

Women and heart disease



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BACKGROUND

THERE are some worrying facts about women and heart disease. Heart disease is the leading killer of Australian women.¹ Heart disease kills almost three times as many women as breast cancer.² Twenty-two Australian women die from heart disease every day (8207 deaths in 2016).³ Ten Australian women die from a heart attack every day.⁴ An Australian woman dies from a heart attack every two hours.⁵

In 2016, almost half (46.8%) of all deaths from heart attacks were women.⁵

Although women are more likely to experience atypical symptoms (jaw, shoulder, neck and back pain)⁶ when having a heart attack, only one in five women is aware of at least one of the symptoms.⁶

There are a number of traditional and emerging non-traditional cardiovascular disease (CVD) risk factors specific to women, of which doctors

should be aware. This How to Treat summarises these risk factors and how they can be managed to reduce the burden of CVD in women. These risk factors are summarised in box 1.

CARDIOVASCULAR RISK FACTORS IN WOMEN

Traditional risk factors

DIABETES MELLITUS

IN Australia, the prevalence of diabetes in women is 5% (self-reported data), and the prevalence increases with age.⁷ Diabetes is a potent risk factor for CVD and confers a greater risk for CV death in women compared with men.⁸ In one meta-analysis, the relative risk (RR) for CVD was 44% and greater in women with diabetes than in men with diabetes.⁹ Women without diabetes have a threefold excess risk of fatal coronary artery disease (CAD) compared with women without the condition.¹⁰

HYPERTENSION

One in four (28.3% or 1.8 million) Australian women aged 35 and over have high BP (140/90 mmHg or higher).¹¹ Premenopause, endogenous oestrogens maintain vasodilation and contribute to BP control, but BP increases after menopause. Women develop hypertension a decade after men, but it becomes more prevalent, and is often poorly controlled in elderly women compared with elderly men.^{12,13}

SMOKING

One in seven (1.2 million) Australian women smoke. Women aged 18-24 have the highest rate of smoking (more than one in six).⁵ In all age groups (with the exception of those aged 30-44) women had a 25% increased risk for CAD conferred by cigarette smoking compared with men.¹⁴ Women who smoke have a 300% greater risk of CAD, compared ▶

INSIDE

Cardiovascular risk factors in women

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Box 1. CVD risk factors for women**Traditional CVD risk factors**

Diabetes
Smoking
Obesity and overweight
Physical inactivity
Hypertension
Dyslipidaemia
Family history of premature CAD
Non-traditional CVD risk factors
Pregnancy complications
• Hypertensive disorders in pregnancy (including pre-eclampsia)
• Gestational diabetes
• Preterm delivery
• Small for gestational age
Polycystic ovarian syndrome
Endometriosis
Autoimmune diseases
Breast cancer treatment
Depression
Early onset menopause/
surgical menopause

◀ with non-smoking women.

OBESITY AND OVERWEIGHT

More than one in four Australian adult women are obese (27.4% or 2.5 million) or overweight (28.8% or 2.6 million), and this has been increasing. The average BMI of an adult woman is 27.1, placing her in the overweight category.¹ Obesity has a greater impact on the development of CAD in women than in men. In the Framingham heart study, obesity increased the RR of CAD by 64% in women as opposed to 46% in men.¹⁵ In addition, compared with BMI, elevated waist-to-hip ratio was an 18% stronger predictor of myocardial infarction in women and a 6% stronger predictor of MI in men.¹⁶ Thus women with an 'apple shape' are at greater risk.

PHYSICAL INACTIVITY

Seventy-six per cent of Australian women are physically inactive.¹⁷ Physical inactivity is associated with increased CVD, while higher levels of activity are associated with lower rates of CVD.¹⁸

DYSLIPIDAEMIA

One in three (33.2% or 2.9 million) Australian adult women had high cholesterol (5.5mmol/L or higher) in 2011/12.¹⁹ Dyslipidaemia has the highest population adjusted risk among women at 47.1% compared with other known risk factors for CVD.²⁰

FAMILY HISTORY OF PREMATURE CAD

Women whose parents have had a MI aged under 60 have a five times greater CAD mortality. Premature CAD in a first-degree female relative is a relatively more potent risk factor than is premature CAD in male relatives.

