FACTSHEET for healthcare professionals

GENCAD

Gender differences in coronary artery disease in Europe

Gender differences in classical risk factors

- Coronary heart disease develops 7-10 years later in women compared to men. Overall, more women are affected, since they live longer and the disease develops in old age.1
- Hypertension occurs more frequently in men before the age of 50, and in women after the age of 50. Hypertension leads to more strokes and heart failure in women than in men.[2,3]
- Diabetes increases the risk of cardiovascular disease more in women than in men.[4,5] Women with diabetes and associated risk factors are high risk patients, and need intense management and treatment.[6]
- Dyslipidemia is an equally strong risk factor in women and in men. Lipid lowering therapy should therefore be equally used in women and men.[1]
- Smoking is a relatively greater risk factor in younger women than in men

- *Age*
- *Hypertension*
- *Diabetes*
- *Smoking*

Gender differences in non-classical risk factors

- Poor socioeconomic status contributes to gender disparities in cardiovascular health.[8, 9]
- Depression and sustained mental stress occur more often in women than in men and are more important risk factors in women. [10,11]
- Autoimmune and rheumatic diseases occur more often in women and are frequently associated with cardiovascular disease.[12]
- Preeclampsia is an increasingly recognized risk factor in women.13 Women who develop preeclampsia have a twofold elevated risk of developing cardiovascular disease later in life.[14-17]
- Genetic factors are important in premature heart disease in women and in men.[18]
- Erectile Dysfunction is associated with general metabolic and cardiovascular health risks in men.[19]
- Menopause, polycystic ovary syndrome, andropause and hypogonadismus are associated with increased cardiovascular risk in women and

- *Socioeconomic status*
- *Mental stress*
- *Autoimmune & rheumatic diseases*
- *Preeclampsia*
- *Sex hormones*

Gender-specific mechanisms of disease

- In men, arteriosclerosis of large coronary arteries is the dominant mechanism leading to myocardial ischemia and infarction.[22]
- Middle-aged women have frequently angina pectoris and myocardial ischemia in the presence of normal coronary arteries. The term ischemic heart disease is suitable for this form of disease.[23-25]
- Functional disorders and spasms of large arteries and the smaller vessels (the microcirculation) of the heart or an increased demand of the myocardial tissue may cause ischemic heart disease, which occurs preferentially in women.[23,25,26]

- *Large coronary artery arteriosclerosis*
- *Ischemic heart disease*
- *Non-obstructive functional coronary artery disease*
- *Stress-induced heart disease, spasms and dissections*
- *Heart disease in pregnancy and peripartum period*

- Stress induced heart disease, coronary artery spasms and spontaneous coronary artery dissections (longitudinal ruptures in the wall) cause relatively more acute coronary syndromes in women than men.[27-30]
- In pregnancy and the peripartum period, preeclampsia, peripartum cardiomyopathy and coronary artery dissection should be suspected in symptomatic women.[29,31]

Gender in prevention

- Women underestimate their risk for cardiovascular disease and are less open for preventive actions than men.[21] Secondary prevention goals are less often achieved in women than in men.[32-34]
- Exercise is a stronger protective factor in women, but women exercise less than men.[5,35]
- Smoking cessation is more difficult for women than for men.[7]
- Healthy nutrition is a strong and underused protective factor in women and men.[5,21] Men generally use less healthy nutrition than women.[36]
- Hormone therapy and selective estrogen-receptor modulators (SERMs) should not be used for the primary or secondary prevention of cardiovascular disease.[21]
- Routine use of aspirin in healthy women under 65 years of age is not recommended to prevent myocardial infarction.[37] However, aspirin in primary prevention for myocardial infarction is useful in men.[21,38]

- *Awareness*
- *Exercise*
- *Smoking cessation*
- *Nutrition*
- *Hormone therapy & SERMs*
- *Aspirin*

Gender in clinical manifestation and diagnosis

- Women with myocardial ischemia and infarction may have a greater variety of symptoms than men.[29]
- The ECG normally is an indicator of myocardial ischemia. However, women exhibit changes in ECG more often than men, caused by factors other than myocardial ischemia.[39, 40]
- Women have relatively lower exercise tolerance than men and the exercise-ECG is less sensitive for CAD.[39, 40]
- The use of high-sensitive Troponins and sex-specific thresholds improve the diagnosis of myocardial infarction in women.[41-43]
- Coronary angiography should not be used as a first test to diagnose myocardial ischemia in young or middle-aged women that have few other risk factors for CAD.44 Newer imaging techniques are recommended by the ESC Guidelines in these patients.[39, 40]
- Non-radiation imaging techniques should be preferred in younger women with suspected myocardial ischemia.[39, 40, 45, 46]

- *Gender specific symptoms*
- *Non-specific ECG changes in women*
- *Lower exercise tolerance in women*
- *Coronary angiography not as first test for myocardial ischemia in low risk women*
- *Imaging and non-radiation diagnostics for suspected CAD in younger women*

Gender, management & outcomes

- Women, and in particular, elderly women with suspected myocardial infarction arrive later at hospital emergency units than men.[29]
- Cardiovascular rehabilitation after myocardial infarction does not reach women and men equally.[47]
- Treatment of CAD should be performed according to the current guidelines for women and men. Women derive the same benefits from bypass surgery and percutaneous coronary intervention as men.[39]
- Women have more complications and more residual chest pain after coronary interventions for myocardial ischemia.[48, 49]
- Women have higher mortality and poorer health related quality of life after elective coronary artery bypass surgery.[10, 50-52]

- *Later arrival to emergency unit for*
- *women with myocardial infraction than for men*
- *Unequal access to cardiac rehabilitation*
- *Adhere to ESC guidelines for CAD treatment in women and men*
- *Gender differences after coronary interventions and bypass surgery*
- *Poorer quality of life and more complications in women after coronary interventions*

Conclusion

- ***Coronary artery disease differs significantly in European women and men, in age distribution, prevention, clinical manifestation, in response to therapies and outcomes.***
- ***Whenever managing women and men with risk factors or coronary artery disease, think about the differences in prevention, diagnosis, and therapy.***
- ***Take conventional risk factors seriously in women and men. Hormonal dysfunction and poor lifestyle increase the risk in both.***
- ***Choose proper and risk-adapted non-invasive and invasive tests for diagnosis of coronary artery disease in women and men.***
- ***Choose proper and risk-adapted pharmaceutical and invasive management for therapy of coronary artery disease in women and men.***

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