Preventive health care, 2001 update: screening mammography among women aged 40 - 49 years at average risk of breast cancer

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Authors' objectives

To consider the new and updated evidence available, since a review in 1994, about the effect of screening mammography on breast cancer mortality among women aged 40 to 49 years.

Searching

MEDLINE and Cancerlit were searched from 1966 to June 2000; the search terms were reported. Reference lists were checked for additional studies.

Study selection

Study designs of evaluations included in the review

Randomised controlled trials (RCTs), or meta-analyses including all eligible RCTs, were eligible for inclusion in the section on the effectiveness of screening. Cohort, case-control and cross-sectional studies were reviewed for the section on the physical and psychological effects of screening.

Specific interventions included in the review

Studies of screening mammography, either alone or in combination with clinical breast examination, were eligible for inclusion. The screening intervals ranged from 12 to 28 months.

Reference standard test against which the new test was compared

The review did not include any diagnostic accuracy studies that compared the performance of the index test with a reference standard of diagnosis.

Participants included in the review

Studies that included women aged 40 to 49 years at average risk of breast cancer, either as the entire sample or as a subgroup, were eligible for inclusion.

Outcomes assessed in the review

Studies had to assess breast cancer mortality as the primary outcome to be eligible for inclusion. Primary studies in which the outcome ascertainment was less than 90% complete were excluded, as were studies with a minimum follow-up of less than 10 years. Studies that reported on the physical and psychological effects of screening were also eligible for inclusion. The length of follow-up ranged from 10 to 18 years in the included trials and from 7 to 12 years in the included meta-analyses.

How were decisions on the relevance of primary studies made?

The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality

RCTs were assessed for the method of randomisation, the proportion of controls who underwent screening mammography, percentage compliance with first examination, mammogram views, radiation dose per breast, and blinded double reading of mammograms. Meta-analyses were assessed according to the criteria of L'Abbe et al. (see Other Publications of Related Interest). The authors did not state how the papers were assessed for validity, or how many reviewers performed the validity assessment.

Data extraction

The authors did not state how the data were extracted for the review, or how many reviewers performed the data

extraction.

Methods of synthesis

How were the studies combined?

A narrative discussion, in which each of the included studies was described, was presented.

How were differences between studies investigated?

Some differences between the studies were discussed in the text.

Results of the review

Seven RCTs (11,089 women in the intervention groups and 98,357 in the control groups) and 6 meta-analyses were included.

All the RCTs were included in at least one of the meta-analyses. Twelve studies assessed the psychological effects of screening, most of which were included in a single review that was also included.

RCTs.

Most of the trials lacked the power to exclude a potentially significant difference. Only one RCT was designed specifically for women aged 40 to 49 years; other results were from a post-hoc subgroup analysis. The relative risks from death cancer reported in RCTS of screening mammography among women aged 40 to 49 years ranged from 0.6 to 11. All but two of the confidence intervals (CIs) for these estimates included 1. The numbers-needed-to-screen to avoid one death from breast cancer were 500 and 782 in the trials that reported statistically significant relative risks at the 5% level.

Meta-analyses.

The pooled relative risks ranged from 0.82 to 1.04; only two of these were statistically significant at the 5% level. Only one meta-analysis included all the trials of breast cancer screening. This meta-analysis reported a relative risk of 0.82 (95% CI: 0.71, 0.95), suggesting strong evidence in favour of a benefit of screening. It also reported a number-needed-to-screen of 1,540 to avoid one death from breast cancer.

The most recent meta-analysis included only 1.5 of the 7 trials, as it judged that randomisation in the other trials had been inadequate. This review was therefore dominated by the negative findings from one of the included trials, and it reported a relative risk of 1.04 (95% CI: 0.84, 1.27).

Other effects of screening.

One RCT reported that over 10 years of screening, 12.6% of younger women required additional mammograms and 0.56% of biopsies showed benign lesions. A second trial reported that 2.5% of women were called back, 0.9% had biopsies, 0.1% had surgery that revealed benign disease, and that about 2 to 3 operations were performed for every death prevented.

Psychological effects of screening.

Women had less anxiety and depression on the day of screening than at baseline. Lower age was associated with increased anxiety. Increased emotional and physical dysfunction was seen only in women recalled for additional testing and was resolved over time. Psychological distress decreased with time in women with normal or false-positive mammograms, or negative biopsy results, but it increased in women found to have cancer. A retrospective survey reported that 72% of women felt reassured by screening. Less information was available on false-negative results.

Authors' conclusions

Currently the conflicting results and methodological differences between trials, and uncertainty about the risk-benefit

ratio of screening mammography, preclude the assignment of a 'good' or 'fair' rating to recommendations drawn from them.

CRD commentary

The review addressed a clearly stated objective and was supported by well-defined inclusion criteria. A limited literature search, which did not include attempts to locate unpublished studies, was carried out. The review may, therefore, be subject to publication bias, although it is unlikely that the authors were unaware of any studies that would be large enough to impact on the results of the review. The review included a quality assessment, and the results for the primary studies were tabulated and discussed. The authors provided very few details of the review process.

Adequate study details were reported in tabular format and further details were discussed in the text. A narrative synthesis was presented. This focused on the results of both the primary studies and meta-analyses of different combinations of these studies, mainly presenting a summary of each of the RCTs and meta-analyses rather than attempting to synthesise the results. It is unclear why the authors conducted this review when all the primary studies had already been included in previous reviews and they did not present a new meta-analysis of the primary studies. The authors' conclusions are supported by the results presented.

Implications of the review for practice and research

Practice: The authors stated that current evidence regarding the effectiveness of screening mammography does not suggest the inclusion of the manoeuvre in, or its exclusion from, the periodic health examination of women aged 40 to 49 years at average risk of breast cancer. Upon reaching the age of 40, Canadian women should be informed of the potential benefits and risks of screening mammography, and be assisted in deciding at what age they wish to initiate the manoeuvre.

Research: The authors stated that a meta-analysis of raw data should be conducted for women aged 40 to 49 years, who are enrolled in existing trials. The psychological effects of breast cancer screening should be studied prospectively in a randomly selected sample of participants in the ongoing British trial, with the use of both a validated scale and health utilities. Research should continue on potential new strategies for the prevention of breast cancer, including the use of genetic markers, number medicine imaging, magnetic resonance imaging and chemoprophylaxis.

Bibliographic details

Ringash J, Canadian Task Force on Preventive Health Care. Preventive health care, 2001 update: screening mammography among women aged 40 - 49 years at average risk of breast cancer. CMAJ: Canadian Medical Association Journal 2001; 164(4): 469-476

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Other publications of related interest

L'Abbe KA, Detsky AS, O'Rourke K. Meta-analysis in clinical research. Ann Intern Med 1987;107:224-33.

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Subject indexing assigned by NLM

MeSH

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.