Non-traditional CVD risk factors**PREGNANCY COMPLICATIONS**

The physiological and metabolic demands of pregnancy serve as a 'stress test'. Thus, pregnancy complications may unmask predisposition to CVD.

HYPERTENSIVE PREGNANCY DISORDERS

These include gestational hypertension, chronic hypertension and



pre-eclampsia. Gestational hypertension is new-onset hypertension greater than 140/90mmHg after 20 weeks' gestation in a woman who was originally normotensive.

Women with hypertension before 20 weeks' gestation are diagnosed with chronic hypertension.

Women with a history of pre-eclampsia or gestational hypertension are at increased risk of hypertension and heart disease later in life (2-4 times).²¹ Each year, up to 30,000 Australian women can develop high blood pressure in pregnancy.²²

GESTATIONAL HYPERTENSION Gestational hypertension has a risk of increased CVD and hypertension, but the risk is not as great as in women with pre-eclampsia. Women with gestational hypertension have an increased risk of ischaemic heart disease, MI, fatal MIs, heart failure,

ischaemic stroke, kidney disease and diabetes.²³

The increased risk of chronic hypertension is high immediately after pregnancy. The rate of hypertension is 3-10-fold higher in the first 1-10 years post-pregnancy and remains twice as high 20 years later in

4 PAGE 18 those with hypertension during pregnancy. It is also higher for first-time older mothers.²⁴

PRE-ECLAMPSIA

Pre-eclampsia is new-onset hypertension (greater than 140/90mmHg) after 20 weeks gestation, proteinuria (0.3g/24h) and end organ dysfunction.

Women with pre-eclampsia have an increased risk of developing hypertension, ischaemic heart disease, stroke, and VTE.²⁵ Earlier pre-eclampsia is associated with poorer outcomes; and the more severe the pre-eclampsia, the greater the severity of CVD in later life. Recurrent pre-eclampsia is associated with a significantly greater risk of CVD (twice the risk of atherosclerosis than in women with non-recurrent pre-eclampsia).²⁶

The largest meta-analysis, (of more than 6.4 million women with 34 years of follow-up), demonstrated that women with a history of pre-eclampsia have a 71% increased risk of CVD mortality, a 2.5-fold increase in risk of CAD and a fourfold increase in heart failure when compared with women without pre-eclampsia.²⁷

In addition, women with pre-eclampsia and an additional complication, such as preterm delivery or small-for-gestational-age infant, are at even greater cardiovascular risk than women with pre-eclampsia alone. A Norwegian study found women with pre-eclampsia alone had a twofold increased risk of a major coronary event, but those with pre-eclampsia and preterm delivery or a small-for-gestational-age infant were four times more likely to have a major coronary event than women with uncomplicated pregnancies.²⁸

GESTATIONAL DIABETES

Gestational diabetes is newly diagnosed diabetes beyond the first trimester of pregnancy.

Around 10-13% of pregnant women in Australia develop gestational diabetes, which is associated with an increased risk of type 2 diabetes and CVD later in life.²⁹ Gestational diabetes increases the risk of developing type 2 diabetes sevenfold, with one-third of women developing the condition in the 3-5 years after delivery, and nearly 70% of women developing type 2 diabetes more than 10 years post-partum.³⁰

In one study, gestational diabetes was associated with a 71% greater risk of future CVD events.³¹ Other studies have found those with gestational diabetes have a 43% higher risk of developing CVD (MI or stroke). Those who developed type 2 diabetes had a fourfold elevation in risk, while those without interim type 2 diabetes had a 30% increased risk for cardiovascular events.^{32,33}

Gestational diabetes confers a 26% increased risk of future hypertension.³⁴ The combination of gestational diabetes and high blood pressure in the same pregnancy increases a woman's future risk of diabetes 37-fold, and she has a six times higher risk of future hypertension. There is also an increased CVD mortality in those with both gestational diabetes and hypertension compared with those who have either gestational diabetes or hypertension alone.³⁵

PRETERM DELIVERY

Preterm delivery birth at less than 37 weeks' gestation is an independent risk factor for subsequent long-term



