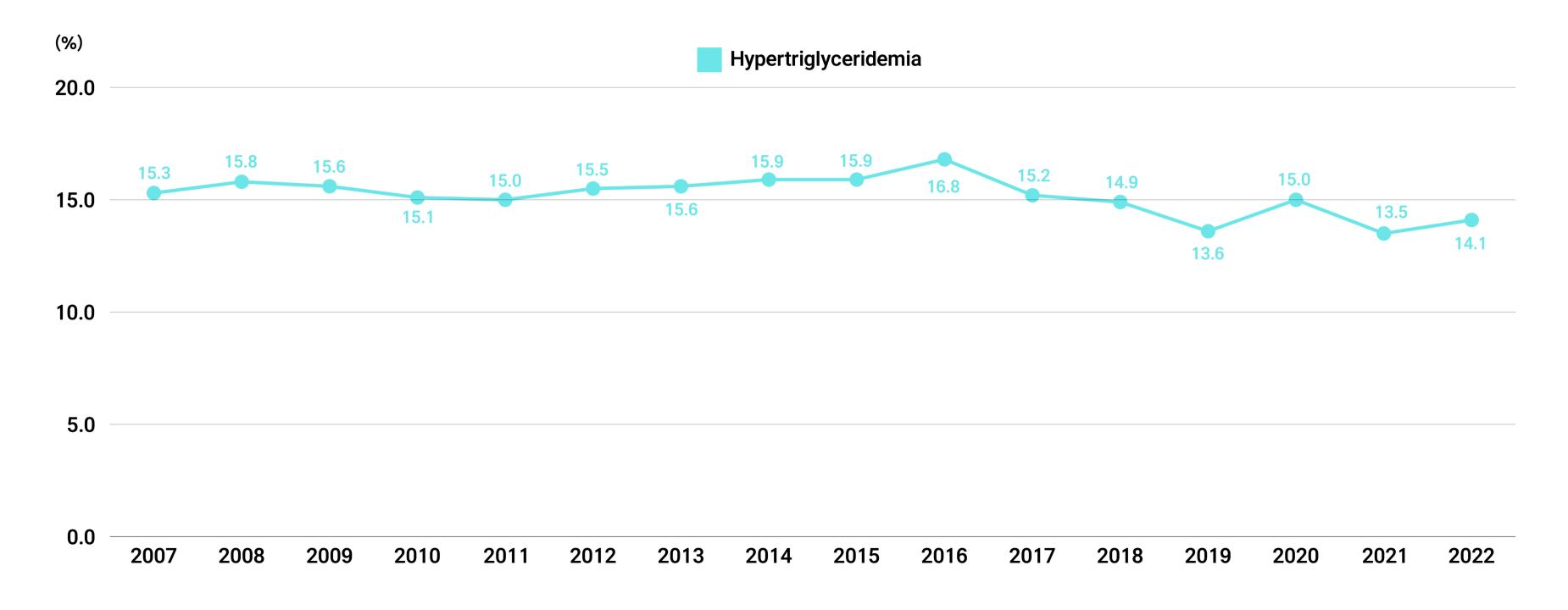
Crude prevalence of hyper-LDL cholesterolemia by sex and age

Nearly 1 out of 4 adults has hyper-LDL-cholesterolemia, and this proportion increases with age. After age 50, women have a higher prevalence of hyper-LDL-cholesterolemia than men.



Data: 2016-2022 KNHANES; adults aged 20+ years Hyper-LDL-cholesterolemia: LDL-cholesterol \geq 160 mg/dL or taking a lipid-lowering drug

Age-standardized prevalence of hypertriglyceridemia



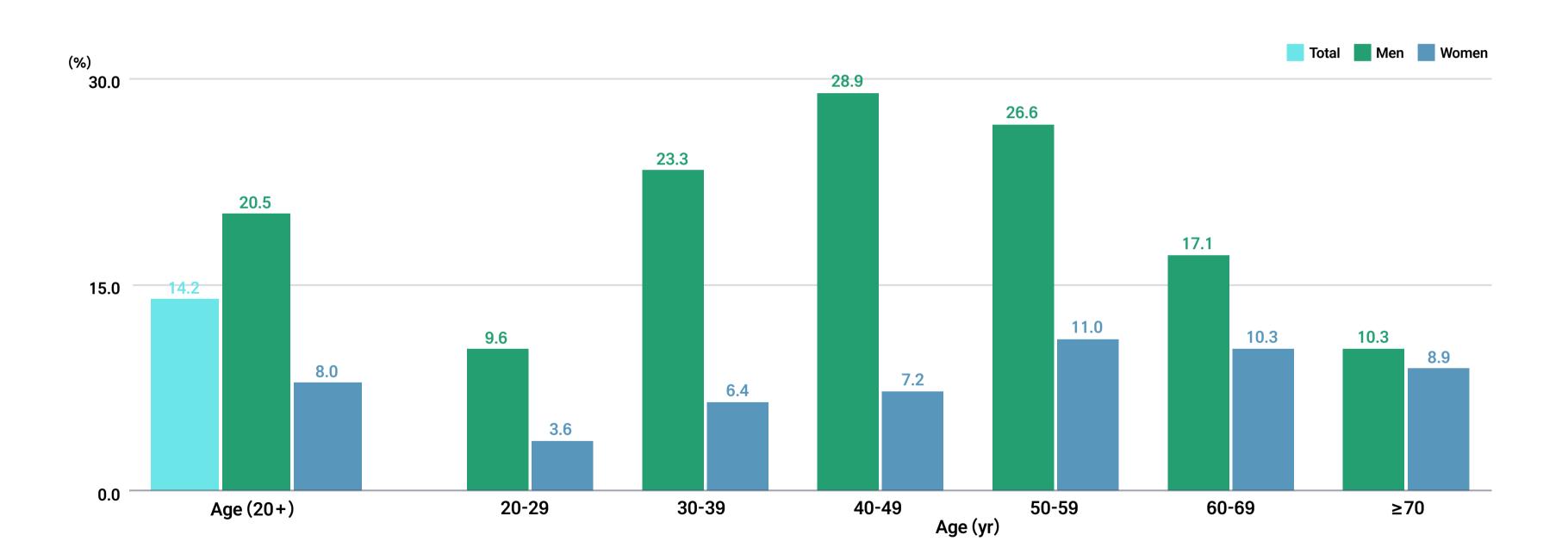
Data: 2007-2022 KNHANES; adults aged 20 + years; standardized to the 2005 Korean population Hypertriglyceridemia: triglyceride \geq 200 mg/dL.

2007-2022 trend

Crude prevalence of hypertriglyceridemia by sex and age

14% of Korean adults have hypertriglyceridemia.

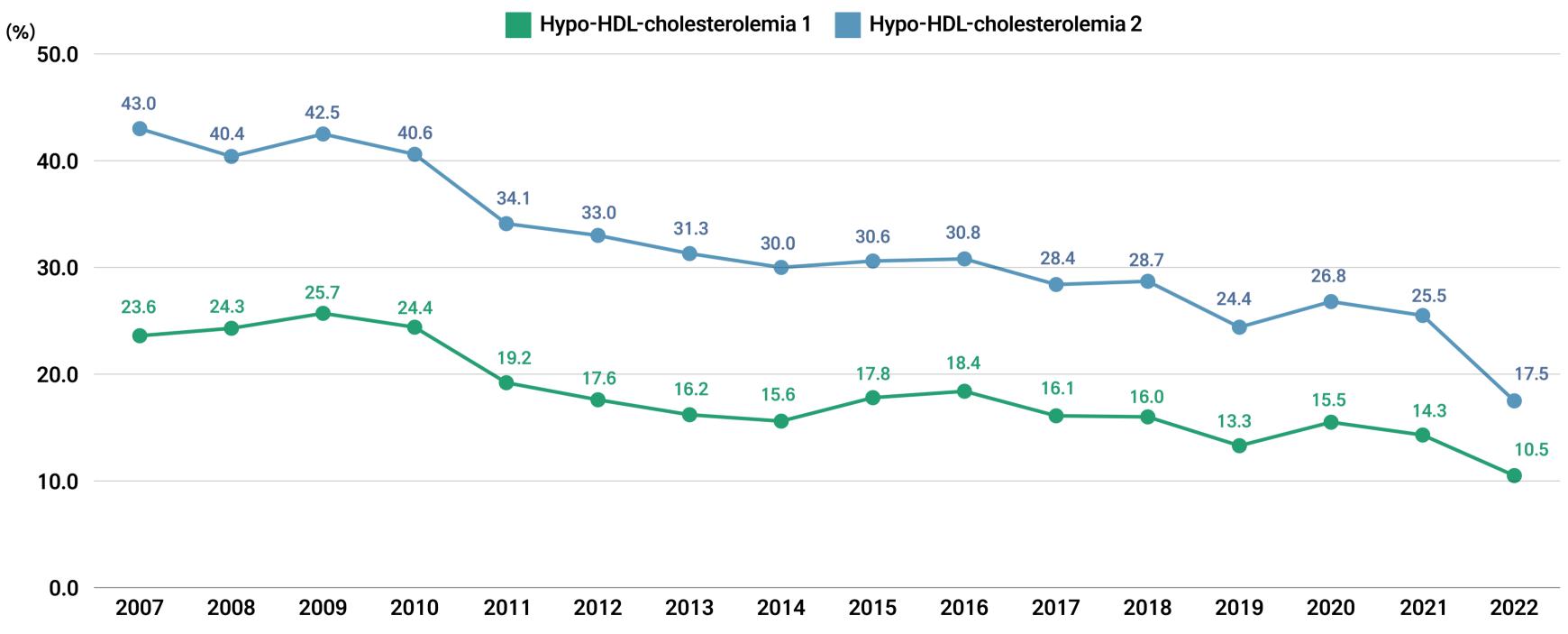
Men aged 40-49 have a 4x higher prevalence of hypertriglyceridemia than women.



Data: 2016-2022 KNHANES; adults aged 20+ years Hypertriglyceridemia: triglyceride \geq 200 mg/dL.

