

# CHOLESTEROL AND THE MENOPAUSE

**A CONTROLLABLE RISK FACTOR FOR CARDIOVASCULAR DISEASE IN WOMEN**

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## FOREWORD

Menopause affects all women and although there is widespread awareness of the common early menopausal symptoms such as hot flushes, sweats and mood changes, there continues to be very poor appreciation of the important long-term effects of estrogen lack on the cardiovascular system.

Since cardiovascular disease increases after the menopause and is by far the leading cause of death of menopausal women, much more must be done to inform both women and health professionals of the problem so that preventive action can take place.

Firstly, there should be wider understanding of the extent and of the serious consequences of the problem; the common belief that cardiovascular disease is a problem of middle-aged men and not women must be challenged immediately so that not only can early signs in women be better recognised and treated, but also so that screening for risk factors in women from age 45 can become the norm and preventive action be taken.

Raised cholesterol, which frequently occurs with the menopause, is a significant risk factor for cardiovascular disease, the detection of which and subsequent lowering can lead to reduced risk. Increased use of a simple cholesterol test should become part of the general assessment when counselling women presenting with menopausal symptoms. In considering the best approach for the treatment of raised cholesterol, consideration needs to be given to the fact that women in this age group frequently express preference for diet and lifestyle change, rather than use of drugs.

This review is long overdue. The statistics highlight the massive problem of poor recognition of the extent of cardiovascular disease and the menopause and the review goes a long way in offering suggestions to tackle the problem.

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## EXECUTIVE SUMMARY

### Cardiovascular disease in women

#### Women are nine times more likely to die of CVD than breast cancer

Cardiovascular disease (CVD) is the leading cause of death worldwide. A common misconception is that it primarily affects middle-aged men; in fact:

- ◆ CVD affects just as many women as men.
- ◆ More women die from heart disease and stroke than the next five causes of death combined, including breast cancer.
- ◆ Globally, women are nine times more likely to die of CVD than breast cancer.

The perception that CVD is a male problem means that women tend not to be screened or treated effectively. The difference in age when risks develop, and the fact that symptoms present differently in women, may affect approaches to their prevention and treatment.

#### The menopause increases the risk of CVD

Hormonal changes triggered by the menopause are an important reason for the gender differences in risk and presentation of CVD symptoms.

- ◆ Women, on average, develop CVD risk factors ten years later than men, largely due to hormonal changes related to the menopause.
- ◆ Female hormonal activity protects women during their fertile years but fades after the menopause, leaving women with untreated risk factors vulnerable to heart disease and stroke.

### Menopausal symptoms

#### A result of hormonal changes that can also affect women's long-term health

The loss of metabolically active hormones produced by the ovaries can begin as early as the age of 45, well before the onset of the menopause.

- ◆ The last period occurs, on average, at the age of 52 and the transition from normal ovarian function to menopause may last for up to five years.
- ◆ Hormonal fluctuations can lead to a range of physical and psychological symptoms including hot flushes, night sweats, urogenital problems and depressed mood.

Hormonal changes related to the menopause also have significant but less obvious effects on women's whole body metabolism:

- ◆ The loss of ovarian estrogen reduces bone density, increasing the risk of developing osteoporosis, and also leads to a progressive increase in the risk of CVD in menopausal women, which is less well-known.
- ◆ Women seek help for short-term physical symptoms without realising that 'silent' metabolic changes are taking place, which could also affect their long-term health.

Women in developed countries can expect to live up to a third of their lifetime after the menopause so their long-term health is an important consideration.

Preventive action to reduce CVD risk factors such as elevated cholesterol and hypertension should be actively promoted before, as well as during, the menopausal transition.

## The menopause, cardiovascular disease and cholesterol

### Menopause triggers progressive increase in cholesterol that increases CVD risk

During the menopause, there is a shift in fat distribution and storage in women from the lower body ('pear' shape) to the upper body ('apple' shape) around the abdominal organs, more resembling that of men.

- ◆ This central lipid redistribution is characteristic of the metabolic syndrome that results in significantly increased risk of CVD, especially in women.
- ◆ An abnormal lipid profile develops progressively during the peri-menopausal years, resulting in a gradual increase in total cholesterol, an increase in LDL-cholesterol and triglyceride levels, and a decrease in HDL-cholesterol.
- ◆ These combined changes in lipid levels significantly increase women's risk of CVD, which has been estimated to increase four-fold over the ten years after the menopause.

### Doctors need to be alert to warning signs

Physical menopausal symptoms are early warning signs that 'silent' metabolic changes are taking place, which are potentially life threatening. Menopausal symptoms should prompt doctors to screen for CVD risk and give advice on controlling modifiable risk factors such as elevated cholesterol and hypertension.

## Implications for public health education

### Awareness of menopause and cholesterol link is low

Expert bodies agree on the need to improve prevention and treatment of CVD in women. For this to happen, doctors and women themselves need to be aware of the problem and sufficiently well-informed to take preventive action.

Recent surveys conducted in five European countries among doctors and women over 45 revealed the need to promote greater awareness of the true risk of CVD in women:

- ◆ Only one third of doctors and a similar number of women aged 45-65 are aware that menopausal women are at equal or greater risk of heart disease than men.
- ◆ Most doctors recognise CVD as a concern in menopausal women but fewer than half rank it as the most significant risk.
- ◆ Women seriously underestimate their risk of CVD, being more concerned about osteoporosis, breast cancer and physical menopausal symptoms. Fewer than one in four women lists heart disease as a concern.
- ◆ Only one in four women associates the menopause with high cholesterol and fewer than one in three associates it with heart disease.

### **Greater awareness needed to improve prevention**

The surveys suggest that women may not receive appropriate prevention advice from their doctor.

- ◆ Only a small minority of doctors regard raised cholesterol as a serious health risk.
- ◆ Only a third of doctors say they include a cholesterol check in their most frequent advice to women over 45.
- ◆ Fewer than half of women aged 45-65 report being advised by their doctor to check their cholesterol levels.