Fetal ultrasound at 37 weeks' gestation. (above)

Around 10-13% of pregnant women in Australia develop gestational diabetes. (left)



cardiovascular morbidity. The Nurses Health Study II found that preterm delivery was independently associated with a 42% greater risk of CVD and a meta-analysis found preterm delivery was associated with a 38% increased risk of ischaemic heart disease, 71% increased risk of stroke, and twofold increased risk of overall CVD.^{36,37} The risk for CVD is further increased with a history of early preterm delivery (less than 32 weeks' gestation), and recurrent preterm delivery.³⁸

LOW BIRTHWEIGHT OR SMALL-FOR-GESTATIONAL-AGE
Low birthweight or small-for-

gestational-age babies are smaller in size than normal for their gestational age and fetal sex, with birth weights below the 10th percentile for the gestational age at delivery. A number of cohort studies have found women with small-for-gestational-age infants are about twice as likely to experience future CVD.^{39,40} This association increases with severity of small-for-gestational-age.

Women with small-for-gestational-age infants also have increased mortality, with a Danish registry noting a 2.5-fold increase in death from cardiovascular causes and a 1.9-fold increase in all-cause mortality in this cohort.⁴¹ A meta-analysis

also demonstrated a 33% increase in maternal cardiovascular mortality associated with roughly each 500g decrease in infant birthweight.⁴² Those with a combination of preterm delivery and small-for-gestational-age infants are at even higher risk of CVD.⁴³

MISCARRIAGE

Women with more than one miscarriage have an increased rate of MI (1.13 x), cerebrovascular infarction (1.16 x) and renovascular hypertension (1.2 x) compared with women with no miscarriages, and the rates for all three outcomes increases with the number of miscarriages.⁴⁴ A UK

biobank study found adjusted hazard ratio for CVD, were 1.04 for each miscarriage, and 1.14 for each still birth.⁴⁵

NON-PREGNANCY-RELATED CVD RISK FACTORS

Polycystic ovarian syndrome/insulin resistance

THIS increases risk for future development of CVD, and probably increases the risk of developing hypertension. Women have a higher risk of developing diabetes and an increased prevalence of impaired glucose tolerance and metabolic syndrome.



Endometriosis

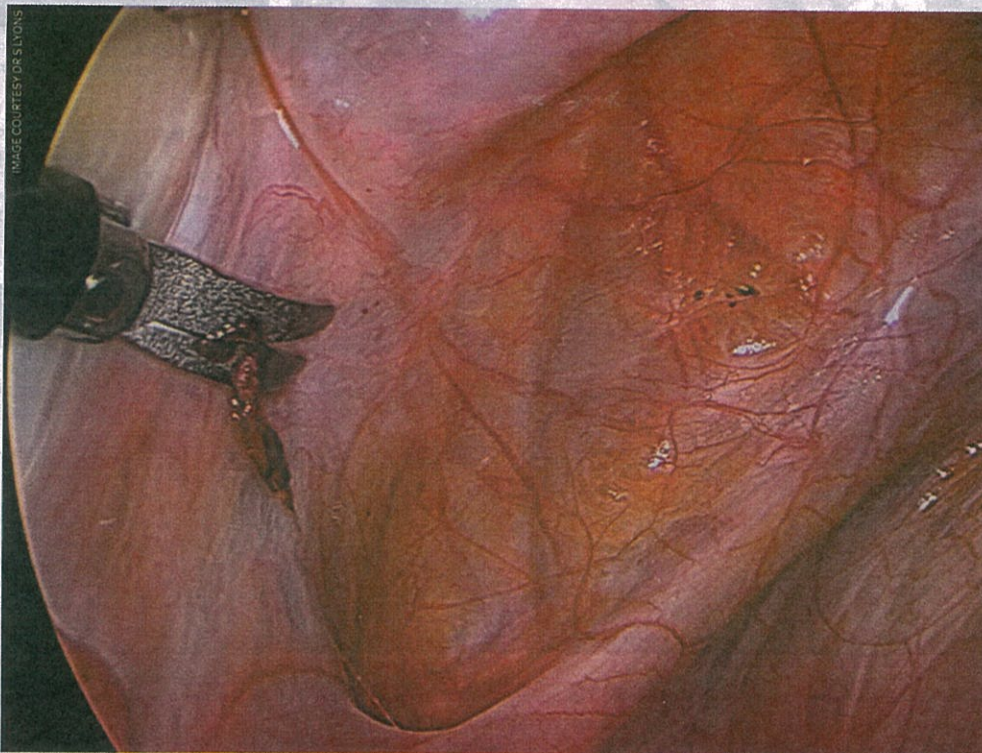
Endometriosis increases the risk for coronary heart disease (MI, angina, CABG/angioplasty/stent) by 62% overall and by 200% in women 40 or younger. Coronary heart disease risk was not increased in women older than 55.⁴⁶ Compared with women without endometriosis, women with endometriosis were 1.52 times more likely to have an MI, 1.91 times more likely to develop angiographically confirmed angina, and 1.35 times more likely to need CABG surgery, a coronary angioplasty or a stent (independent of cofounders such as the oral contraceptive pill or HRT use). However, 42% of the association between coronary heart disease and endometriosis could be explained by greater frequency of hysterectomy/oophorectomy and earlier age at surgery.⁴⁶