2016-2022 average

Age-standardized prevalence of hypo-HDL-cholesterolemia



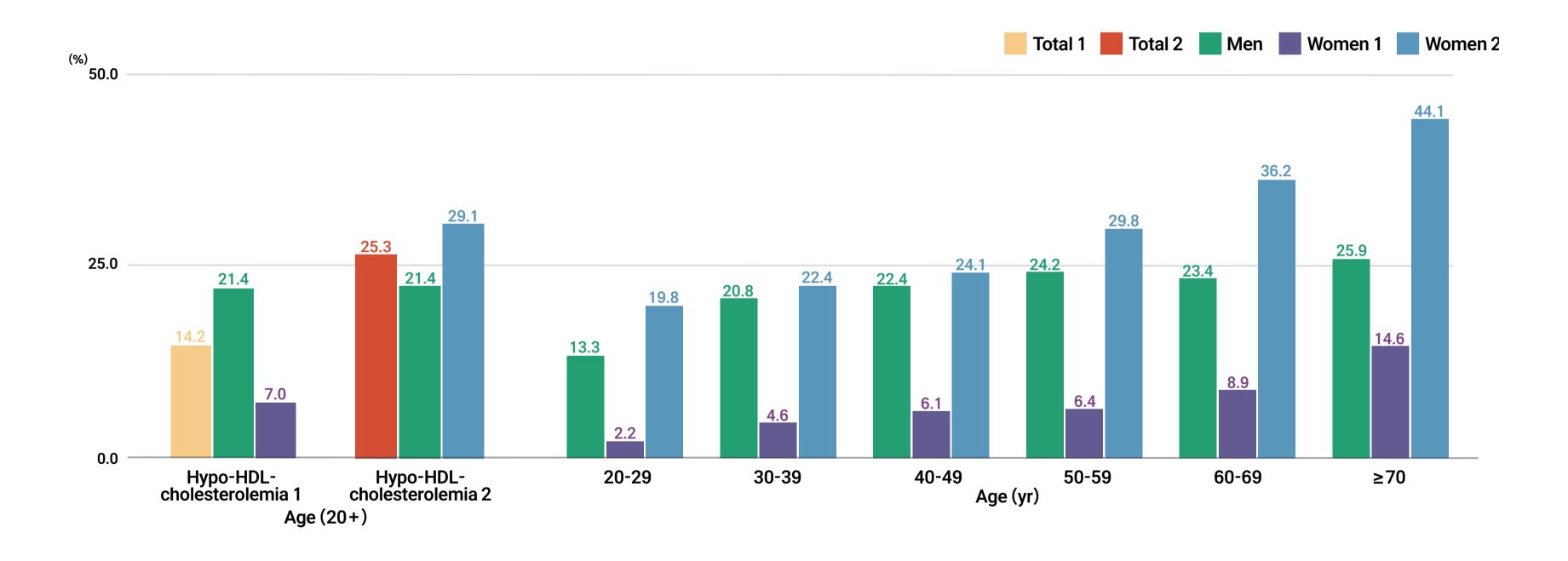
Data: 2007-2022 KNHANES; adults aged 20+ years; standardized to the 2005 Korean population Hypo-HDL-cholesterolemia 1: HDL-cholesterol <40 mg/dL in both men and women. Hypo-HDL-cholesterolemia 2: HDL-cholesterol <40 mg/dL in men; <50 mg/dL in women.

2007-2022 trend

Crude prevalence of hypo-HDL-cholesterolemia by sex and age

14% of Korean adults have hypo-HDL-cholesterolemia.

This percentage increases to 25% when using the definition of <50 mg/dL for women.



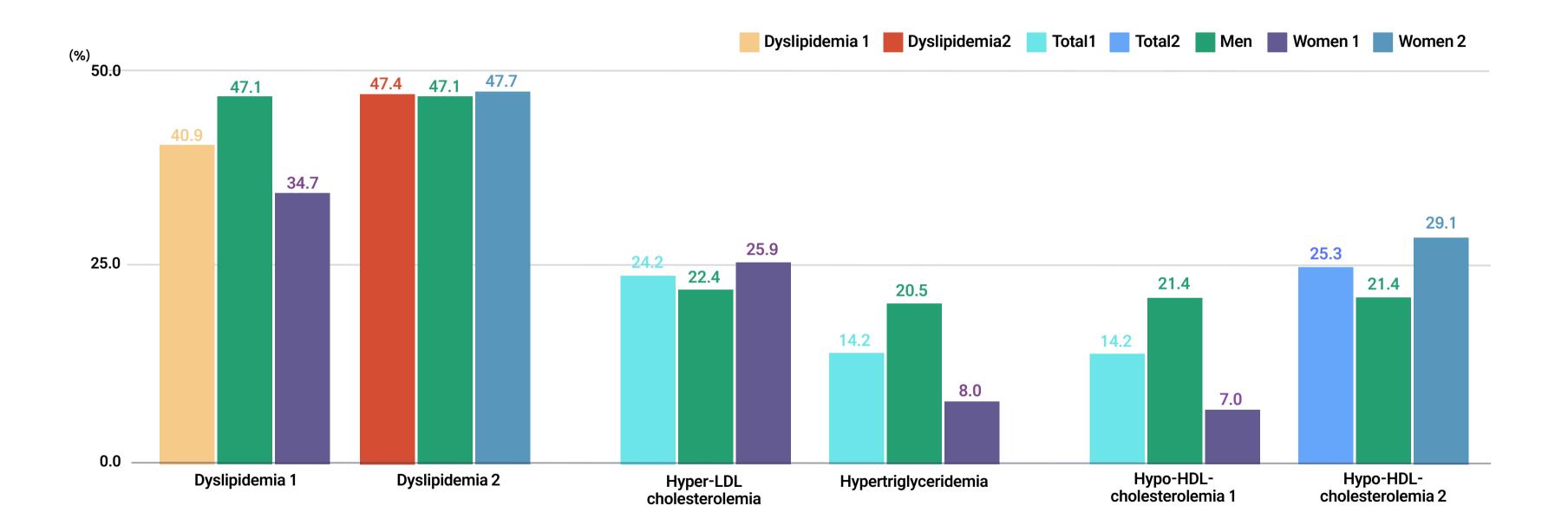
Data: 2016-2022 KNHANES; adults aged 20+ years

Hypo-HDL-cholesterolemia 1: HDL-cholesterol <40 mg/dL in both men and women.

Hypo-HDL-cholesterolemia 2: HDL-cholesterol <40 mg/dL in men; <50 mg/dL in women.

2016-2022 average

Prevalence of dyslipidemia and its components



Data: 2016-2022 KNHANES; adults aged 20+ years

Dyslipidemia 1: hyper-LDL-cholesterolemia, hypertriglyceridemia, or hypo-HDL-cholesterolemia (<40 mg/dL in both men and women). Dyslipidemia 2: hyper-LDL-cholesterolemia, hypertriglyceridemia, or hypo-HDL-cholesterolemia (<40 mg/dL in men; <50 mg/dL in women). Hypo-HDL-cholesterolemia 1: HDL-cholesterol <40 mg/dL in both men and women.

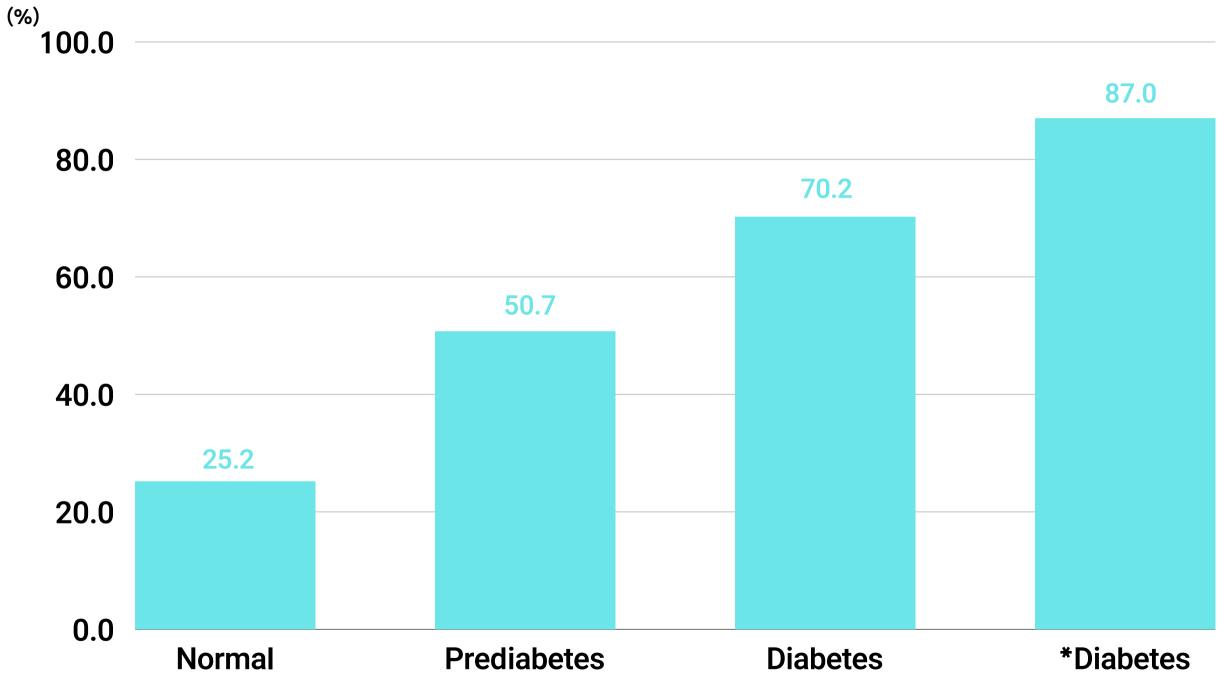
Hypo-HDL-cholesterolemia 2: HDL-cholesterol <40 mg/dL in men; <50 mg/dL in women.

2016-2022 average

Dyslipidemia in Specific Populations

Prevalence of dyslipidemia according to diabetes status

People with diabetes have much higher risk of dyslipidemia than those without diabetes. Almost 90% of people with diabetes have dyslipidemia if high LDL-cholesterol is defined as \geq 100 mg/dL.