On the general issue of dealing with menopausal symptoms, women indicated a strong preference for adopting the right diet and lifestyle, rather than medication.

## **Diet and lifestyle modification for LDL-cholesterol lowering**

### **Diet and lifestyle change is key for cholesterol reduction**

The World Heart Organisation estimates that 80 per cent of cardiovascular disease could be prevented by positive diet and lifestyle changes. Elevated LDL-cholesterol is widely accepted as a key modifiable risk factor for coronary heart disease:

- ◆ Studies estimate that, on average, lowering cholesterol by 10 per cent will reduce the risk of CHD by 20 per cent.
- ◆ Making positive dietary changes, including replacing saturated fats with a combination of polyunsaturated and monounsaturated fats, as well as keeping intake of trans fats and dietary cholesterol to a minimum, are well-known to lower LDL-cholesterol.
- ◆ There are now also a variety of foods containing specific active ingredients, such as plant sterols/stanols, beta glucan and soy protein, that have been shown to have LDL-cholesterol lowering properties.

### **Positive dietary changes should include plant sterols/stanols**

Experts agree that, of all these dietary changes, one of the most effective ways to lower LDL-cholesterol with dietary change is to include plant sterols or stanols, which reduce the absorption of cholesterol from the intestine.

- ◆ Eating 2-2.5g of plant sterols daily has been shown to lower LDL-cholesterol by 10-15 per cent when combined with moving to a healthy diet and lifestyle.
- ◆ Inclusion of plant sterols results in a reduction in blood LDL-cholesterol with no effect on HDL-cholesterol or triglycerides.
- ◆ Plant sterols and stanols may be a useful adjunct to lipid-lowering medications such as statins and fibrates.

## Conclusions and recommendations

### Women over 45 are inadequately screened and treated for CVD

- ◆ The scale of CVD in women is grossly underestimated amongst both women and their doctors.
- ◆ Because of the low awareness and understanding of the role the menopause plays in significantly increasing the risk of CVD in women over 45, women are inadequately screened and treated.

### Regular cholesterol checks and diet and lifestyle advice should be routine

- ◆ Early intervention and prevention are key to reduce mortality in women, as hormonal changes begin early but symptoms of increasing CVD risk present late.
- ◆ Menopausal symptoms should prompt doctors to discuss steps to reduce heart disease risk with their female patients, and regular cholesterol checks need to be routine for all women over 45.
- ◆ Although cholesterol levels increase significantly around the menopause, elevated LDL-cholesterol is controllable through simple diet and lifestyle changes.

### Greater need for education of women and their doctors

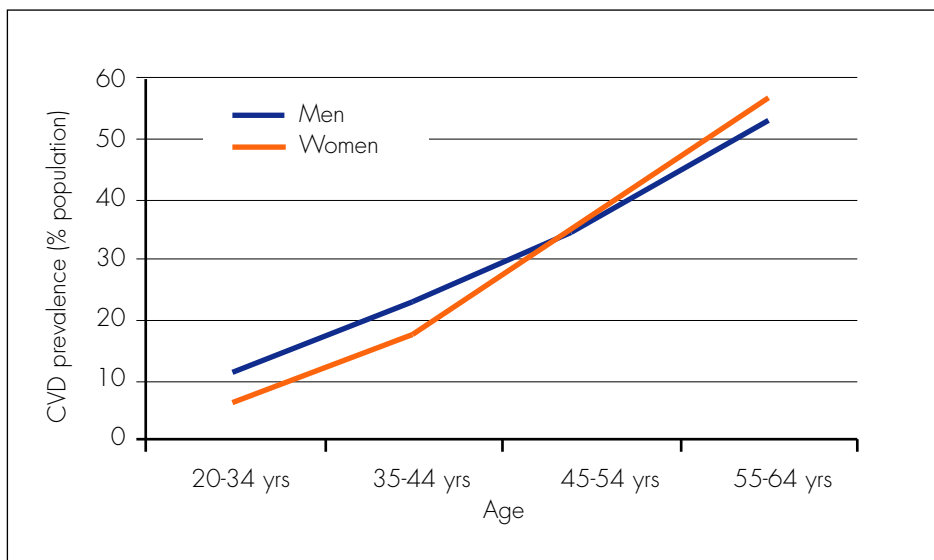
- ◆ Professional Bodies representing the medical and healthcare professionals should actively promote greater awareness and education of their members on the impact of endocrine changes on CVD risk in women over 45.
- ◆ Education aimed at women should be positive and encourage them to realise that they can make realistic changes to their diet and lifestyle to help them take control of their cholesterol levels.
- ◆ Women's health organisations and the media have a significant role to play in raising awareness and communicating simple and relevant advice to women, that could have a real impact on women's long-term health.

## SECTION 1: Cardiovascular disease in women

### CVD is the leading cause of death

Cardiovascular disease (CVD) is the leading cause of mortality worldwide<sup>1</sup> - accounting for a third of all deaths among men and women.<sup>2</sup> CVD is predicted by the World Health Organisation to remain the number one global cause of mortality for decades.<sup>3</sup>

There are still widespread misconceptions about CVD, despite its rising incidence and it accounting for over half of all female deaths in Europe,<sup>1</sup> and one death in every 2.5 women annually in North America.<sup>4</sup> CVD is often thought to be primarily a disease of middle-aged men,<sup>1</sup> but it affects as many women as men, albeit at an older age (Figure 1).<sup>5</sup>



**Figure 1 - The prevalence of CVD in men and women (% of population)<sup>5</sup>**

The risk of CVD as a health problem in women is generally underestimated.<sup>6</sup> Breast cancer is often wrongly reported in the media as the leading cause of death in women but in fact, more women die from CVD every year than the next five causes of death combined, including breast cancer.<sup>5,7</sup> In Europe, CVD accounts for 57% of all female deaths compared with 3% due to breast cancer (Figure 2).<sup>7</sup> Globally women are nine times more likely to die of CVD than breast cancer.<sup>6</sup> The substantial healthcare cost implications of CVD add to its burden (see box).