Autoimmune diseases

Both male and female patients with inflammatory diseases such as rheumatoid arthritis (RA) and SLE have increased mortality, mainly as a consequence of CVD.⁴⁷ There is a female predisposition in the prevalence of these disorders, making it a common risk factor in women – female-to-male ratio for RA is 2.5:1; for SLE, the ratio is 9:1. Patients with RA have a 2-3-fold higher risk of MI and a 50% higher risk of stroke.⁴⁸ The greater the RA disease activity, the higher the risk of MI. For SLE, the risk of MI is increased 9-50-fold higher than that in the general population.⁴⁹

Radiation and chemotherapy for breast cancer

Radiotherapy for breast cancer often involves exposing the heart to ionising radiation, which increases the risk of subsequent ischaemic heart disease. The risk is proportional to the mean dose to the heart, beginning within a few years after exposure and continuing for at least 20



Patients with inflammatory diseases such as rheumatoid arthritis have increased mortality. (above)

There is an association between coronary heart disease and endometriosis (pictured at laparoscopy). (left)

the development of CAD and portends an unfavourable outcome after a CAD event.⁵⁰ In younger women, it is a particularly powerful risk factor.⁵¹ Younger women have higher rates of depression and also higher mortality rates after acute MI than men.^{54,55}

MENOPAUSE AND CVD

PREMENOPAUSAL women are relatively protected against CVD compared with age-matched men. After menopause, the risk increases to equal that of men. Thus hormone replacement therapy was hypothesised to be cardioprotective. This

has subsequently been refuted by many randomised clinical trials.^{56,57} Further review of trials has found that oestrogen-only HRT may have favourable CAD outcomes in younger women, reducing the risk in women under 60, but not in older women.^{58,59} Current guidelines recommend that HRT at the lowest effective dose is not appropriate for treatment of menopausal symptoms in early (within five years) of menopause, but should not be prescribed for the sole purpose of preventing CVD.⁶⁰

Early-onset menopause

Women who experience early-onset menopause (younger than 45) carry

an increased cardiovascular risk – for overall CAD, fatal CAD, overall stroke, stroke mortality, CVD mortality and all-cause mortality.⁶¹

Another study found those who had menopause before 47 were 33% more likely to develop cardiovascular disease and 42% more likely to have a stroke than women who went through menopause later.⁴⁵