Data: 2016-2022 KNHANES; adults aged 20+ years

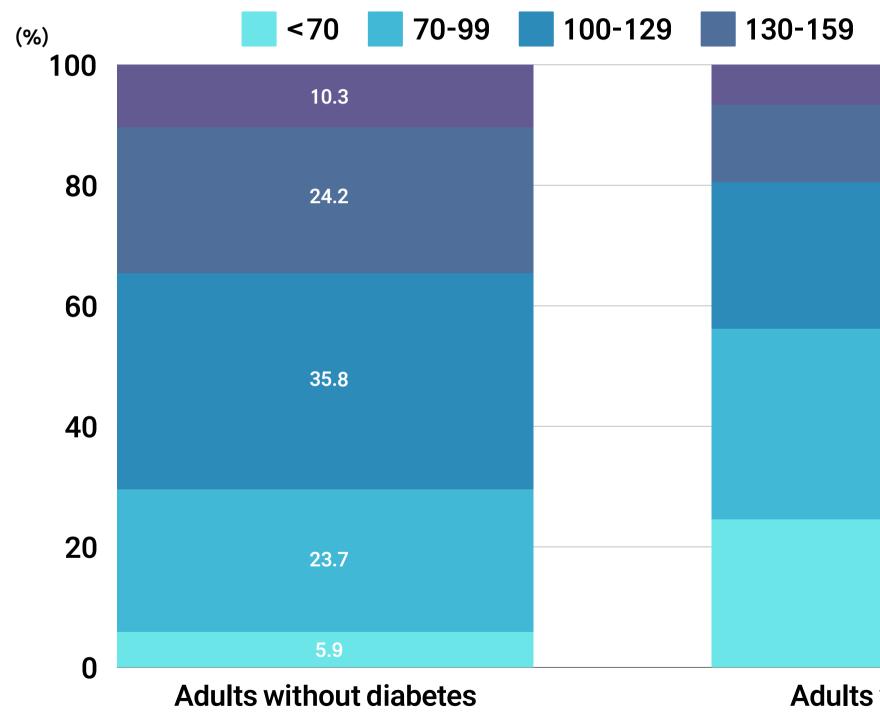
Prediabetes: fasting glucose 100-125 mg/dL or HbA1c 5.7-6.4%

Diabetes: fasting glucose ≥126 mg/dL, HbA1c ≥6.5%, previously diagnosed, or taking glucose-lowering drugs or insulin Dyslipidemia: LDL-cholesterol \geq 160 mg/dL, triglyceride \geq 200 mg/dL, HDL-cholesterol < 40 mg/dL, or taking a lipid-lowering drug *Dyslipidemia: LDL-cholesterol \geq 100mg/dL, triglyceride \geq 200 mg/dL, HDL-cholesterol < 40 mg/dL, or taking a lipid-lowering drug



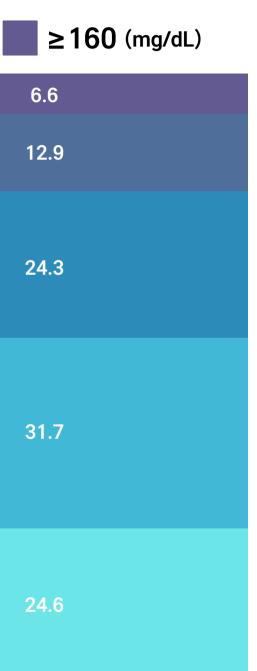
Distribution of LDL-cholesterol levels among adults with and without diabetes

44% of people with diabetes have LDL-cholesterol levels higher than 100 mg/dL.



Data: 2016-2022 KNHANES; adults aged 20+ years

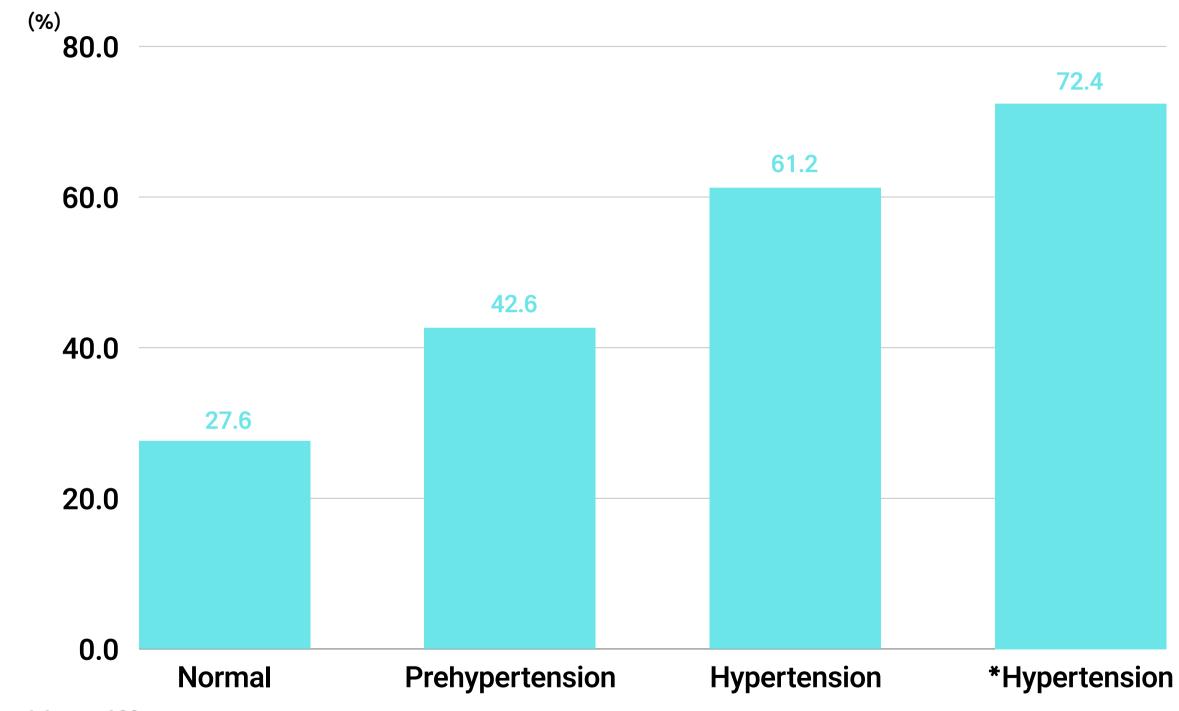
Diabetes: fasting glucose \geq 126 mg/dL, HbA1c \geq 6.5%, previously diagnosed, or taking glucose-lowering drugs or insulin



Adults with diabetes

Prevalence of dyslipidemia according to hypertension status

People with hypertension have a much higher risk of dyslipidemia than those without hypertension. 72% of people with hypertension have dyslipidemia if high LDL-cholesterol is defined as \geq 130 mg/dL.



Data: 2016-2022 KNHANES; adults aged 20+ years

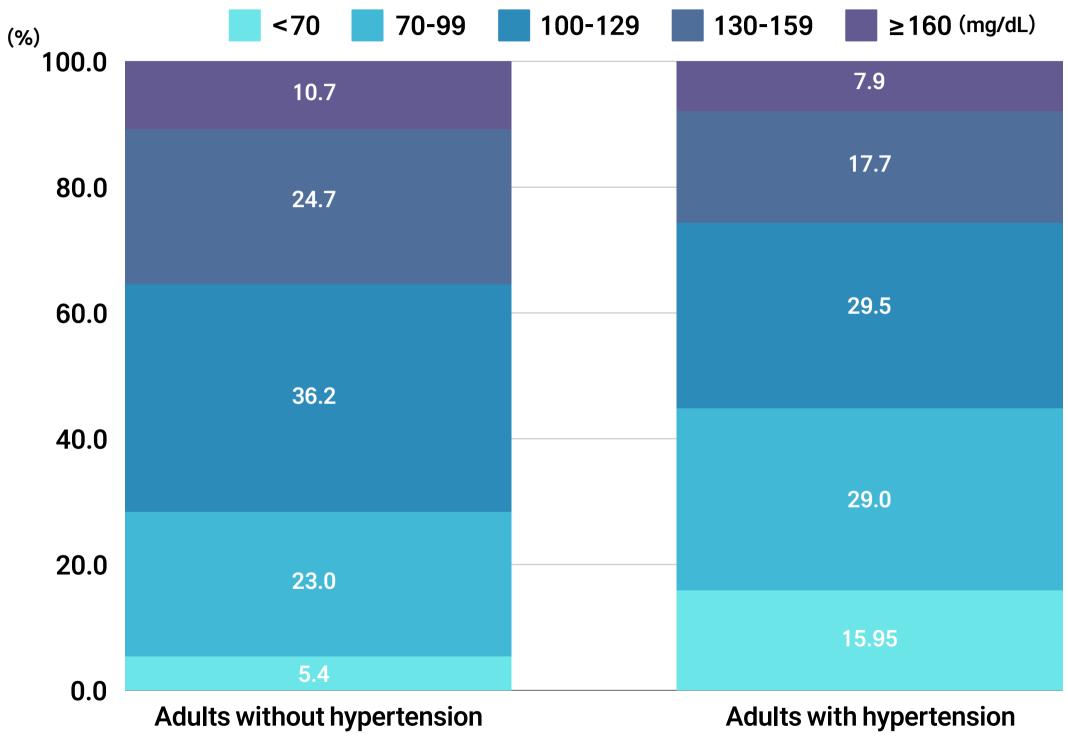
Prehypertension: SBP120-139 mmHg or DBP 80-89 mmHg

Hypertension: SBP \geq 140 mmHg, DBP \geq 90 mmHg, or taking a BP-lowering drug

Dyslipidemia: LDL-cholesterol \geq 160 mg/dL, triglyceride \geq 200 mg/dL, HDL-cholesterol < 40 mg/dL, or taking a lipid-lowering drug *Dyslipidemia: LDL-cholesterol \geq 130 mg/dL, triglyceride \geq 200 mg/dL, HDL-cholesterol < 40 mg/dL, or taking a lipid-lowering drug

Distribution of LDL-cholesterol levels among adults with and without hypertension