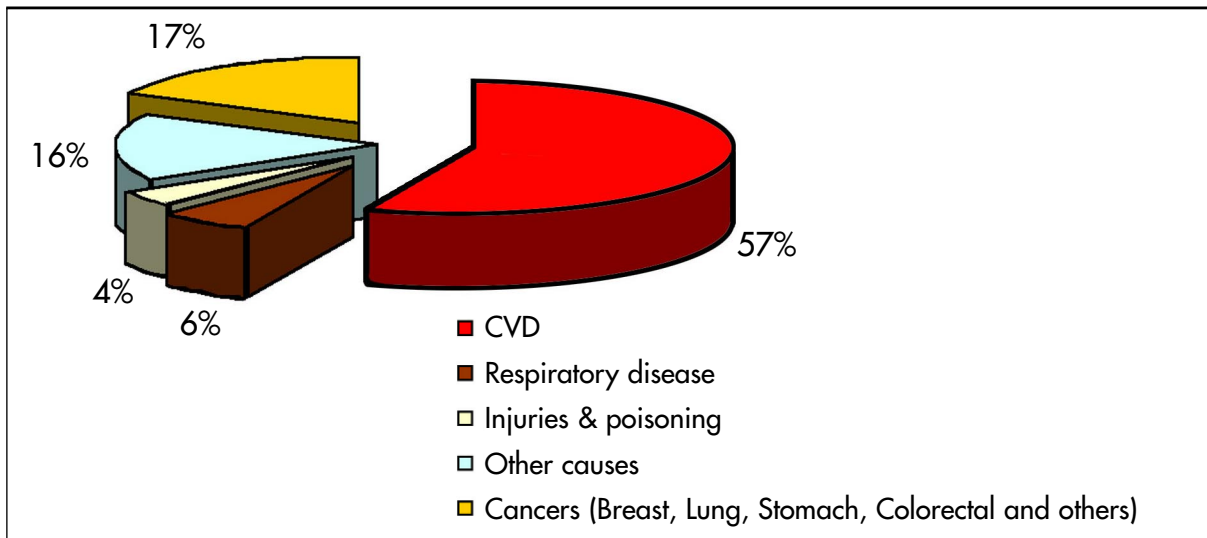


Figure 2 - Causes of death in European women<sup>7</sup>

### Treating CVD has substantial healthcare cost implications

#### Individual countries

[Countries to include local figures e.g. The total healthcare cost of CVD in 2003 for Belgium was €2billion and €1.5billion for Greece.<sup>8</sup>]

#### Europe

**In 2003, the estimated cost of CVD to the EU economy was €169 billion.<sup>9</sup>**

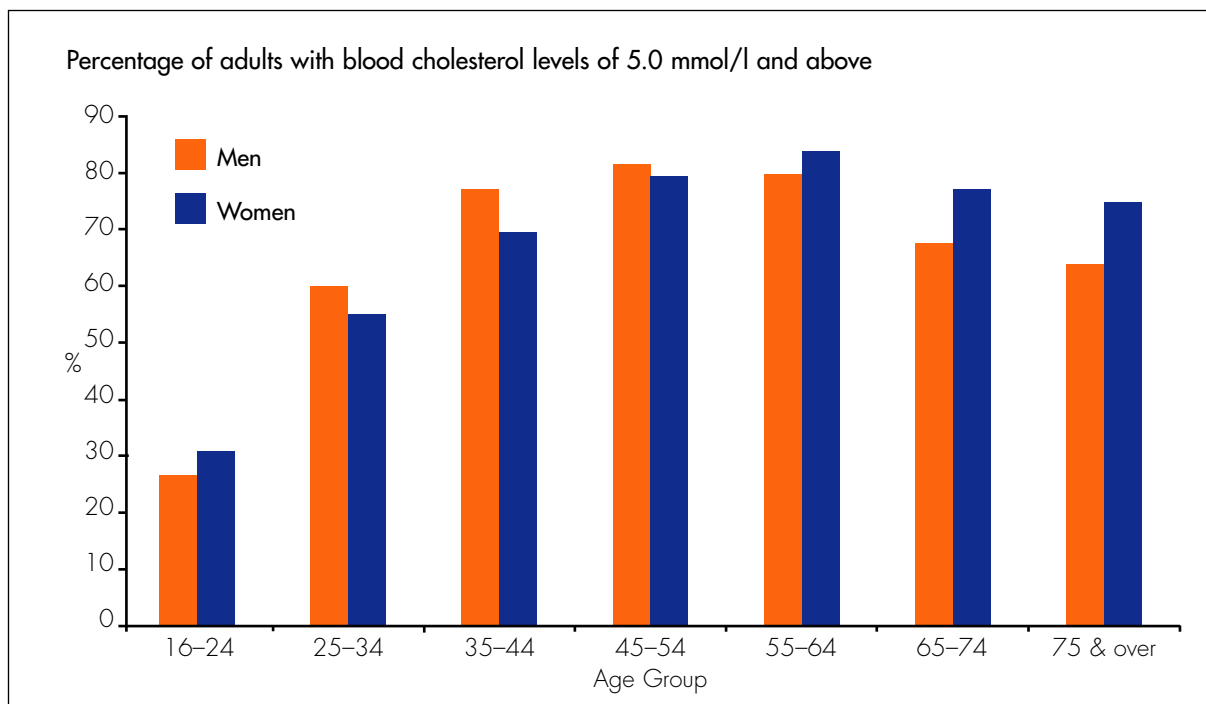
#### United States

**In 2005, the estimated total cost of CVD was €279 billion.<sup>4</sup>**

### CVD risk factors present differently in men and women

Despite the large number of women at risk of CVD, many are not screened and therefore not treated effectively.<sup>1,2</sup> Because of the perception that CVD is primarily a male problem, women and their doctors are less likely to consider the existence of risk factors, such as elevated cholesterol and hypertension, that may affect their CVD treatment and risk reduction.<sup>1</sup>

It has been shown that the prevalence of risk factors in various age groups is different in women when compared with men. Age is an important risk factor for both genders, but women are, on average, ten years older when they develop CVD.<sup>10</sup> Also, the age at which risk factors appear differs between men and women. More women than men develop hypertension as they get older, particularly women over 45.<sup>10</sup> Total cholesterol levels in women peak between 55 and 65 years of age, about a decade later than in men (Figure 3).