Surgical menopause

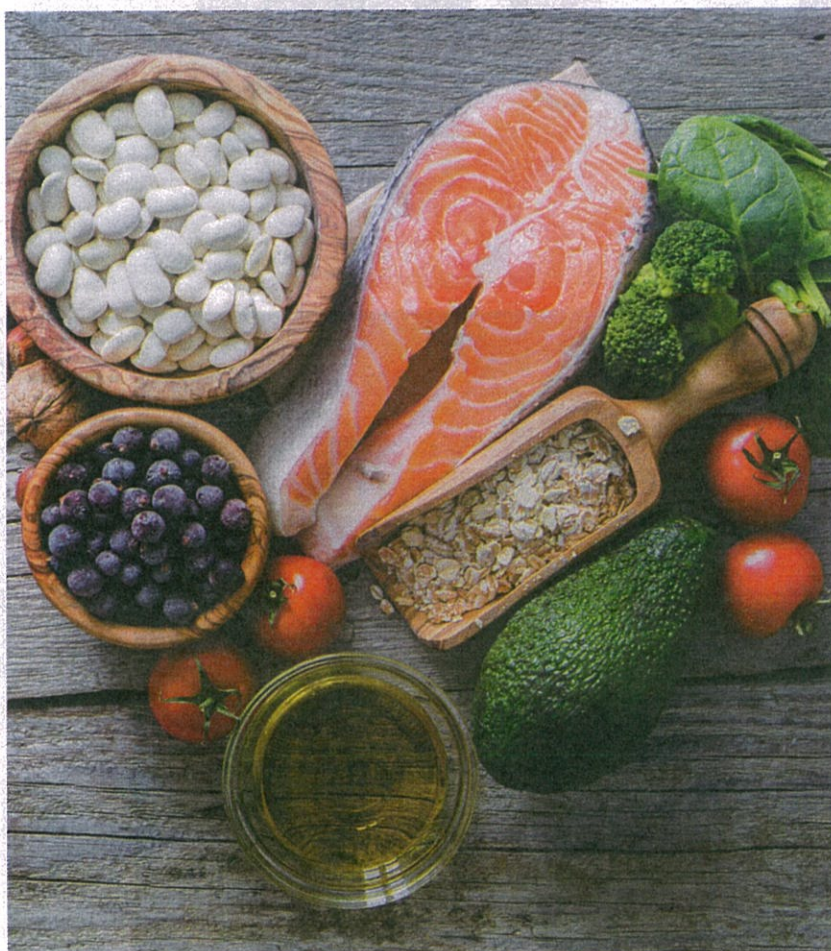
Surgical menopause in young women is associated with increased risk for development of premature CVD.⁶² Those who had a hysterectomy were 12% more likely to develop cardiovascular disease, and the increased

Table 1. Traditional cardiovascular risk factors and management

Risk Factor	Management
Diabetes mellitus	Aggressive management of CVD risk factors Women may require greater frequency/intensity of physical activity than men to reduce CVD events
Hypertension	Encourage lifestyle modifications for optimal BP control (diet, exercise, and avoiding excess alcohol and sodium) Pharmacotherapy is indicated in those with high atherosclerotic cardiovascular risk and stage 2 hypertension (BP greater than 140/90mmHg), and in those with concomitant diabetes, chronic kidney disease, ischaemic heart disease, or heart failure
Dyslipidaemia	Lifestyle modification: diet and exercise Statins for secondary prevention in moderate to high CVD risk
Obesity	Women should lose weight through physical activity and diet. For weight loss or sustaining weight loss, women must exercise a minimum of 60-90 minutes of at least moderate intensity on most – preferably all – days of the week
Physical inactivity	Encourage 150minutes/week of moderate exercise or 75 minutes/week of vigorous exercise, or an equivalent combination
Smoking	Advise women not to smoke and to avoid second-hand smoke. Counselling, nicotine replacement, and medical +/-behavioural therapy should be advised

Table 2. Pregnancy history

Suggested pregnancy history questions	Target adverse pregnancy outcomes
How many pregnancies have you had?	
How many miscarriages have you had?	
Any babies delivered early (more than three weeks before your due date) - How many? - Were they delivered early because you were ill or did you go into labour early?	Preterm delivery, pre-eclampsia
Hypertension in any pregnancy? - Any protein in your urine during pregnancy?	Gestational hypertension, pre-eclampsia
Pre-eclampsia in any pregnancy? - Which pregnancy? - How many times? - Early delivery because of pre-eclampsia? - How many weeks before due date was delivery?	Pre-eclampsia
Family history of pre-eclampsia?	Pre-eclampsia
Gestational diabetes during any of your pregnancies? - Which pregnancy? - How many times? - Did you require insulin or oral medication to reduce blood glucose?	Gestational diabetes
Birth weight of each baby? - How many weeks before due date were they delivered?	Small-for-gestational age or preterm delivery
Number of pregnancies you breastfed? Number of months after each pregnancy?	