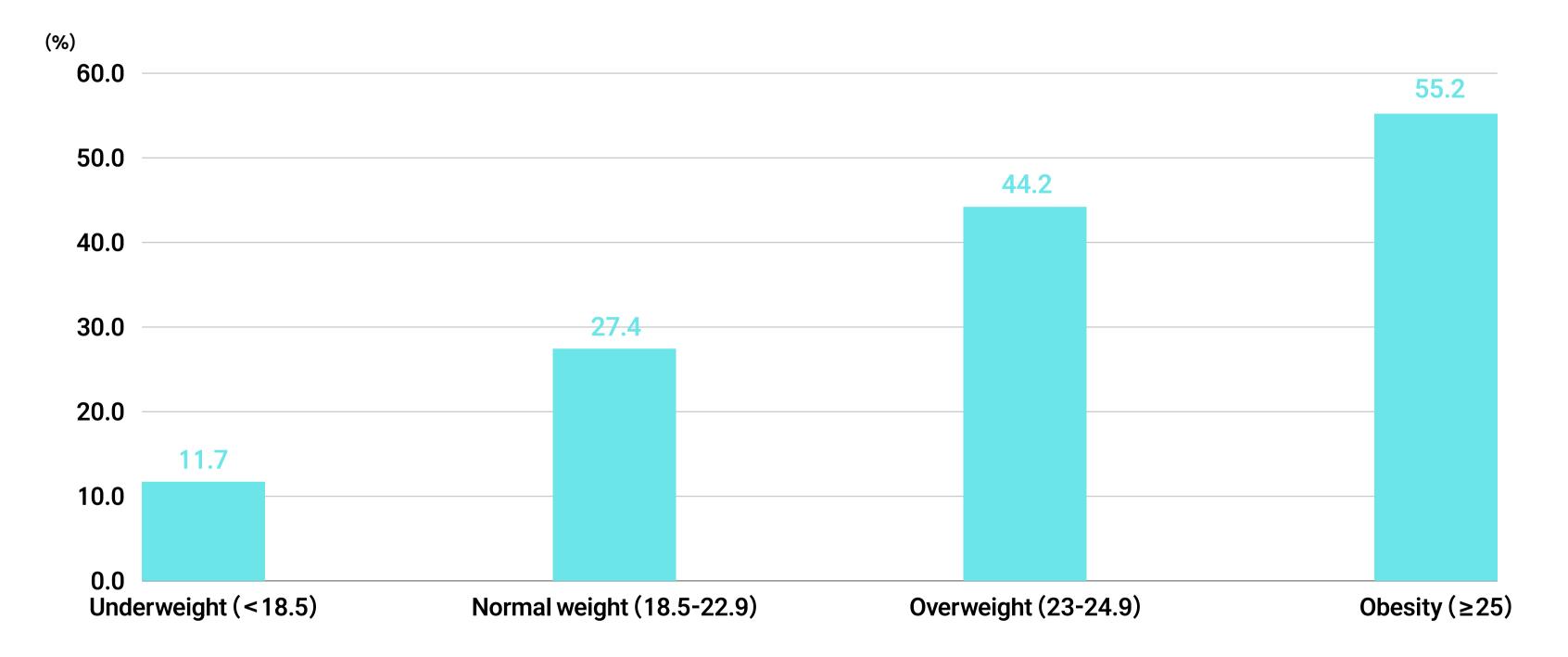
26% of people with hypertension have LDL-cholesterol levels higher than 130 mg/dL.



Data: 2016-2022 KNHANES; adults aged 20+ years Hypertension: SBP \geq 140 mmHg, DBP \geq 90 mmHg, or taking a BP-lowering drug

Prevalence of dyslipidemia according to obesity status

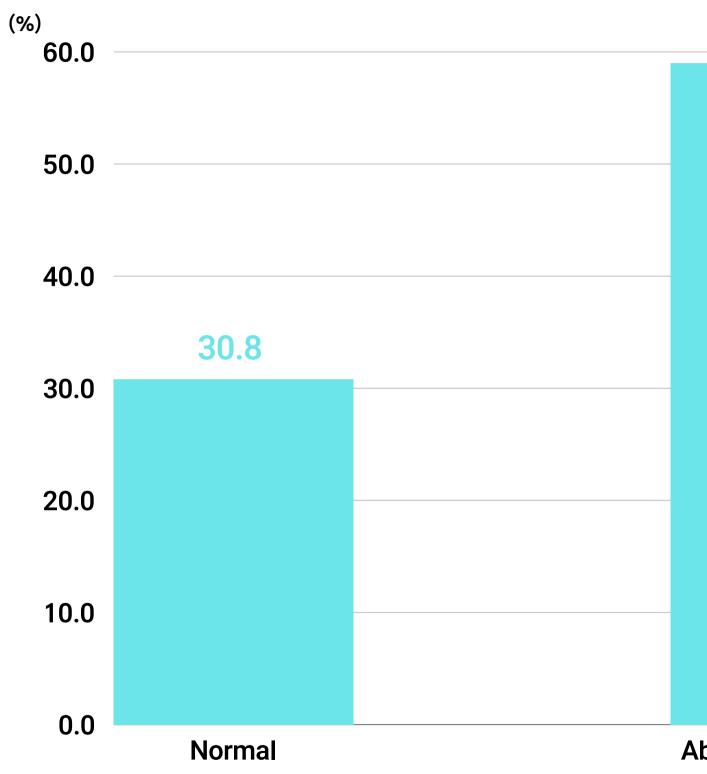
People with obesity have a 2x higher risk of dyslipidemia than those with normal weight.



Data: 2016-2022 KNHANES; adults aged 20+ years

Dyslipidemia: LDL-cholesterol \geq 160 mg/dL, triglyceride \geq 200 mg/dL, HDL-cholesterol < 40 mg/dL, or taking a lipid-lowering drug

Prevalence of dyslipidemia among adults with and without abdominal obesity



Data: 2016-2022 KNHANES; adults aged 20+ years

Abdominal obesity: waist circumference \geq 90 cm in men; \geq 85 cm in women.

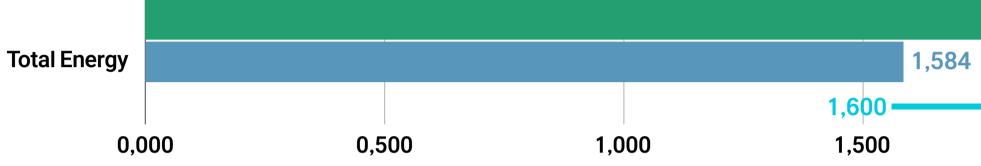
Dyslipidemia: LDL-cholesterol \geq 160 mg/dL, triglyceride \geq 200 mg/dL, HDL-cholesterol < 40 mg/dL, or taking a lipid-lowering drug

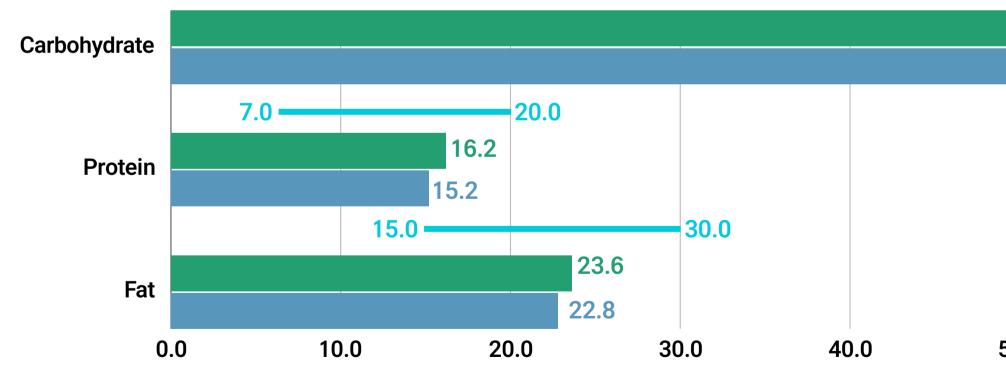
59.0

Abdominal obesity

Health Behaviors among Adults with dyslipidemia

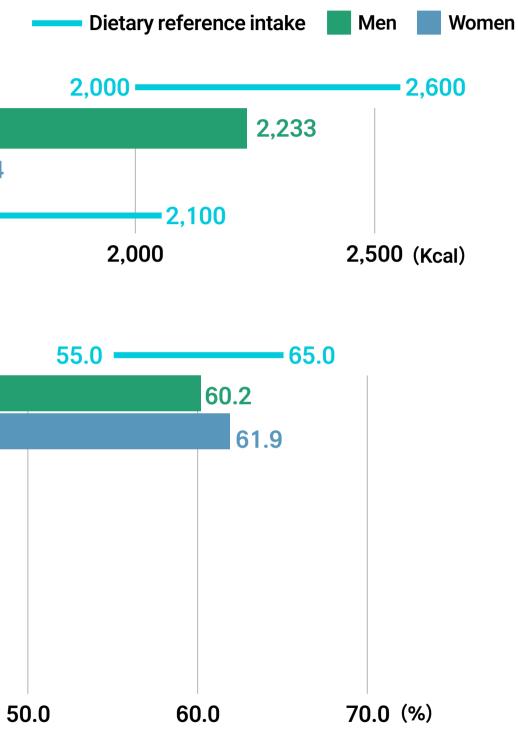
Dietary intake of energy and macronutrients among adults with dyslipidemia





