THEORY AND METHODS

Performance of the WHO Rose angina questionnaire in post-menopausal women: Are all of the questions necessary?

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Objective: To assess the performance of a shortened version of the Rose angina questionnaire focusing on exertional chest pain.

Methods: Cross sectional analysis of 3987 women aged 60 to 79 years from 23 British towns. The performances of definite Rose angina (using data from the full Rose angina questionnaire) and exertional chest pain (using data from a subset of three questions from the Rose angina questionnaire) were assessed against a medical record of angina.

Results: The sensitivity (the proportion with a medical record of angina who were identified as having angina by the questionnaire) was 29.9% (95% confidence intervals 25.7% to 34.4%) comparing definite Rose angina to any medical record of angina since 1978 and 50.7% (45.9% to 55.5%) comparing exertional chest pain to any medical record diagnosis of angina. The positive predictive values of both questionnaires were similar. When the two questionnaires were compared with a gold standard of a primary care consultation for angina symptoms within the past five years the sensitivity of definite Rose angina was 33.0% (26.9% to 39.6%) and that of exertional chest pain was 51.8% (45.1% to 58.5%). Although the sensitivity of both versions of the questionnaire was greater in those aged 60–69 years compared with those aged 70–79 years, it remained higher in the exertional chest pain version of the questionnaire than for definite Rose angina based on the full version of the questionnaire in both age groups. Performance of either version of the questionnaire was not affected by occupational social class.

Conclusions: With respect to identifying women with a medical diagnosis of angina or those presenting to primary care with anginal symptoms, these results suggest that a shortened version of the Rose angina questionnaire focusing on exertional chest pain performs better than the full version. Other studies suggest that exertional chest pain is the crucial element of the Rose angina questionnaire with respect to predicting future coronary events. It is concluded that using a shortened version of the Rose angina questionnaire is adequate in epidemiological studies.

The WHO Rose angina questionnaire is widely used in epidemiological studies as a standardised method for assessing angina. Although it is a screening tool, rather than a diagnostic test, and was originally designed for use in men (the figure used to localise the chest pain is a male torso, which is used in study populations of both sexes), it has been found to predict major coronary events in middle aged men and coronary heart disease mortality in both women and men. In studies of the ability of the Rose questionnaire to predict future events the crucial predictive component of the questionnaire seems to be experience of exertional chest pain, raising the possibility that some of the questions may be redundant. The entire questionnaire is long, taking up one side of A4 (see fig 1). Shorter questionnaires are one way in which response rates can be increased and response bias is an important concern in all epidemiological studies.

The aim of this study was to assess the performance of “definite Rose angina” defined using the complete Rose angina questionnaire (fig 1) and “exertional chest pain” defined using just three questions from the questionnaire (box 1) against a clinical diagnosis of angina in post-menopausal women.

METHODS

Data from the British Women’s Heart and Health Study were used. Full details of the selection of participants and measurements have been previously reported. Women aged 60–79 years were randomly selected from general practitioner lists in 23 British towns. A total of 4286 women (60% of those invited) participated and baseline data (self completed questionnaire, research nurse interview, physical examination, and primary care medical record review) were collected between April 1999 and March 2001. Local ethics committee approvals were obtained.

The full Rose Angina questionnaire (fig 1) was administered by trained research nurses at the interview. “Definite Rose angina” was defined according to standard criteria as chest pain or discomfort (yes to question 1) that fulfilled all of the following criteria: (a) was brought on by exertion (yes to either question 3 or 4); (b) was situated in the central or left anterior chest (site 4, 5, or 8 on diagram in question 2); (c) forced the subject to slow down or stop (question 5); (d) was relieved if the subject did so (yes to question 6), and (e) was relieved within 10 minutes (question 7). This definition was further subcategorised into severe (grade II) if the exertional chest pain comes on when walking on level ground (yes to question 3) and not severe (grade I) if the exertional chest pain only comes on when hurrying or walking up hill (no to question 3 and yes to question 4). Angina based just on the subset of three questions from the questionnaire (box 1) was defined as exertional chest pain (yes to question 1 and yes to either question 2 or 3). Again this was subcategorised as grade I and grade II as described above.

The performance of these two definitions of questionnaire angina were compared with a clinical diagnosis of angina.
from the medical records. Detailed reviews of participants’
general practice medical records (including general prac-
titioner notes, hospital letters, and computer data) were
undertaken independently by a member of the primary care
medical team to identify all diagnoses of angina occurring
since 1978, with their date of occurrence. The people
undertaking the medical record reviews at each practice were
unaware of any of the participants responses to the Rose
angina questionnaire. Each questionnaire diagnosis of angina
was compared with a “gold standard” of any record of a diag-
nosis of angina since 1978. As the questionnaire refers to
symptomatic angina, and some patients with a diagnosis of
angina in their medical records may be well controlled and
symptom free, we repeated the analyses with a different “gold
standard”: consultation with a doctor with anginal symptoms
within the five years before the Rose angina assessment was
carried out.

Statistical analysis
Sensitivity (the proportion of those with angina in their
medical records who were defined by the questionnaires as
not having angina); positive predictive value (the proportion
identified by the questionnaire as having angina who actually
had a medical diagnosis), and negative predictive value (the
proportion identified by the questionnaire as not having
angina who did not have a medical diagnosis) were expressed
as percentages, with 95% confidence intervals calculated using
the exact binomial method. Analyses were repeated stratified
by age (two age groups: 60–69 years and 70–79 years) and
occupational social class (manual occupational class and non-
manual occupational class based on the participant’s hus-
band’s longest held occupation for married women and her
own longest held occupation for single women) to determine
whether accuracy was affected by age or social class.