Source: Adapted from Roberts and Catov⁴³

Healthy eating habits, such as following the Mediterranean diet, reduce stroke/MI or cardiovascular mortality in patients with high cardiovascular risk.

◀ risk is even higher for women who had an oophorectomy as well. **RISK FACTOR MANAGEMENT AND GUIDELINES** IT is important to assess both traditional and non-traditional risk factors in women. The Heart Foundation recommends a heart health check for women over 45. For traditional risk factors, implement the appropriate management strategies (see table 1). Incorporate a pregnancy history (see table 2) to identify those who have a history of pregnancy complications.

These women require regular follow-up and early management of cardiovascular risk factors to reduce their future risk of cardiovascular disease (see box 2). Lifestyle modifications for those who have a history of pregnancy complications are listed in box 3. The management of specific pregnancy complications to reduce future CVD risk is summarised in table 3.

Specific management

PCOS: Screen regularly for diabetes, encourage a healthy diet and regular exercise.

Endometriosis: Refer young women with endometriosis to a cardiologist for evaluation and possible management of their risk factors. Women who have surgical menopause should be aware that this confers a higher cardiovascular risk.

Early menopause/surgical menopause: In those who experience menopause before age 45, consider control of hypertension, dyslipidaemia and insulin resistance earlier, as they are considered at higher risk of CVD.

CVD and breast cancer: Recognise that for postmenopausal women, CVD poses a greater mortality threat than

Box 2. Reducing cardiovascular risk in those with pregnancy related complications

- Identify those at risk (take a pregnancy history – table 2)
- Counsel women regarding their increased cardiovascular risk and advise on risk reduction
- Measure BP, lipids, BSL and insulin regularly
- Advise lifestyle modification (see box 3)
- Pharmacological treatment: antihypertensives, statins, diabetic medications if required
- There is some evidence for metformin and pioglitazone in reducing diabetes incidence in those with GDM^{44,45}

Box 3. Lifestyle modifications for those with a history of pregnancy related complications

- Diet modification and regular exercise: the Mediterranean diet reduces stroke/MI or cardiovascular mortality in patients with high cardiovascular risk. Dietary interventions reduce the risk of GDM, gestational hypertension and preterm birth⁴⁶
- Physical activity before and in early pregnancy is significantly associated with lower GDM risk⁴⁷
- Maintain smoking cessation
- Avoid weight gain: interpregnancy weight gain is associated with an increased risk of gestational diabetes, preeclampsia and gestational hypertension with a subsequent pregnancy⁴⁸
- Breast feeding: feeding for more than 12 months decreased CVD (by 72%), decreased the occurrence of hypertension, diabetes, and hyperlipidaemia. The longer the lactation the lower the cardiovascular risk. Even more than three months of breastfeeding is associated with a lower risk of type two diabetes progression, breastfeeding for more than five months is linked to a 50% reduced incidence of type two diabetes in women who have had GDM. In a large study in China, women who breastfed were 12% less likely to have CVD, 9% less likely to have CAD, and 8% less likely to have a stroke compared with women who had children but never breastfed.^{49,50}

the breast cancer itself. Guidelines recommend echo evaluation (assessing LV function/strain) based on signs and symptoms, along with echo surveillance five years after treatment⁵¹ in high-risk (for example, anthracycline chemotherapy) patients and 10 years in all other patients⁵². Refer high-risk patients for a functional (non-invasive stress test within 5-10 years of completing chest radiation therapy.⁵³ Adhering to seven heart-healthy behaviours is associated with a trend toward a lower incidence of breast cancer and a significantly lower risk of CVD.⁷⁸ These

include being physically active, achieving and maintaining a healthy body weight, eating a healthy diet, avoiding tobacco, and maintaining healthy levels of BP, cholesterol and blood sugar.