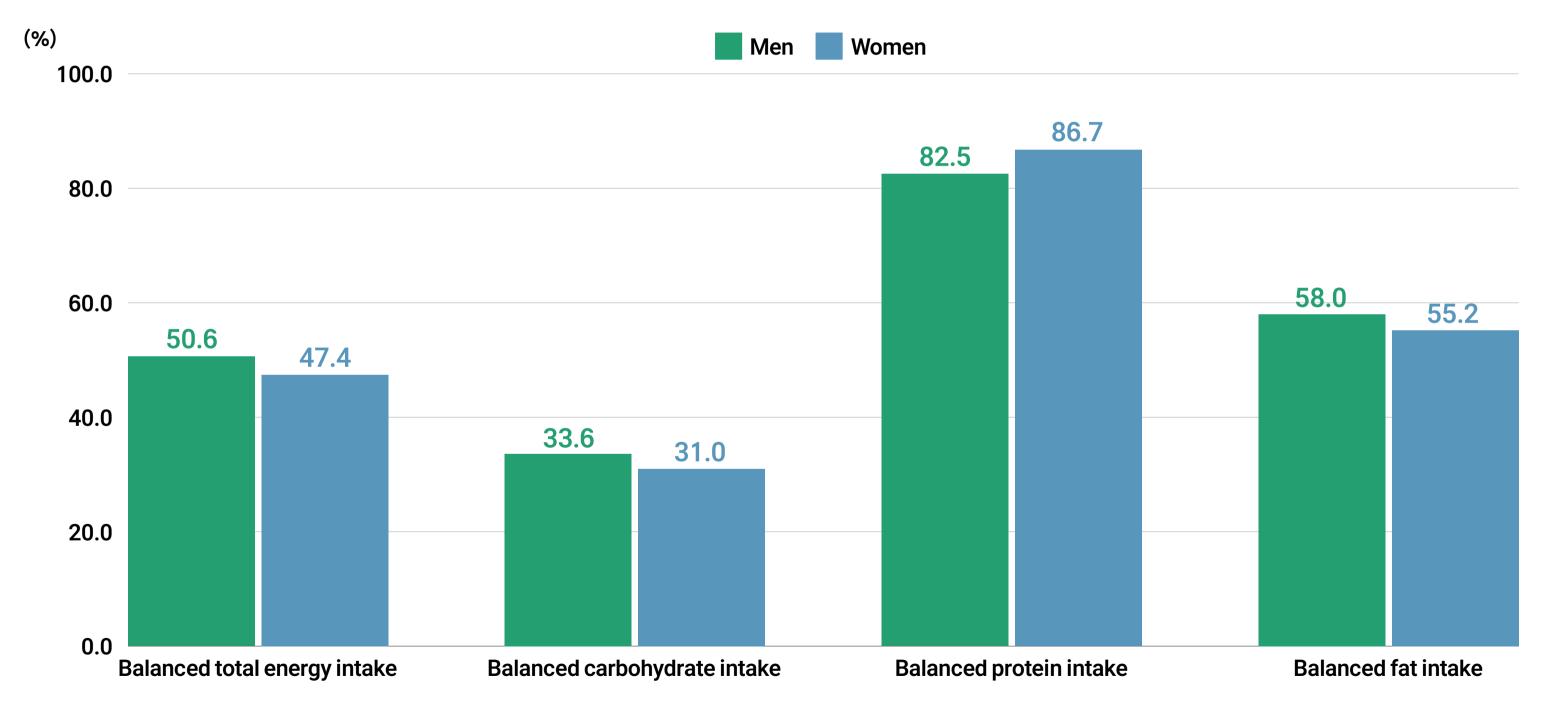
Data: 2016-2018 KNHANES; adults aged 20+ years with dyslipidemia

2019-2021 average



Proportion of those who met the criteria for balanced consumption among adults with dyslipidemia

About half of men and women with dyslipidemia meet the energy intake recommendations. Only one-third of men and women with dyslipidemia meet the carbohydrate intake recommendation.

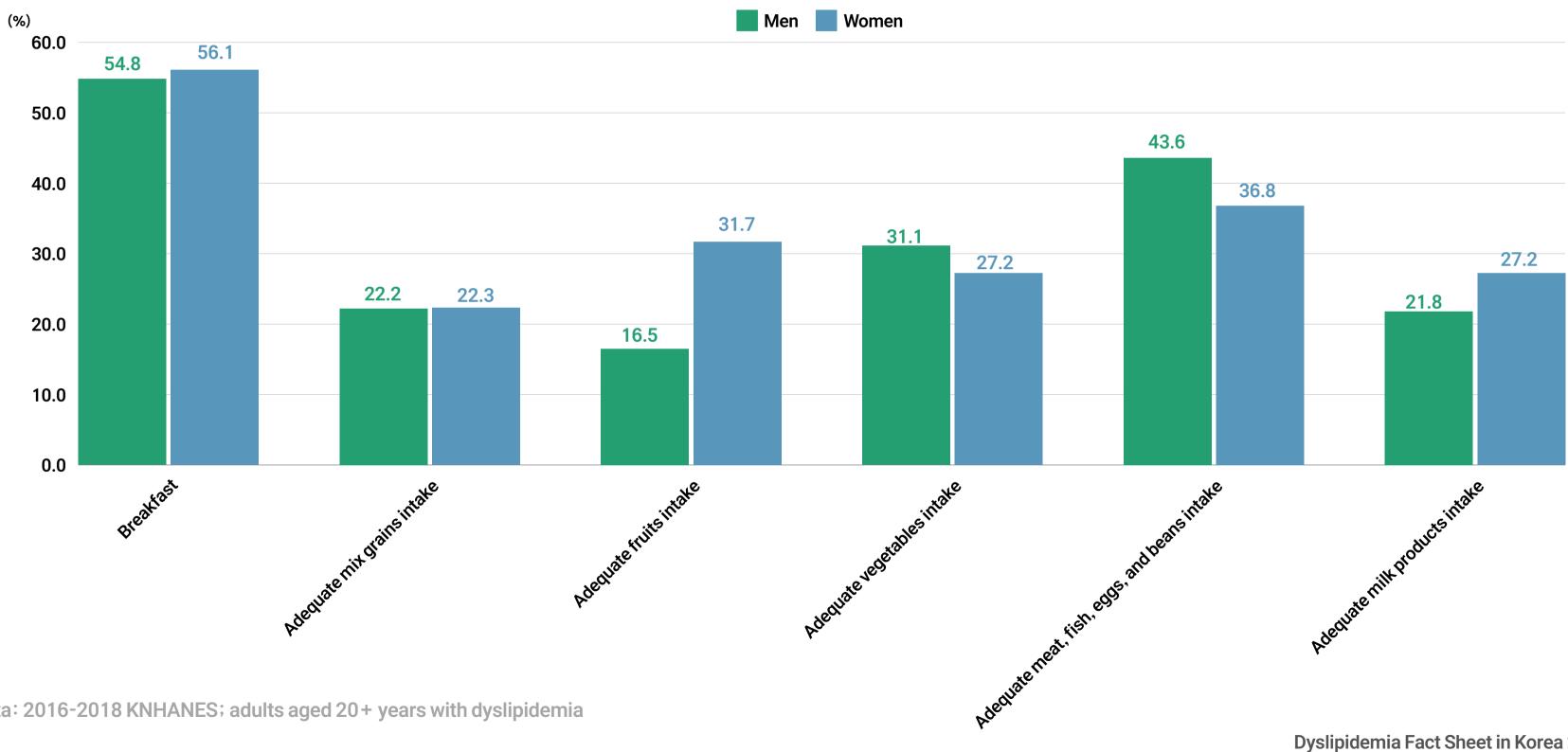


Data: 2016-2018 KNHANES; adults aged 20+ years with dyslipidemia



Distribution of desirable dietary habits among adults with dyslipidemia

Only 31% of men and 27% of women with dyslipidemia eat enough vegetables.

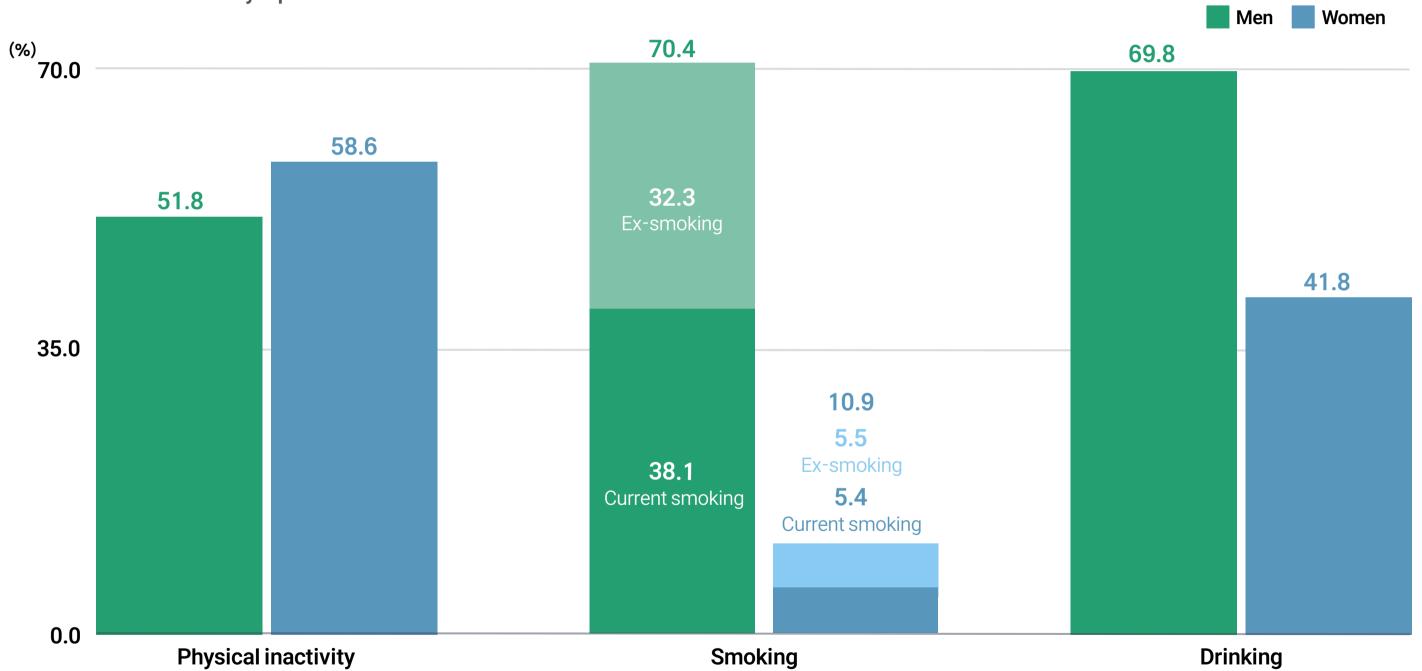


Data: 2016-2018 KNHANES; adults aged 20+ years with dyslipidemia

2019-2021 average

Distribution of physical inactivity, cigarette smoking, and alcohol drinking among adults with dyslipidemia

52% of men and 59% of women with dyslipidemia do not meet the recommendations for physical activity. 38% of men and 5% of women with dyslipidemia smoke cigarettes, and 70% of men and 42% of women with dyslipidemia drink alcohol.



Data: 2016-2018 KNHANES; adults aged 20+ years with dyslipidemia

Physical inactivity: moderate-intensity activity <150 minutes, vigorous-intensity activity for <75 minutes, and an equivalent combination of moderate-and vigorous-intensity activity over the past week Current smoking: have smoked 100 + cigarettes during lifetime and currently smoking.