**Figure 3 – High cholesterol levels for men and women in England, 2003**

The symptoms of heart disease also manifest themselves differently in women compared with men. For example, women are less likely than men to present with classic cardiovascular symptoms and more frequently have acute myocardial infarctions.<sup>11</sup> Almost two thirds of women who die suddenly of CHD have had no prior symptoms.<sup>4</sup> In the immediate period following acute myocardial infarction, more women die than men.<sup>12</sup> There are also distinct gender differences in responses to treatment.<sup>12</sup> Many clinical trials have been conducted in largely male populations and the results cannot always be extrapolated to women.

### **CVD in women is not well understood**

Research has shown that the majority of health care professionals in primary care are not aware that more women die from CVD than men every year.<sup>6</sup> According to the American Heart Association, “Women’s heart risk (is) underestimated by doctors, resulting in less preventative care than in men”. The situation is similar in Europe. According to a recent survey of health care professionals in Europe, more than two thirds were unaware that women of menopausal age are at equal or greater risk of CVD than middle-aged men (see section 4).<sup>13</sup>

The European Society of Cardiology’s policy statement on cardiovascular disease in women has highlighted the need to raise awareness of CVD morbidity and mortality in women through targeted education, more gender-specific research including greater representation of women in clinical trials, and the implementation of guidelines to improve prevention and treatment of CVD in women.<sup>1</sup>

## The menopause increases the risk of CVD

It is not fully recognised that hormonal changes triggered by the menopause are an important reason for the gender differences in risk and presentation of CVD symptoms. Although women on average develop CVD risk factors ten years later than men, their overall risk is no lower than men's.<sup>6,14</sup> Experts believe that this is probably related to hormonal differences that protect women during their fertile years but fade after the menopause, leaving women with untreated risk factors vulnerable to heart disease and stroke.<sup>1</sup>

The need to reduce major risk factors in women as they approach the menopause is not necessarily recognised by health care professionals. In a recent European survey, less than half of doctors ranked CVD in their top two most significant health risks to menopausal women.<sup>13</sup> Although nearly three quarters of them agreed that the menopause increases the risk of high cholesterol, only 16% regarded raised cholesterol as a serious health risk to menopausal women.<sup>13</sup>

### KEY POINTS

- ◆ More women die of CVD than the next five causes of female deaths combined.
- ◆ Women are nine times more likely to die of CVD than breast cancer.
- ◆ The risk of heart disease and stroke in women is under-recognised and under-treated.
- ◆ Gender differences in the way risk factors and symptoms develop adversely affects prevention and treatment of CVD in women.
- ◆ The menopause increases women's risk of CVD, which is not sufficiently well-recognised.

## SECTION 2: The menopausal symptoms

### Menopausal hormone changes lead to physical and psychological symptoms

Hormonal changes during the menopause account for a number of physical, psychological and physiological changes in women.<sup>15</sup> The loss of major metabolically active hormones produced by the ovaries has been reported to begin after the age of 45,<sup>15,16</sup> several years before the average age of the menopause, which is 52.<sup>17</sup>

The transition time from the beginning of the ovarian decline until the cessation of menstruation lasts on average five years.<sup>16</sup> It is important for health care professionals to understand the endocrine changes that are occurring, and their implications, in order to improve the management of the transition.<sup>16</sup>

During the menopause, hormone secretion is unpredictable and hormonal fluctuations lead to symptoms such as vasomotor symptoms, depressed mood, anxiety, night sweats, hot flushes, and irregular menstruation amongst others.<sup>15,16</sup> Ovarian hormones play an important role in maintaining a sense of well-being and psychological health, which can be impaired by the fluctuating and falling hormone levels.<sup>15</sup> Some menopausal women also report a reduction in sexual function and desire, which corresponds to the low estradiol levels, known to affect sexual response.<sup>15,18</sup>

Urogenital symptoms are also very common as women approach and experience the menopause. Without the production of estrogen by the ovaries, the skin and support tissues of the vulva and vagina become thin and less elastic. This condition, known as vaginal atrophy, is a very common consequence of the menopause and the majority of women will experience some form of symptoms.<sup>19</sup> Vaginal dryness is often the first reported symptom, followed by painful sexual intercourse. Menopausal women also experience urinary tract problems including poor bladder control.<sup>20</sup>

### Women seek medical help primarily for short-term symptoms

The majority of women tend to seek medical help for these immediate or short-term physical and psychological symptoms.<sup>15</sup> However, the hormonal changes that occur during the menopause have less obvious, but still significant and long-term effects on whole body metabolism.

It is widely accepted that the loss of the ovarian hormone estrogen affects skeletal health by reducing bone density, thus increasing the likelihood of menopausal women developing osteoporosis.<sup>18</sup> It is well-documented, though not widely recognised, that the risk of CVD in women increases progressively throughout the menopausal transition.<sup>18</sup> Estrogen deficiency increases the risk of CVD through lipid profile alteration (see Section 3).<sup>18,21</sup> As a consequence, the management of the menopausal transition is particularly important both in the short and longer term.

Whilst they are different diseases, CVD and osteoporosis have a similar underlying physiological mechanism – estrogen loss. Health care professionals should be aware of the likely co-existence of these two conditions<sup>22</sup> and discussions about osteoporosis could act as a trigger to screen for CVD risk in menopausal women.<sup>15</sup>

Women in developed countries can expect to live up to a third of their lifetime after the menopause so their long-term health is an important consideration. The risks of osteoporosis and CVD are significantly increased by the 'silent' metabolic changes taking place both before and during the menopause. Preventive action to reduce risk factors such as elevated cholesterol and hypertension should be actively promoted during the pre- and peri-menopausal years.

