Editorial

The rights of woman

While Europe’s eye is fix’d on mighty things,
The fate of empires and the fall of kings;
While quacks of State must each produce his plan,
And even children lisp the Rights of Man;
Amid this mighty fuss just let me mention,
The Rights of Woman merit some attention.

The Rights of Woman, Robert Burns, 1759–96

Coronary heart disease (CHD) is regarded as a disease that largely afflicts men but even a casual glance at mortality rates belies this. There is obvious concern\textsuperscript{1–4} about the lack of studies of CHD in women and there are suggestions of a sex bias in the way women are investigated and treated.

It is true that the main thrust of the primary prevention trials was to reduce the incidence of CHD in men, particularly by reducing blood cholesterol. In the age groups studied in the primary prevention trials the rate of CHD events in women is much lower than that seen in men. Thus any clinical trials in women would require even greater numbers to achieve the same results. Yet the conclusions from these studies in men, which were some of the largest clinical trials performed, have caused continuing controversy. They have polarised views within the profession and have caused confusion about the value of lowering cholesterol.

An analysis of 34 000 deaths of women in the United States showed a virtually flat relation between blood cholesterol and mortality\textsuperscript{5} and led to the proposal that only high risk patients needed treatment to reduce high serum cholesterol. The joint Medical Research Council/British Heart Foundation Heart Protection Study, which has been designed to see whether this proposal is valid, will include women. Such a study is long overdue. We contend that in the interim it is reasonable to extrapolate from men to women when the risk of CHD is high, as it is in familial hypercholesterolaemia, or when the protective female benefit has gone, such as after myocardial infarction, in women with diabetes mellitus, or in the elderly.

Manolio and Harlan neatly summarised the political dilemma facing the health services in the United States in dealing with CHD in the elderly—as a problem affecting women more than men.\textsuperscript{1} CHD is the major cause of death in postmenopausal women and has been calculated to cost the United States health service more than CHD in men.\textsuperscript{6} Most of the cost of treatment for the over 65s in the United States comes from public funds. Thus the scientific imperative is to evaluate the treatment of CHD in the elderly. Are the strategies and studies of coronary bypass surgery undertaken in the 1970s, which seemed to emphasise survival, applicable to an aging population in the 1990s?

It has been alleged that doctors underinvestigate and undertreat women with CHD. This criticism has been countered by claims that in the United States the level of revascularisation in women is more appropriate than it is in men.\textsuperscript{7} In the United Kingdom we might believe intuitively that this is correct because of our standards the rate of revascularisation in American men seems excessive. Perhaps part of the problem is that in published studies we are not able to determine the basis of evaluation, referral, investigation and treatment in men and women. Conclusions of sex bias drawn from crude comparisons of rates of investigation and treatment assume that we are dealing with the same clinical problem in men and women. This is not so. The presentation of CHD differs in men and women. In the Scottish Heart Study\textsuperscript{8} women were three times less likely to have a history of myocardial infarction than men. Women answering the Rose questionnaire were less likely to report previous angina but more likely to report current angina than men. Thus women tend to present with angina and their clinical course seems to be more benign,\textsuperscript{9,10} until myocardial infarction occurs.

The death rate from CHD in the Greater Glasgow Health Board (ages 35–64) was about 3 times higher in men (12.4/1000) than in women (4.0/1000) and the corresponding rates for coronary angiography were about twice as high (8.9 to 4.7 for 1986/87 combined).\textsuperscript{11} Thus if the need for coronary angiography were based on mortality from CHD these data would suggest overinvestigation of women rather than underinvestigation. If, however, the need for coronary angiography were based on the incidence of current angina reported in the Scottish Heart Study the results would suggest underinvestigation of women by coronary angiography.

Detailed analysis of the 1989/90 discharge diagnosis for CHD (ICD code 9) for 7743 Greater Glasgow Health Board cases aged 35 to 64 (5336 in men and 2407 in women) showed myocardial infarction in 37%, angina pectoris in 26%, and other forms of chronic ischaemic heart disease in 35%. Annual coronary arteriography rates at that time were 4.3/1000 and 1.9/1000 respectively. This difference was not statistically significant but more importantly the ratios between the discharge and coronary angiography rates were similar in men and women. Thus there was no evidence of sex bias in the investigation of these patients when hospital discharge was used as the basis of need.

The annual rate of coronary bypass surgery (CABG) was significantly higher in men (1.39/1000) than in women (0.32/1000). One interpretation is that women are undertreated but because the proportion of normal coronary angiograms in men and women is not known we cannot conclude that fewer women with coronary heart disease are referred for revascularisation. If the
proportion of normal angiograms were similar an explana
tion would have to be found to explain the markedly
different rates of subsequent CABG in men and women. 
But many middle aged women referred for cardiological
treatment have had normal epicardial coronary arteries.
Almost half the women reported in the CASS (Coronary 
Artery Surgery Study) registry in 1982 had normal epi-
cardial coronary arteries compared with only 17% of men.