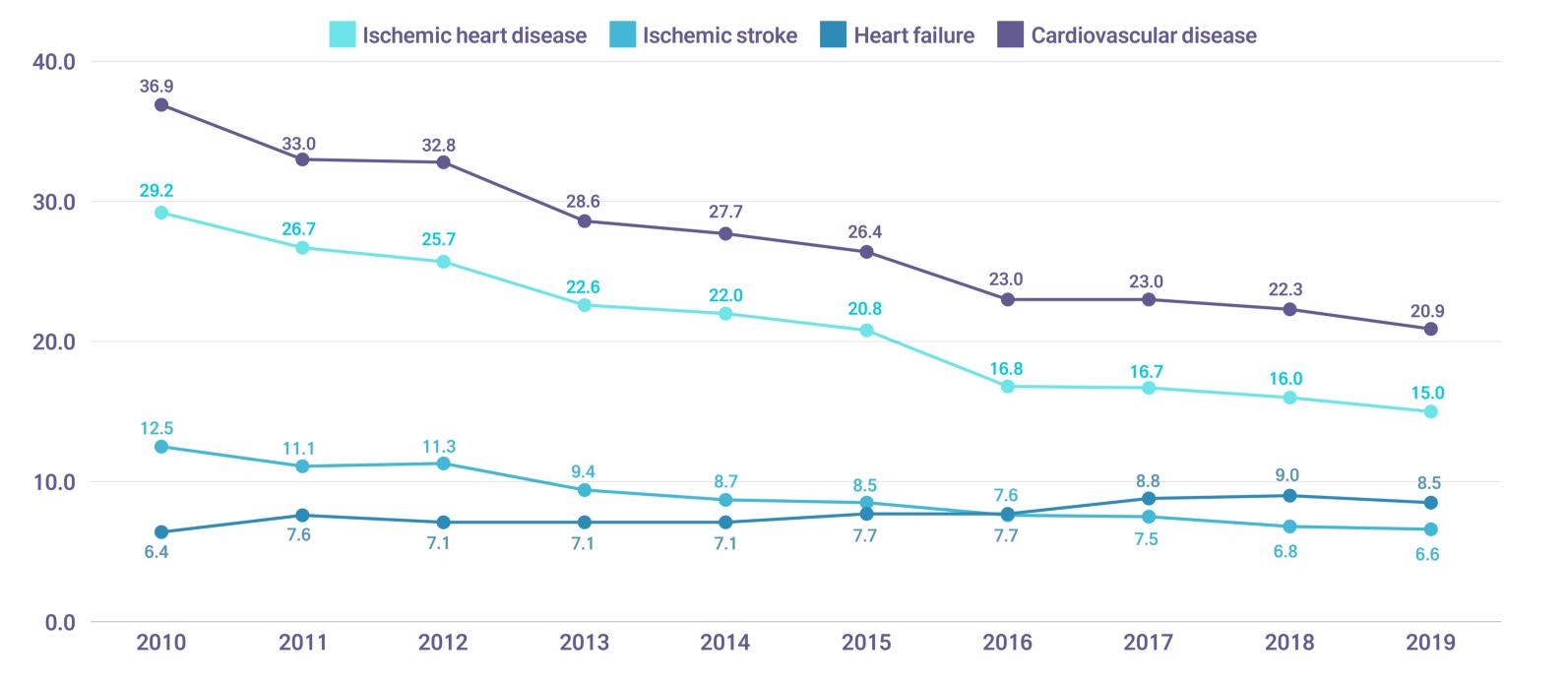
Alcohol drinking: consuming alcohol more than once a month in the past year.

2019-2022 average

Cardiovascular Disease Status in Patients with Dyslipidemia

Changes in the incidence of cardiovascular disease in patients with dyslipidemia (per 1,000 population)

The incidence of cardiovascular disease among 1,000 dyslipidemia patients on lipid-lowering drugs decreased from 36.9 in 2010 to 20.9 in 2019.



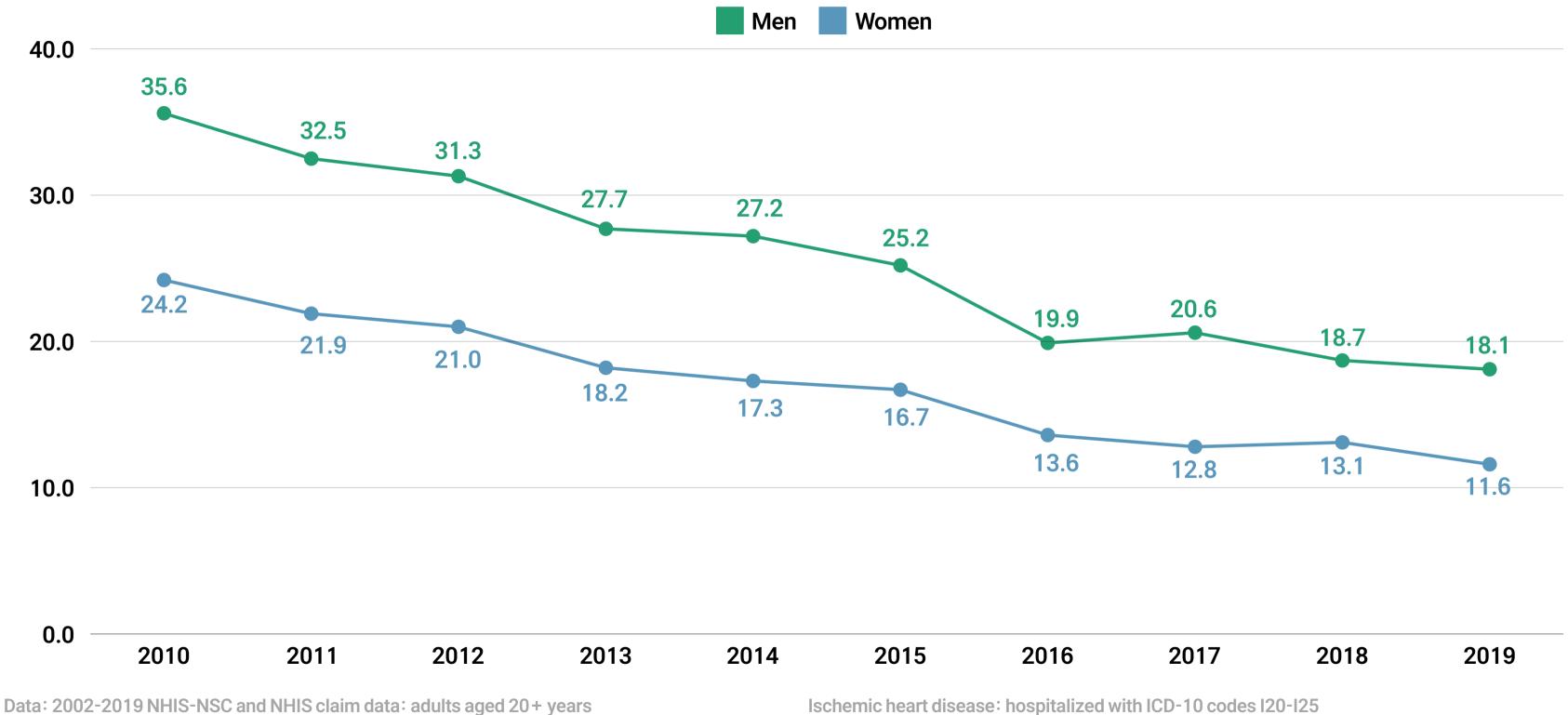
Data: 2002-2019 NHIS-NSC and NHIS claim data: adults aged 20 + years Dyslipidemia: taking a lipid-lowering drug was claimed with ICD-10 code E78

Ischemic heart disease: hospitalized with ICD-10 codes I20-I25 Ischemic stroke: hospitalized with ICD-10 codes I63 or I64 and a brain CT or MRI was also claimed Heart failure: hospitalized with ICD-10 code I50

Cardiovascular disease: diagnosed with at least one of the following conditions: ischemic heart disease, ischemic stroke. or heart failure

2010-2019

Changes in the incidence of ischemic heart disease in patients with dyslipidemia by sex (per 1,000 population)