### KEY POINTS

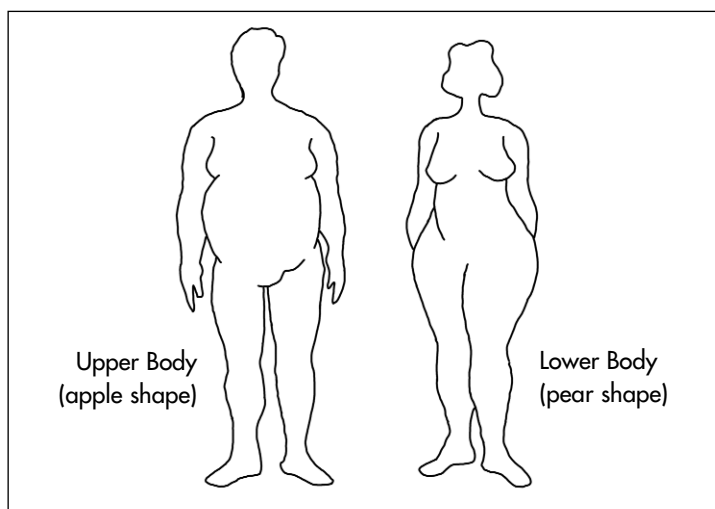
- ◆ Hormonal changes can begin from age 45, several years before onset of the menopause.
- ◆ Fluctuating hormone levels account for unpleasant physical and psychological symptoms.
- ◆ Women seek help for short-term physical symptoms, unaware of the 'silent' underlying metabolic changes also taking place that could affect their long-term health.
- ◆ Menopausal symptoms should act as a trigger to screen for long-term health risks such as CVD.
- ◆ Preventive action to reduce long-term risks should be actively promoted during the pre- and peri-menopausal years.

## SECTION 3: The menopause, cardiovascular disease and cholesterol

### Metabolic changes at the menopause increase CVD risk

During the menopause, there is a shift in fat distribution and storage in women from the lower body ('pear shape') to the upper body ('apple shape'), resembling the abdominal visceral fat storage of men. (Figure 4).<sup>21,23,24</sup>

**Figure 4 - Patterns of body fat distribution**<sup>24</sup>



This central fat redistribution is characteristic of the metabolic syndrome that results in insulin resistance, diabetes and an increased risk of CVD.<sup>24</sup> The adverse impact on CVD risk is greater in women than in men, as shown in a number of prospective studies including the Framingham Study.<sup>25,26,27</sup> Given the impact of overweight and obesity on the metabolic syndrome, and rising rates of obesity, it can be predicted that there will be even greater effects in women than men in the future.

Menopausal age, visceral fat accumulation and increased body mass index are significant predictors of abnormal lipid levels.<sup>21,28</sup> This progressive shift towards an abnormal lipid profile during the peri-menopausal years is significant. The abnormal lipid profile is characterised by a gradual increase in total cholesterol, an increase in low density lipoprotein cholesterol (LDL-cholesterol) and triglycerides, and a decrease in high density lipoprotein cholesterol (HDL-cholesterol) levels.<sup>11,21,23</sup> These changes in lipid levels represent a significant increase in CVD risk for menopausal women, in comparison to both men and pre-menopausal women.<sup>21,28</sup>

### The impact of elevated triglycerides

Many studies have shown that triglyceride levels increase with the transition through the menopause and an increase in triglycerides also appears early in the post-menopausal period. Although men generally have higher triglyceride levels than women, triglyceride levels increase in women aged between 40 and 69 years, but not in men.<sup>24</sup> Increased triglycerides during the menopause are thought to be related to the fact that triglyceride levels are highly correlated with increased abdominal fat content and insulin resistance.<sup>24</sup>

### The impact of raised LDL-cholesterol

LDL-cholesterol is the primary lipid measurement and target of therapy for CVD risk reduction. It is recognised by the National Cholesterol Education Program (NCEP) as the primary modifiable target for CVD risk reduction.<sup>29</sup> It is generally accepted that LDL-cholesterol is the main atherogenic lipoprotein in the development of atherosclerosis.

The levels of LDL-cholesterol in women undergoing the menopause increase significantly by 10-20%,<sup>28</sup> with the greatest change likely to occur in the early transition from pre-menopause to post-menopause.<sup>24</sup>

### The impact of reduced HDL-cholesterol levels

The levels of HDL-cholesterol are also important when determining CVD risk in women.<sup>11</sup> Estrogen tends to raise HDL-cholesterol levels, which may help explain why pre-menopausal women are relatively protected from developing coronary heart disease. Lower levels of HDL-cholesterol may be part of the reason for the increased incidence of heart attacks among post-menopausal women.<sup>29</sup>

### CVD risk in women increases four-fold after the menopause

The Framingham Study suggests that CVD risk in women in the ten years after the menopause increases four-fold, partly as a result of this change in lipid profile.<sup>30</sup> In view of the potentially life-threatening consequences of these changes in lipid levels, physical menopausal symptoms could serve as early warning signs to the 'silent' adverse metabolic and physical changes that are taking place (see box).<sup>15</sup>

#### Spot the warning signs

#### Indicators of need to screen for CVD risk factors in women 45+

- ◆ Irregular menstruation
- ◆ Changes in body-fat distribution: from pear-shape to apple-shape
- ◆ Depressed mood, anxiety
- ◆ Night sweats, hot flushes
- ◆ Decline in libido
- ◆ Vaginal dryness, painful sexual intercourse, bladder changes
- ◆ Osteoporosis

These underlying changes need to be taken into consideration during clinical consultations with menopausal women. In particular, menopausal symptoms are useful warning signs for women and their health care professionals of the need to check for and address CVD risk factors, including elevated cholesterol levels.<sup>11,15</sup>

**KEY POINTS:**

- ◆ Fat storage is redistributed during the menopause from the lower to the upper body, changing the body shape from 'pear' to 'apple', more resembling that of men.
- ◆ This shift in fat storage is characteristic of the metabolic syndrome that leads to significantly increased risk of CVD, particularly in women.
- ◆ Declining estrogen levels progressively disrupt the lipid profile, increasing LDL-cholesterol and triglycerides and lowering HDL-cholesterol, a combination that heightens CVD risk.
- ◆ CVD risk in women increases four-fold over the ten years from the onset of the menopause.
- ◆ Women and their doctors should act on menopausal warning signs to screen for and address CVD risk factors, including managing cholesterol levels.