CASE STUDY

OLIVIA, 45, comes to see you because she would like to have liposuction as she is overweight. She has not seen you before, but was seen at the practice 15 years ago for a six-week post-partum check-up for herself and for the baby. She has since been lost to follow-up. PAGE 24 ▶

Table 3. Managing specific pregnancy complications

Adverse pregnancy outcome	Recommendations
Gestational hypertension or pre-eclampsia	Educate patient about the increased risk of hypertension and CVD later in life. Follow-up regularly with BP (aim for less than 120/80), lipids, fasting glucose and BMI. Encourage a healthy lifestyle with weight loss, physical activity and smoking cessation. Maintain a BMI under 25kg/m ² (obesity increases hypertension). ⁷⁰ Consider the DASH (Dietary Approaches to Stop Hypertension) diet, lowering sodium intake and minimising alcohol use. Consider aspirin prophylaxis in future pregnancies in those with pre-eclampsia. ⁷¹ Encourage breastfeeding if possible.
Gestational diabetes	Screen for persistent diabetes 6-12 weeks postpartum and every 1-3 years depending on other risk factors (eg, family history, pre-pregnancy BMI, need for medication during pregnancy). Advise women that they have an increased risk of developing type 2 diabetes and increased CVD risk, and that lifestyle modifications can reduce their risk.* Encourage healthy eating patterns** and lifestyle intervention to support weight loss. Prescribe/encourage regular exercise. Check BP, lipids and blood glucose annually. Screening early for gestational diabetes (prior to 28 weeks) in those at higher risk of the condition, eg, those with obesity, previous gestational diabetes, PCOS, metabolic syndrome, a first-degree relative with diabetes, or in those with a high BP/abnormal cholesterol profile. Encourage breastfeeding if possible.
Preterm delivery/small-for-gestational-age infants	There is no real consensus or guideline as to when to screen, however, GPs can increase the patient's awareness of their increased CV risk and follow-up their risk factors.

* In the Harvard Nurses' Health Study II, the women with gestational diabetes who followed healthy lifestyle practices (such as maintaining a healthy weight, regular physical activity, not smoking and following a heart healthy diet) had no significant increased risk of developing cardiovascular disease. Women who did not follow these lifestyle practices, or who followed only one or two of them, had a substantial increase in risk.

** Having a healthy diet (DASH diet, Mediterranean diet, and alternative healthy eating index) reduces the risk of developing hypertension in patients with gestational diabetes by 20-30%.⁷²



Key points

- Heart disease is the number one killer of Australian women.
- Traditional cardiovascular risk factors are common in women and have a greater impact on cardiovascular risk than in men. Women should have a heart health check if they are over 45 or postmenopausal.
- Certain pregnancy-related complications increase future cardiovascular disease. Include a pregnancy history when evaluating a woman's cardiovascular risk and provide regular follow-up.
- Other emerging risk factors for heart disease include autoimmune disease, PCOS, endometriosis, treatment for breast cancer and depression.
- Recognising women at risk allows early intervention with lifestyle modification with or without pharmacotherapy, which will help to reduce the burden of cardiovascular disease in women.

4 PAGE 22 The notes from that consultation reflect a discussion about the increased risks of CVD, diabetes and hypertension associated with gestational diabetes. Recommendations included a healthy diet, maintaining a normal weight, regular exercise and no smoking. Olivia was

referred for a follow-up blood sugar, HbA1c and lipids (at 6-12 weeks post-partum and again every 1-3 years), but tells you she felt well at that stage so did not have the tests. Her BP was noted as normal.

Olivia did breastfeed the baby, who was born at term. She did not

have any other pregnancy-related complications.

On examination, her BMI is 29, BP 150/90, and HR 60bpm and regular. You assess for other CVD risk factors and order some investigations: total cholesterol 6.3mmol/L, triglycerides 2.3mmol/L, HDL 0.7mmol/L, LDL

4.4mmol/L. Her BSL was 10mmol/L, and HbA1c was 8%. You order an oral glucose tolerance test.

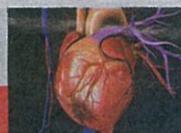
You advise Olivia that she can help manage her hypertension, diabetes and dyslipidaemia with lifestyle interventions. She will need to lose weight, reduce her blood

pressure, cholesterol and BSL through diet and regular exercise. If lifestyle measures do not result in an improvement, you may need to consider pharmacological intervention. You also consider a cardiology review given her increased cardiovascular risk.