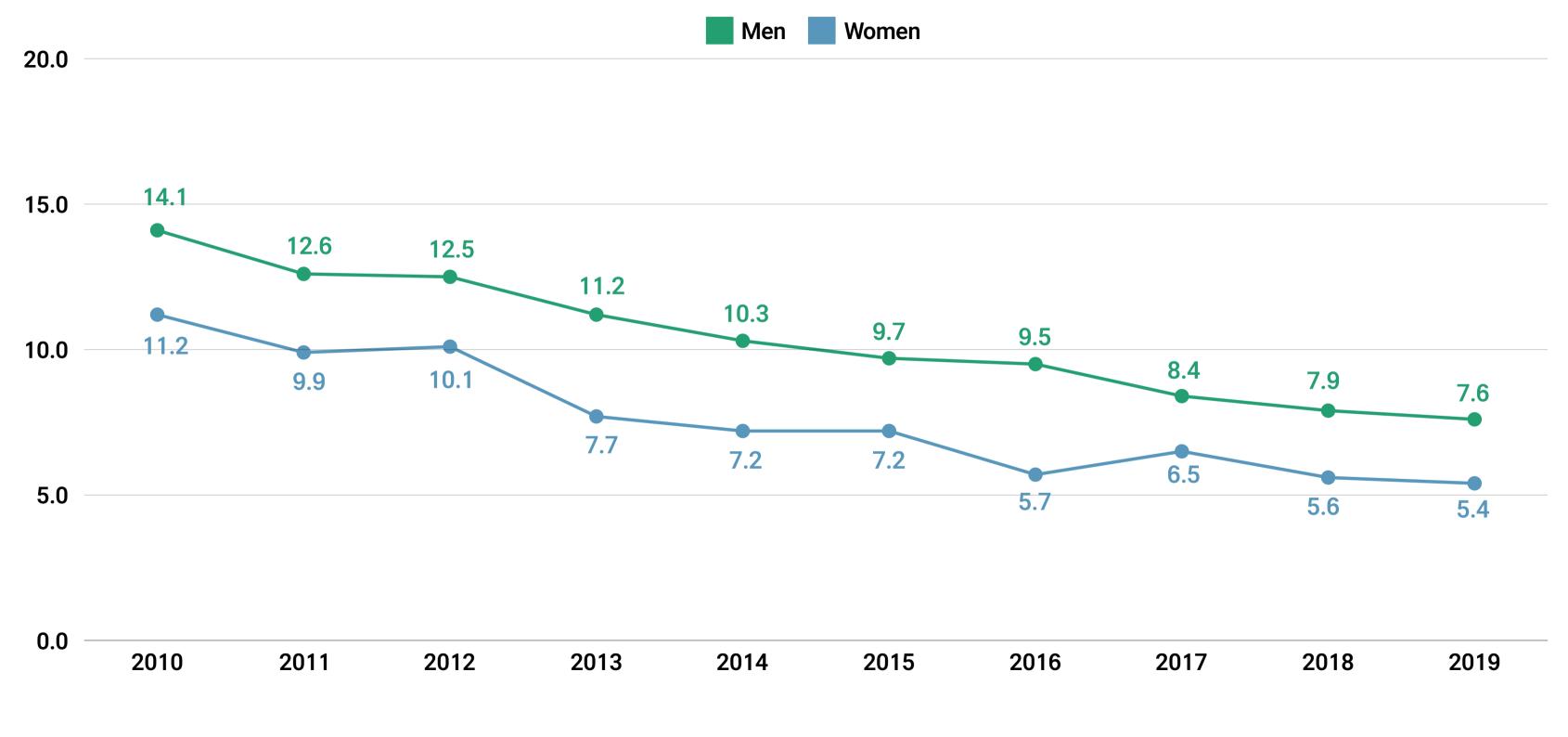


Dyslipidemia: taking a lipid-lowering drug was claimed with ICD-10 code E78

Ischemic heart disease: hospitalized with ICD-10 codes I20-I25

2010-2019

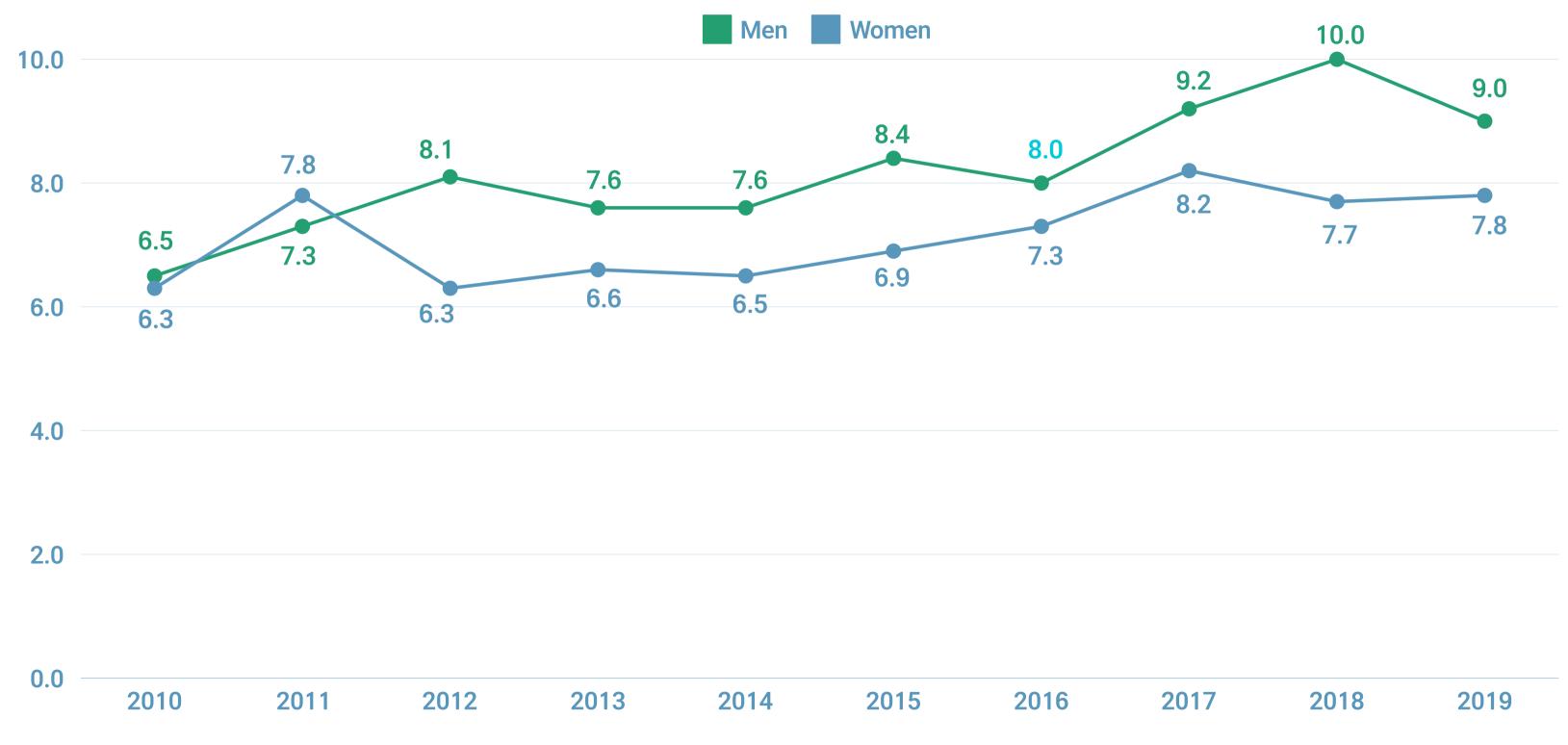
Changes in the incidence of ischemic stroke in patients with dyslipidemia by sex (per 1,000 population)



Data: 2002-2019 NHIS-NSC and NHIS claim data: adults aged 20 + years Dyslipidemia: taking a lipid-lowering drug was claimed with ICD-10 code E78 Ischemic stroke: hospitalized with ICD-10 codes I63 or I64 and a brain CT or MRI was also claimed

2010-2019

Changes in the incidence of heart failure in patients with dyslipidemia by sex (per 1,000 population)

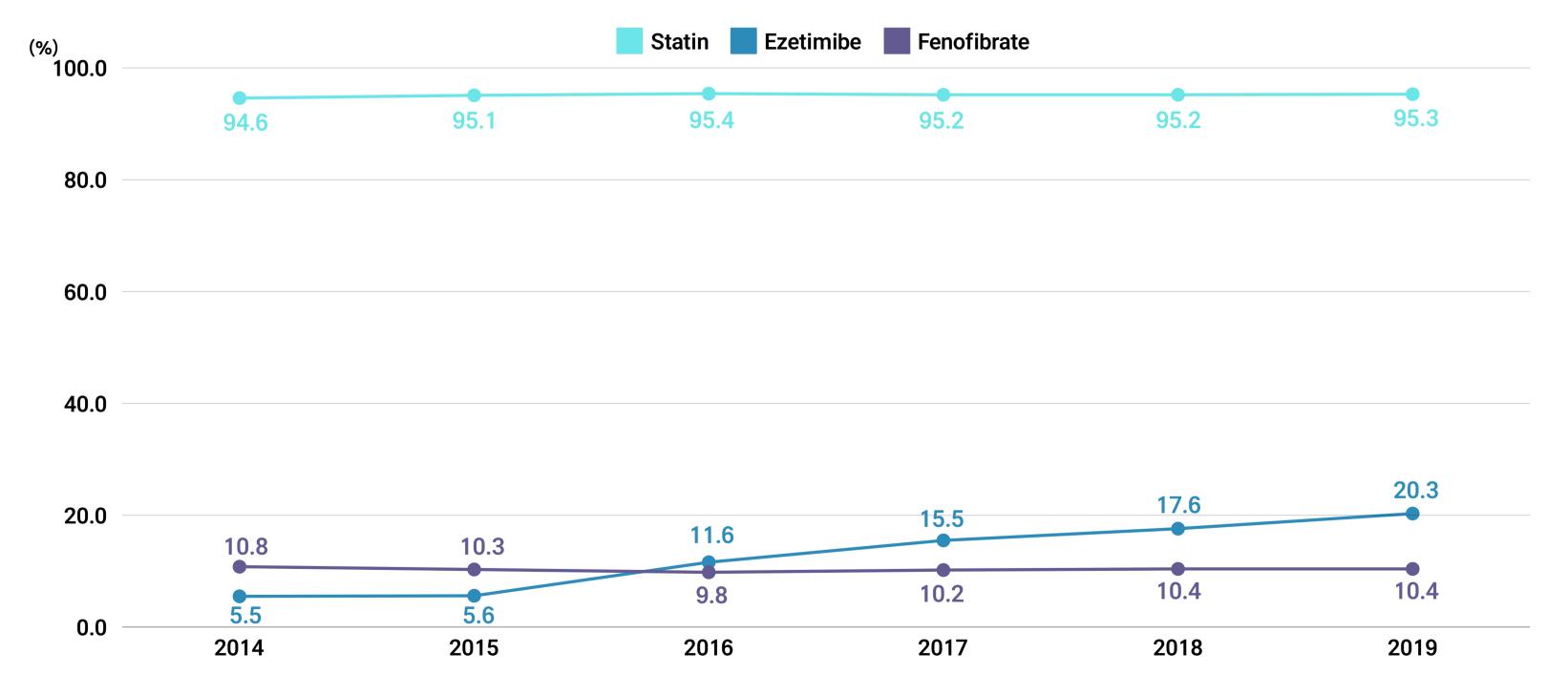


Data: 2002-2019 NHIS-NSC and NHIS claim data: adults aged 20+ years Dyslipidemia: taking a lipid-lowering drug was claimed with ICD-10 code E78 IHeart failure: hospitalized with ICD-10 code I50

Prescription Status in Patients with Dyslipidemia

Changes in the prescription of lipid-lowering drugs in dyslipidemia patients with cardiovascular disease

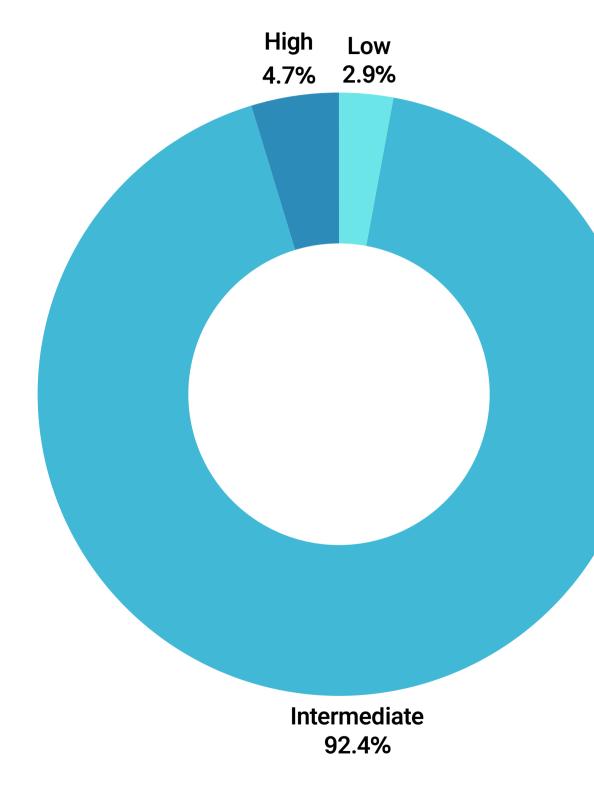
Prescription rates for lipid-lowering drugs were 95.3% for statins, 20.3% for ezetimibe, and 10.4% for fenofibrate, with ezetimibe showing an increasing trend.