## SECTION 4: Implications for public health education

Expert bodies including the World Health Organisation, the European Society of Cardiology and the American Heart Association have highlighted the growing problem of CVD in women and the need to improve prevention and treatment. However, this is unlikely to happen unless frontline health care practitioners and women themselves are aware of the problem and sufficiently well-informed to take preventive action.

In order to better understand present levels of awareness, Unilever commissioned two independent surveys of attitudes among doctors and women aged 45-65 in five European countries (UK, France, Germany, Poland and Greece).<sup>13</sup> The surveys were carried out in July/August 2007 among 250 doctors, comprising general practitioners and gynaecologists, and 961 women between the ages of 45 and 65 (see box for key findings).

- ◆ Only a third of doctors (31%) are aware that women of menopausal age are at equal or greater risk of CVD than middle-aged men.
- ◆ Most doctors acknowledge that CVD is the most significant health risk in menopausal women and are also aware that the risk increases with the menopause.
- ◆ However, doctors do not address elevated cholesterol as a priority in their advice to menopausal women, even though it is a major risk factor for CVD.
- ◆ Women aged 45-65 significantly underestimate their risk of CVD, being more concerned about osteoporosis, breast cancer and physical menopausal symptoms.
- ◆ Only one quarter of women aged 45-65 associate the menopause with high cholesterol and fewer than a third associate it with heart disease.
- ◆ Most women (73%) would prefer to deal with menopausal symptoms through diet and lifestyle changes, rather than medication (21%) or complementary therapies (25%).

### Awareness of CVD as a problem in women

Only one third of doctors (31%) and a similar number (34%) of women aged 45-65 are aware that women are at equal or greater risk of heart disease than men. Since experts have commented that this view affects the health advice given to menopausal women, attitudes were explored in more detail.

Doctors were asked to rank the following list of significant health risks for menopausal women according to which they were most - and least - concerned about. Women were asked to select the top three they were most concerned about:

- Breast cancer
- Cervical cancer
- Heart or cardiovascular disease
- Physical symptoms (eg hot flushes)
- Psychological symptoms (eg mood swings)
- Osteoporosis
- Ovarian cancer
- Raised cholesterol

The doctors mentioned CVD first (27%), followed by osteoporosis (21%) and breast cancer (18%). Based on overall ranking, doctors are least concerned about raised cholesterol, physical and psychological symptoms and ovarian and cervical cancer. Despite recognising CVD as the major health risk for older women, one in four doctors puts raised cholesterol bottom on their list of concerns.

Women aged 45-65 significantly underestimate the risk to their health of heart disease. They are most likely to associate the menopause with osteoporosis, followed by high blood pressure and breast cancer. The three risks they are most concerned about are osteoporosis (44%), physical menopausal symptoms (43%) and breast cancer (37%), whereas less than a quarter (23%) mention heart disease. Only 15% mention raised cholesterol as a concern.

### Menopause link to CVD and elevated cholesterol

Although fewer than half ranked CVD as the most significant health risk to menopausal women, the vast majority of doctors (91%) agree that the risk of heart disease increases with the menopause, two thirds (62%) of them agreeing strongly. Fewer, though still the majority (71%), agree that the menopause increases the risk of raised cholesterol. Yet, only 16% regard raised cholesterol as a serious health risk to menopausal women.

Women 45-65 are much less aware of the link, with fewer than half (45%) saying that, as far as they know, the menopause increases cholesterol and the risk of heart disease. One in five women (21%) admits that she does not know.

### CVD risk prevention advice

A further aim of the study was to explore how awareness of health risks associated with the menopause is being translated into preventive advice and treatment. Doctors were, therefore, asked to state which are the top four recommendations they most often make when advising women on the menopause. Their answers are ranked in Table 1.

**Table 1 - Ranking of doctors' recommendations for preventive treatment**

| Doctors' recommendations            | Most commonly recommended |
|-------------------------------------|---------------------------|
| Take more exercise                  | 1                         |
| Lose weight                         | 2                         |
| Give up smoking                     | 3                         |
| Self check for breast cancer        | 4                         |
| Have a smear test                   | 5                         |
| Increase calcium intake             | 6                         |
| <b>Check cholesterol</b>            | <b>7</b>                  |
| Consume low-fat diet                | 8                         |
| Go on HRT                           | 9                         |
| Alternative/complementary therapies | 10                        |
| Eat more soy                        | 11                        |

Although doctors rated heart disease as the risk they were most concerned about in patients of menopausal age, only just over a third (35%) included cholesterol screening in their four most frequent recommendations. As the chart shows, a cholesterol test was way down on the list of advice most often given to women over 45 by doctors.

Women aged 45-65 were asked a similar question about the advice their GP or gynaecologist gives them around managing the menopause. Their perception is ranked according to the advice most often mentioned (percentages in brackets, based on the 70% of total sample who had received advice).

|                                 |       |
|---------------------------------|-------|
| 1. Have a smear test            | (67%) |
| 2. Self check for breast cancer | (67%) |
| 3. Do more exercise             | (49%) |
| 4. Consume a low-fat diet       | (47%) |
| 5. Check cholesterol            | (47%) |
| 6. Eat more calcium             | (40%) |
| 7. Lose weight                  | (36%) |
| 8. Go on HRT                    | (33%) |
| 9. Give up smoking              | (24%) |
| 10. Eat more soy                | (12%) |
| 11. Healthy nutrition (general) | (1%)  |

Overall, just under half (47%) of women 45-65 reported being advised to check their cholesterol levels by their doctor.

### Managing the menopause

To gain insight into potential areas where support and education might be indicated for women facing the menopause, women 45-65 were asked to indicate their preferred way of dealing with the symptoms of the menopause.

Almost three quarters of respondents (73%) said they would prefer to deal with menopausal symptoms by having the right diet and lifestyle. One in four women (25%) mentioned complementary/alternative therapies and one in five (21%) indicated a preference for medication.