Pettigrew et al reviewed 23 000 hospital discharges and 
concluded that there was a systematic difference in the 
treatment received by men and women. They reported 
that more men than women underwent revascularisation, 
the ratio was about 1:5 to 1. Among the explanations for 
this discrepancy was the differing rates of obstructive 
epicardial coronary disease at angiography in men and 
and women. We believe that this may be an adequate 
explanation for much of the lower incidence of subse-
quent coronary bypass surgery in women. A revasculari-
sation bias could be proved only by analysis of the 
numbers of men and women with angiographically 
confirmed coronary disease who subsequently have 
bypass surgery.

Kee et al did not come to the same conclusions as we 
did. They found that women had only half the rate of in-
vestigation for correction for age and comorbidity. The 
crude rates of investigation were more than four 
times higher in men than women—a much greater differ-
ce than what we found. They used the same basis for  
need (hospital discharge), which reinforces our view that 
the question of sex bias cannot be answered until a true 
measure of need is obtained.

It is difficult to manage chest pain in middle aged 
women. They often go through a year or so of medical 
therapy, which usually gives little benefit; then they 
undertake treadmill exercise tests, which are frequently 
unhelpful; and finally, after myocardial imaging, coronary 
angiography shows a normal epicardial coronary tree. 
This high incidence of normal epicardial coronary ar
teries in women with angina probably explains the 
relatively benign prognosis of chest pain in middle aged 
women.

We and others have reported a higher in hospital mor-
tality and morbidity from myocardial infarction in 
women than in men even after taking into account 
known adverse factors and correcting for age. The 
results in these relatively small study populations accord 
with mortality in Scotland 1983–89 after inpatient ad-
mission for heart disease. Over this period 74 649 men 
and 53 322 women were admitted to hospital. The 4 day, 30 
day, and 1 year mortality for men < women (%) was 9-4  
12-2, 16-4 v 21-4, and 25-2 v 32-3. Data from the 
MONICA (Monitoring Trends and Determinants in 
Cardiovascular Disease) project (personal communica-
tion, Dr Caroline Morrison, Glasgow MONICA project 
centre), specifically those on myocardial infarction, sug-
gest that men are more likely than women to die before 
they reach hospital but women are more likely to die after 
reaching hospital. Thus resultant 28 day mortality is the 
same. This excess in hospital mortality and morbidity in 
women after correction for age and comorbidity in 
women should not lead to them being investigated or 
treated less intensively after myocardial infarction but 
study the United Kingdom and United States sug-
uggest that they are. Pettigrew et al found that men were 
2-3 times more likely to undergo revascularisation. This 
was based on data on only 1-9 and 0-8% of male and 
female patients discharged with myocardial infarction. 
American data point strongly to this result being due to 
a difference in the investigation rate. In a retrospective 
analysis of 130 000 hospital discharges of cases with 
CHD men were significantly more likely to undergo 
coronary angiography, even after myocardial infarction, 
but the proportions of men and women who subse-
quently had revascularisation were similar. In contrast, 
investigators from Alabama found no difference in the 
investigation rates and subsequent revascularisation rates 
in men and women in a prospective study of 1000 
patients admitted with myocardial infarction. They did 
confirm an unexplained excess mortality in women.

Whatever the case, there is no justification for treating 
men and women differently after coronary heart disease 
is diagnosed. Women with CHD do not do well. Early 
concerns about the poorer results of CABG and higher 
mortality in women were not confirmed in later stud-
ies. Further research is required in the United 
Kingdom to confirm American findings that women 
seem to be referred for revascularisation later in the 
course of their disease with more symptoms and greater 
advocate features.

In conclusion, we have examined those areas that 
seemed most relevant to the management of CHD in 
women and, where appropriate, have tried to give them a 
local perspective. Our local perspective may differ from 
others as discussed and perhaps what we should be 
addressing is the striking regional variations in the inves-
tigation and treatment of CHD. The answer to the 
question “Are women with CHD under-
investigated?” If the determining factor is the incidence 
of chest pain the answer probably is “yes” (though it 
could easily be argued that women are overinvestigated 
if the normal coronary angiography rates reported by the 
CASS study are representative of practice in the United 
Kingdom.) Perhaps women are underinvestigated 
because a diagnosis of CHD in a woman is more likely to 
be doubted. This may lead to coronary angiography 
being performed only in women with severe symptoms. 
There is no doubt that exercise testing is less useful in 
assessing women, and perhaps our lack of confidence in 
the diagnostic and prognostic capability of stress testing 
in women makes their investigation more subjective.

For subsequent revascularisation the picture seems 
clearer. In our practice, and we are confident that this is 
not dissimilar to that in most centres in the United 
Kingdom, most patients (men or women) undergoing 
investigation have chest pain that is not controlled by 
medical therapy and if they are shown to have coronary 
disease they are offered CABG. Thus we believe that it 
is reasonable to assume that there is little sex bias in 
the referral of patients with symptoms for revascularisation.

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5 Hulley SB, Walsh JMB, Newman TB. Health policy on blood choles-