This case highlights how gestational diabetes increases future cardiovascular risk as Olivia has developed hypertension, diabetes and high cholesterol.

How to Treat Quiz.

WOMEN AND HEART DISEASE



GO ONLINE TO COMPLETE THE QUIZ www.howtotreat.com.au

1. Which TWO statements regarding women and heart disease are correct?

- In Australia, heart disease kills almost three times as many women as breast cancer.
- Risk factors for cardiovascular disease are the same in both men and women.
- Women are more likely to experience atypical symptoms (jaw, shoulder, neck and back pain) when having a heart attack.
- In 2016, almost three times as many men than women died from heart attacks.

2. Which THREE are traditional risk factors for CVD?

- Diabetes.
- Depression.
- Physical inactivity.
- Dyslipidaemia.

3. Which THREE are non-traditional risk factors for CVD?

- Obesity and overweight.
- Pregnancy complications.
- Breast cancer treatment.
- Early onset menopause.

4. Which TWO statements regarding traditional cardiovascular risk factors in women are correct?

- Diabetes is a potent risk factor for CVD and confers a greater risk for CV death in women than in men.
- Pre-menopause, endogenous

progesterones maintain vasodilation and contribute to BP control, but BP increases after menopause.

- Women who smoke have a 300% greater risk of COPD compared to with non-smoking women.
- Women with an 'apple shape' are at greater CVD risk than those who are pear shaped.

5. Which TWO statements regarding non-traditional CVD risk factors for women are correct?

- Gestational hypertension does not increase the risk of developing hypertension post-pregnancy.
- Women with a history of pre-eclampsia or gestational hypertension are at increased risk of hypertension and heart disease later in life.
- Gestational diabetes is associated with an increased risk of type 2 diabetes, but not CVD, later in life.
- Women with pre-eclampsia and an additional complication, such as preterm delivery, are at even greater cardiovascular risk than

women with pre-eclampsia alone.

6. Which THREE statements regarding the non-traditional CVD risk factors for women are correct?

- Women with small-for-gestational-age infants are about twice as likely to experience future CVD.
- Those with a combination of preterm delivery and small-for-gestational-age infants are at an even higher risk of CVD.
- Preterm delivery (birth at less than 32 weeks' gestation) is an independent risk factor for subsequent long-term cardiovascular morbidity.
- Women with more than one miscarriage have an increased rate of MI, cerebrovascular infarction, and renovascular hypertension compared with women with no miscarriages.

7. Which TWO are non-pregnancy related CVD risk factors?

- Osteoarthritis.
- Endometrial polyps.
- Polycystic ovarian syndrome.
- Depression.

8. Which THREE statements regarding menopause and CVD are correct?

- Pre-menopausal women are relatively protected against CVD compared with age-matched men.
- Current guidelines recommend that HRT at the lowest effective dose is appropriate treatment for the sole purpose of preventing CVD.
- Women who experience early-onset menopause carry an increased cardiovascular risk.
- Surgical menopause in young women is associated with increased risk for developing premature CVD.

9. In which TWO situations is pharmacotherapy indicated in the management of hypertension when there are additional CVD risk factors?

- BMI greater than 30.
- BP greater than 140/90mmHg.
- Postmenopausal women.
- Chronic kidney disease.

10. Which THREE are indicated in the management of gestational hypertension or pre-eclampsia?

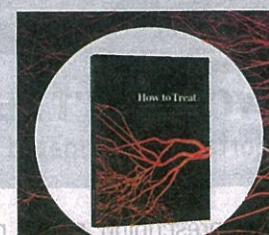
- Aspirin prophylaxis in future pregnancies in those with gestational diabetes.
- Follow-up regularly with BP, lipids, fasting glucose and BMI.
- Encourage breastfeeding if possible.
- Maintain a BMI under 25kg/m².

CONCLUSION

HEART disease is the number one killer of Australian women. Most of us are aware of the traditional risk factors for CVD, however, there are many emerging non-traditional risk factors specific to women, particularly pregnancy-related complications. Identifying these women at risk allows us to start intervention early with the aim of reducing the burden of cardiovascular disease in women.

References

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