### RESEARCH IMPLICATIONS

- ◆ Women over 45 need to be made more aware of their risk of developing CVD and how the menopause increases this risk because of its effect on cholesterol levels.
- ◆ Doctors could play a greater part in educating menopausal women if they routinely advised a cholesterol test alongside other health checks and guidelines.
- ◆ Women are more likely to be motivated by advice related to diet and lifestyle than being offered medication.

## SECTION 5: Diet and lifestyle modification for LDL-cholesterol lowering

### CVD in women is largely preventable

Diet and lifestyle play a key role in cardiovascular disease prevention. About 80% of CVD is attributable to modifiable risks like diet and lifestyle. The World Health Organisation estimates that 80% of cardiovascular disease could be prevented by positive diet and lifestyle changes.<sup>3</sup>

### Dietary changes can help lower LDL-cholesterol levels

Elevated LDL-cholesterol is widely accepted as a key modifiable risk factor for coronary heart disease (CHD), the main form of CVD, yet more than half the population in most Western countries have cholesterol levels higher than desirable. Epidemiological and intervention studies estimate that, on average, lowering cholesterol by 10% will reduce the risk of CHD by up to 20%.<sup>31</sup>

Many dietary factors affect LDL-cholesterol levels. Making positive dietary changes including replacing saturated fats with mono- and polyunsaturated fats and keeping intake of trans fats and dietary cholesterol to a minimum are well known to lower LDL-cholesterol.<sup>32</sup>

### International guidelines for a heart healthy diet

The International Atherosclerosis Society, the US National Cholesterol Education Program (NCEP), and many national organisations have all developed dietary recommendations designed to improve cholesterol management (Table 2).

**Table 2 - International Atherosclerosis Society guidelines for prevention of heart disease<sup>33</sup>**

| <b>Therapeutic modifications towards a heart healthy diet</b>   |
|---|
| <ul style="list-style-type: none"> <li>◆ Reduce saturated fats to &lt;7% of total energy</li> <li>◆ Keep intakes of trans fatty acids low</li> <li>◆ Maintain intake of omega-3 fatty acids:                             <ul style="list-style-type: none"> <li>◆ linolenic acid to at least 1% of total energy (2–3 g/day)</li> <li>◆ fish oil supplements for high risk patients optional (EPA+DHA of 1 g/day)</li> </ul> </li> <li>◆ Reduce dietary cholesterol to &lt;200 mg/day</li> <li>◆ Increase viscous fibre, if possible to 10 g/day</li> <li>◆ Consume at least 5 servings of fruits and vegetables daily</li> <li>◆ Ensure adequate intake of folic acid (400–1000 mg/day)</li> <li>◆ Avoid excess intake of alcohol: no more than 20–30 g/day (men) or 10–20 g/day (women)</li> <li>◆ Consider adding plant sterols/stanols (2 g/day) for elevated LDL-cholesterol</li> </ul> |

### The effect of diet and lifestyle changes on cholesterol-lowering

Since elevated LDL-cholesterol has been shown to be one of most significant risk factors for CVD, lowering LDL-cholesterol is a key focus of diet and lifestyle modification. As described in Table 3, this can be achieved through a combination of strategies designed to restrict dietary components that raise LDL-cholesterol and increase consumption of LDL-cholesterol-lowering foods.

Eating a diet low in saturated fat is an established way to lower cholesterol. Replacing saturated fats with unsaturated fats (mono- and polyunsaturated fats) can help to lower cholesterol. At the same level of intake, polyunsaturated fats are twice as effective at lowering LDL-cholesterol as mono-unsaturated fats.<sup>34</sup>

Weight reduction or control through diet and increased physical activity can also help to lower cholesterol. Limiting intake of cholesterol-rich foods can also contribute to cholesterol-lowering.

**Table 3 - Dietary factors and their effect on LDL-cholesterol levels**<sup>34,35,36,37</sup>

| Component   | Effect on LDL-cholesterol | Recommendation or change made | Current intakes*      | LDL-cholesterol reduction | Food sources   |
|---|---------------------------|-------------------------------|-----------------------|---------------------------|--|
| <b>Increasing the amount of these cholesterol-lowering dietary components</b> |                           |                               |                       |                           |  |
| Plant sterols   | ▼                         | 2-2.5g                        |                       | -10%                      | 3 portions of Becel pro.activ foods (Two teaspoons of spread, 250ml milk and 1 pot of yoghurt) or One portion of Becel pro.activ mini-drink. |
| Soluble dietary fibre (beta-glucan)   | ▼                         | 3g/day                        | Total fibre 14g       | -2 to -5%                 | Minimum: 2 – 5 portions of breakfast cereals with added beta-glucan  |
|   |                           | 10g/day                       |                       | -7.5%                     | 3-12 portions of breakfast cereals with added beta-glucan  |
| Soy protein   | ▼                         | 25g/day                       | Vegetable protein 28g | -3 to -5%                 | 3-4 portions of soya foods: soya beans and derived products e.g. soya-based milk and yoghurts, tofu, miso and tempeh                         |
| Polyunsaturated fatty acids   | ▼                         | 5-10% of energy               | 7% of energy          | -3%                       | Margarines high in polyunsaturated fatty acids, sunflower oil, corn and soya oil, walnuts, sesame and pumpkin seeds                          |
| <b>Restricting the amount of these cholesterol-raising dietary components</b> |                           |                               |                       |                           |  |
| Saturated fatty acids   | ▲                         | -3.5 to -7% of energy         | 15% energy            | -5 to -10%                | Meat pies, sausages and fatty cuts of meat, butter, ghee, lard, cream, hard cheese, cakes and biscuits                                       |
| Dietary cholesterol   | ▲                         | <200mg/day                    | 236g                  | -5%                       | Liver, kidney, eggs, and prawns.   |

\* UK data<sup>38</sup> - countries to adapt locally

There is now also a variety of foods containing specific active ingredients that have been shown to have LDL-cholesterol lowering properties. Active ingredients such as plant sterols/stanols (added to foods such as margarine, yoghurt and milk), beta-glucan (a soluble fibre found in oats), and soy protein (found in soy-based products) also have a role to play.