Data: 2002-2019 NHIS-NSC and NHIS claim data: adults aged 20 + years Dyslipidemia: taking a lipid-lowering drug was claimed with ICD-10 code E78

Statin prescription in patients with dyslipidemia (2019)

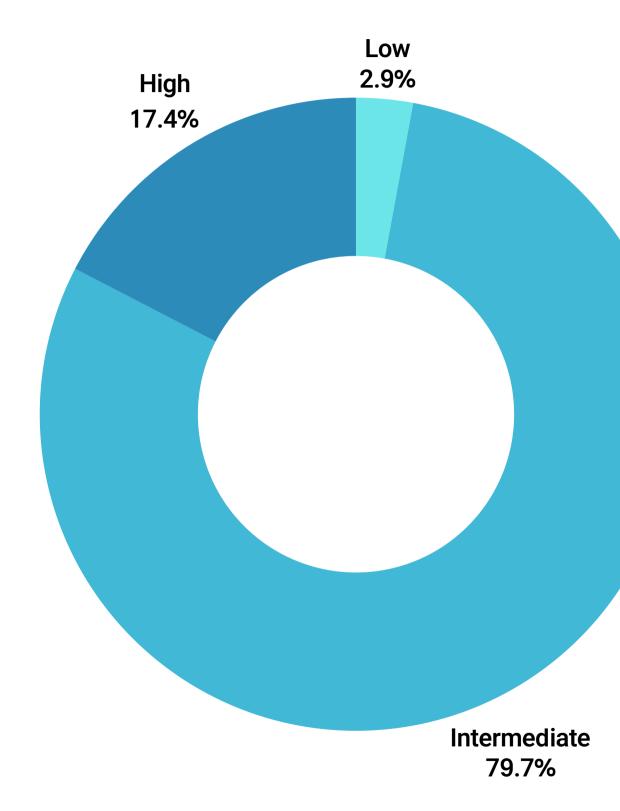
Among statin prescriptions, 92.4% were for intermediate-intensity statins, 4.7% for high-intensity statins, and 2.9% for low-intensity statins.



Data: 2019 NHIS-NSC and NHIS claim data: adults aged 20+ years Dyslipidemia: taking a lipid-lowering drug was claimed with ICD-10 code E78

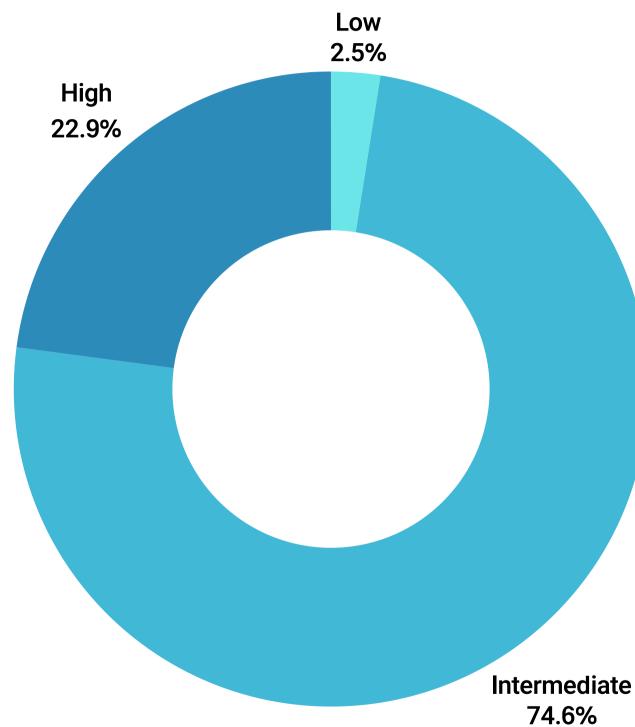


Statin prescription in dyslipidemia patients with ischemic heart disease (2019)



Data: 2019 NHIS-NSC and NHIS claim data: adults aged 20+ years Dyslipidemia: taking a lipid-lowering drug was claimed with ICD-10 code E78 Ischemic heart disease: hospitalized with ICD-10 codes I20-I25

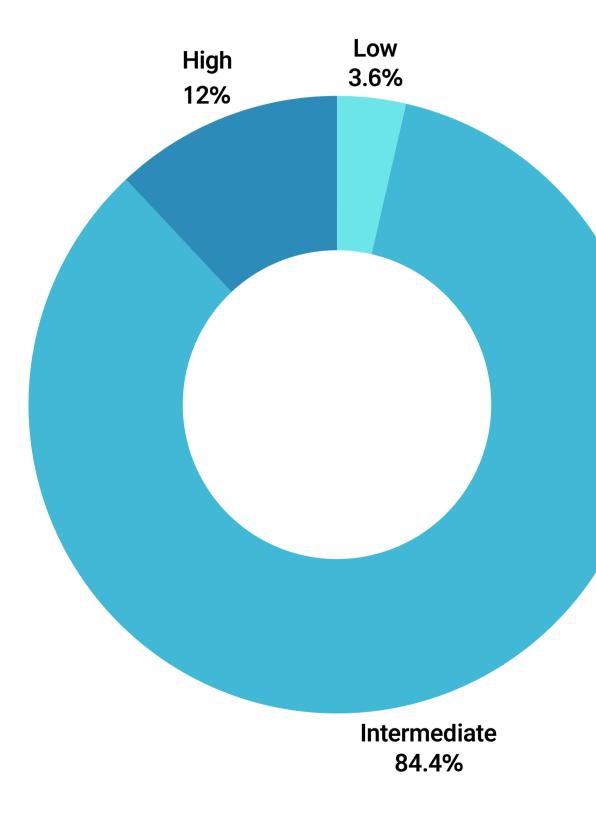
Statin prescription in dyslipidemia patients with ischemic stroke (2019)



Data: 2019 NHIS-NSC and NHIS claim data: adults aged 20 + years Dyslipidemia: taking a lipid-lowering drug was claimed with ICD-10 code E78 Ischemic stroke: hospitalized with ICD-10 codes I63 or I64 and a brain CT or MRI was also claimed



Statin prescription in dyslipidemia patients with heart failure (2019)



Data: 2019 NHIS-NSC and NHIS claim data: adults aged 20+ years Dyslipidemia: taking a lipid-lowering drug was claimed with ICD-10 code E78 Heart failure: hospitalized with ICD-10 code I50

Summary & Conclusion

- Currently, 1 in 4 Korean adults has hypercholesterolemia, and 2 in 5 have dyslipidemia.
- The prevalence of hypercholesterolemia is steadily increasing, with 24% of men and 31% of women affected.
- Although awareness of hypercholesterolemia is improving, 3 out of 10 individuals remain unaware of their condition.
- While treatment rates for hypercholesterolemia have improved, approximately 4 out of 10 individuals still do not use lipid-lowering drugs.
- Currently, 54% of people with hypercholesterolemia and 87% of those on lipid-lowering drugs maintain cholesterol levels below 200 mg/dL.
- The prevalence of dyslipidemia increased from 40.9% to 47.4% when the definition of hypo-HDL-cholesterolemia in women changed from <40 to <50 mg/dL.
- Although the overall prevalence of dyslipidemia has not changed substantially, hyper-LDL cholesterolemia is increasing while hypo-HDL cholesterolemia is decreasing.
- 87% of individuals with diabetes have dyslipidemia (LDL-C \geq 100 mg/dL, TG \geq 200 mg/dL, or HDL-C < 40 mg/dL). Additionally, 44% of those with diabetes have LDL-cholesterol levels above 100 mg/dL.
- 72% of individuals with hypertension have dyslipidemia (LDL-C \geq 130 mg/dL, TG \geq 200 mg/dL, or HDL-C < 40 mg/dL). Also, 26% of hypertensive individuals have LDL-cholesterol levels above 130 mg/dL.
- About half of those with dyslipidemia meet energy intake recommendations, but only one-third adhere to carbohydrate intake recommendations. Only 31% of men and 27% of women with dyslipidemia consume adequate vegetables.
- About half of individuals with dyslipidemia meet physical activity recommendations. However, 38% of men and 5% of women with dyslipidemia smoke, and 70% of men and 42% of women drink alcohol.
- The incidence of cardiovascular disease among 1,000 dyslipidemia patients on lipid-lowering drugs decreased from 36.9 in 2010 to 20.9 in 2019. The rates of both ischemic heart disease and ischemic stroke have declined in both men and women.
- Prescription rates for lipid-lowering drugs were 95.3% for statins, 20.3% for ezetimibe, and 10.4% for fenofibrate, with ezetimibe showing an increasing trend.
- Among statin prescriptions, 92.4% were for intermediate-intensity statins, 4.7% for high-intensity statins, and 2.9% for low-intensity statins.

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The above images were generated using ChatGPT's DALL-E to visualize atherosclerosis.