RESULTS
Of the 4286 participants in the British Women’s Heart and
Health Study 3987 (93%) had complete classifiable data for
the Rose angina questionnaire; as the subset of “exertional”
chest pain questions was derived from the complete question-
naire the response rate was identical for both applications of
the questionnaire. Of the 299 women without complete
classifiable data 237 had missing data on at least one question
and 62 had unclassifiable responses, for example an indication
that they were unable to walk on the level (question 3) and
then a response indicating that they stopped or slowed down
if the pain came on while walking (question 5). These women
did not differ from those with complete data with respect to
age (68.8 years versus 68.7 years, p=0.95), medical record
diagnosis of myocardial infarction (2.03% versus 2.01%,
p=0.98), angina (11.00% versus 12.00%, p=0.44), stroke
(1.73% versus 2.00%, p=0.31), diabetes (4.56% versus 4.68%,
p=0.96) or cancer (9.08% versus 9.70%, p=0.72). All
participants had medical record review data. All further
presented analyses refer just to the 3987 women with
complete data on the angina questionnaire.

Table 1 shows the prevalence of definite Rose angina, exer-
tional chest pain and non-exertional chest pain (as deter-
mined by the questionnaire) together with the prevalence
of angina determined by the review of medical records and the
prevalence of those presenting with anginal symptoms within
the past five years. Thirteen per cent of the women had exert-
tional chest pain; 7.7% definite Rose angina, and 11.0% a
clinical diagnosis of angina in their medical records, with 5.6%
having consulted with anginal symptoms in the past five
years. Only 68 (1.7%, 1.3% to 2.2%) women had had revascu-
larisation procedures (coronary artery bypass graft or balloon
angiography) and 301 (7.5%, 6.7% to 8.4%) women were tak-
ing anti-anginal nitrate medication. Exclusion of these
women from subsequent analyses did not materially affect our
findings, and all presented results include these 369 women.

Table 2 shows the performance of definite Rose angina and
exertional chest pain compared with a clinical diagnosis of
angina. The sensitivity was higher with the exertional chest
pain (51%) than when definite Rose angina (30%) was used.
Specificity was slightly higher for definite Rose angina. The
positive predictive value of both were similar. Sensitivity of
both definite Rose angina and exertional chest pain increased when the comparison was made with those who had consulted with symptoms in the past five years. However, exertional chest pain still performed better with respect to sensitivity. The positive predictive values decreased for both tests because the prevalence of women who had presented with symptoms during the previous five years was lower than that for any diagnosis of angina.

Tables 3 shows the analyses stratified by age group (60–69 years versus 70–79 years). With respect to sensitivity both versions of the questionnaire performed better in women aged 60–69 years than those aged 70–79 years. However, a similar pattern to that for the whole cohort, between the two versions of the questionnaire, remained, with sensitivity being greater in both age groups for exertional chest pain than for definite angina. As the prevalence of angina is greater in older age groups the positive predictive values of both versions of the questionnaire was greater among older women. However, positive predictive value was similar with both versions of the questionnaire (as in the main cohort) in the age stratified analysis. There was no difference in the performance of either version of the questionnaire when analyses were stratified by social class, for example sensitivity of definite Rose angina among women from manual social classes was 29.72 (27.65 to 31.79) compared with 28.86 (26.75 to 30.97) for non-manual social classes. Similar results for exertional chest pain were 49.00 (46.73 to 51.26) and 48.43 (46.08 to 50.77).

**DISCUSSION**

Our results suggest that in post-menopausal women using a shortened version of the Rose angina questionnaire, a subset of just three questions, performs as well as the full version. One difficulty with assessing the performance of any screening tool for angina is the lack of a clear gold standard. However, the consistency of our findings, using independent medical record diagnoses as the gold standard, with those of
Burden of angina.

Limitations with respect to assessing the population disease

Low sensitivity of the Rose angina questionnaire highlights its

Asymptomatic at the time of the questionnaire. However, the

preceding five years. The remaining 48% may have been

symptoms defined as angina in their medical records over the

Multivariate analysis of the full and shortened versions of the

questionnaire cross sectionally with respect to a

clinical diagnosis. An important aspect of the Rose angina

questionnaire is its ability to predict future cardiovascular

events. With long term follow up of these women we will fur-

ther assess the performance of the full and shortened version

of the questionnaires to determine whether results of previous

studies with respect to the prediction of future events are con-

firmed in this group of post-menopausal women. 1-4

In conclusion we would suggest that a shortened version of

the Rose angina questionnaire performs better than the full

version with respect to identifying patients with clinical

angina in post-menopausal women. Although both versions of

the questionnaire perform better in younger compared with

older women the difference between the full and a shortened

version of the questionnaire remained in both age groups sug-

suggesting that the shortened version may be suitable for all age

groups. Prospective studies suggest that a shortened version of

the questionnaire focusing on exertional chest pain may also

be adequate for men, 5-7 and our results suggest that socioeco-
nomic position does not importantly affect the performance of

either version of the questionnaire when administered by a

research nurse.

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Contributors

All authors developed the study aim and design. DAL undertook the

initial analysis and coordinated writing of the paper. All authors con-

tributed to the final version.

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