In the case of beta-glucan, the ingredient in oats-based cereals, the evidence supports cholesterol lowering in the range of 2-5% when 3-5g beta-glucan is consumed daily. Eating 25g per day of soya protein as part of a low fat diet has also been shown to lower cholesterol by 3 to 5%.

### Plant sterols/stanols – an effective way to lower cholesterol

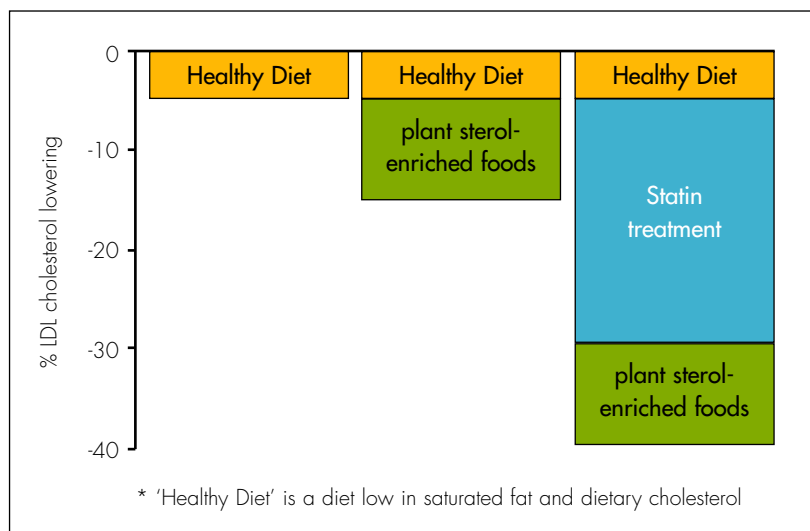
Experts agree that of all these dietary changes, one of the most effective ways to lower LDL-cholesterol with dietary change is to include plant sterols or stanols.<sup>37</sup> Eating 2-2.5g of plant sterols daily can lower LDL-cholesterol by 10-15% when combined with moving to a healthy diet and lifestyle.<sup>39</sup> Cholesterol reduction is dependent on the quantity consumed and the individual's response, but clinical studies have shown that 2-2.5g of plant sterols a day result on average in a 10% reduction in LDL-cholesterol levels within two to three weeks. By moving to a healthy diet, LDL-cholesterol can be further reduced by 5%.<sup>37</sup>

Plant sterols and stanols reduce the absorption of cholesterol from the intestine. This results in a reduction in blood LDL-cholesterol with no effect on HDL-cholesterol or triglycerides. Consuming plant sterols and stanols may therefore be of particular value to menopausal women who are prone to developing other lipid abnormalities (raised triglycerides and lowered HDL-cholesterol), which may be further exacerbated by very low-fat diets.

### Plant sterols and stanols work alongside lipid-lowering medication

Plant sterols and stanols may also be a useful adjunct to statins and fibrates. They can be used in conjunction with these lipid-lowering medications. The 10% cholesterol-lowering of plant sterols is additive to that of a healthy cholesterol-lowering diet and cholesterol-lowering medication like statins and fibrates (Figure 5).<sup>37,40</sup>

**Figure 5 - The effect of plant sterols, dietary modification and drug treatment on LDL-cholesterol levels<sup>37,40</sup>**



**KEY POINTS:**

- ◆ 80% of cardiovascular disease can be prevented by diet and lifestyle changes.
- ◆ Elevated LDL-cholesterol, a key risk factor for CVD, can be lowered by adopting a healthy diet low in saturated fats and dietary cholesterol.
- ◆ On average, lowering LDL-cholesterol by 10% will reduce CVD risk by up to 20%.
- ◆ Regular consumption of foods enriched with plant sterols or stanols is one of the most effective ways to lower LDL-cholesterol through diet.

## CONCLUSIONS AND RECOMMENDATIONS

1. Millions of women are dying every year from heart disease and stroke, and in just as great numbers as men. Yet the scale of cardiovascular disease in women is generally totally underestimated compared to other 'female diseases' such as breast cancer and osteoporosis, even though these account for far fewer deaths.
2. Women's lives are being lost unnecessarily because of low awareness and understanding of the role the menopause plays in significantly increasing the risk of CVD in women over 45, leading to inadequate screening, prevention and treatment.
3. Hormonal changes leading to menopausal symptoms and the underlying metabolic syndrome that characterise the menopause begin early, but increasing CVD risk presents late, so early intervention and prevention are key to reducing mortality.
4. Menopausal symptoms are an early warning sign for women and their doctors to think about long-term as well as short-term health implications. When menopausal symptoms appear, it should become as automatic for doctors to discuss steps to reduce heart disease risk with their female patients as it is osteoporosis.
5. Elevated cholesterol is a major modifiable risk factor for CVD, which increases significantly due to the menopause but is also controllable through simple diet and lifestyle changes to lower LDL-cholesterol. Regular cholesterol tests should be routine for all women over 45, alongside other health checks such as cervical smear tests and mammograms.
6. Doctors and other health care professionals need to have a better understanding of the impact on CVD risk of endocrine changes taking place before and during the menopause, which is then translated into early preventive advice and treatment. Professional Bodies representing the medical and healthcare professions should actively promote greater awareness and education of their members in this vital area of public health.
7. Women themselves, particularly those over 45, need to be made more aware of the link between the menopause, cholesterol and increased risk of heart disease and stroke. Education should be positive and encourage women to realise that they can avoid the cholesterol trap by taking simple steps to reduce their own risk through diet and lifestyle changes.
8. All organisations concerned with women's health, including public health authorities, should campaign through traditional and on-line channels to raise awareness of the increased risk of CVD in menopausal women and how it can be prevented.
9. The media, particularly those that target women in this age group, could play a highly significant and influential role in raising awareness and communicating simple and relevant advice that could make a major difference to women's long-term health.

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