Acta Oncologica, 2008; 47: 1618

informa
healthcare

ABSTRACT

Performance and effectiveness of organised breast cancer screening in Finland

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Randomised trials have shown that screening reduces mortality from breast cancer among those invited. Since the results from rigorously conducted trials may not be directly convertible into routine service, and the validity of some trials has been questioned, evaluation and monitoring of service screening is essential. This study retrospectively evaluated the performance and the effectiveness of organised breast cancer screening in Finland by estimating the process and validity indicators of screening, the effect of screening on breast cancer mortality, and the relationships between process, validity and outcome of screening.

The Finnish breast cancer screening programme was started in 1987 by a group-randomised design. Results from the first five years of the programme showed 24%, non-significant reduction in breast cancer mortality among the screening invitees. From 1992 onwards, all the Finnish municipalities were entitled to invite women aged 50–59 to free-of-charge mammography screening every two years. Invitations for 60–69 year old women remained optional. In 2007, the Ministry of Health and Social Welfare announced a Decree on Screening according to which the invitational age is to be extended from 50–59 to 50–69 by the year 2016.

This study was the first to monitor and evaluate the routine screening after the nationwide screening coverage was attained in 1992. The study subjects were 40–74 year old women who had been invited to breast cancer screening in ten centres of the Cancer Society of Finland (CSF) from 1991 onwards. Invitations from CSF centres accounted for 50–60% of screening invitations in Finland in the study period.

The CSF centres sent more than one million invitations, and processed 930 000 visits in 1991–2000. The coverage of invitations was more than 95% among women aged 50–59 years, 20–40% among women aged 60–69 years, and less than 10% among 40–49 and 70–79 year old women. The overall attendance at ages 50–64 was 90%. Per one subsequent screen, less than 3% of attendees were sent for further examinations. Their breast cancer detection rate was 0.4%. The positive predictive value of mammography increased towards the end of the study period and with age from 3 to 30%.

The episode sensitivity at the subsequent screens was 54% in 1991–2001. The sensitivity estimates 0–11 and 12–23 months after the screening visit were 70 and 38%. The sensitivity increased 13% per 1% absolute increase in the recall rate.

The reduction in the incidence-based breast cancer mortality among the screening invitees aged 50–69 at death was 22% (95% confidence interval 13–30%) in 1992–2003. After adjusting for self-selection, the reduction among the participants became 28% (12–44%). Among all females aged 60–79 at death, the greatest reduction in breast cancer mortality, 28% (3–49%), was estimated in municipalities inviting 50–69 year old women on a regular basis. In municipalities restricting their invitations to 50–59 year old women, no reduction in breast cancer mortality at ages 65–79 was observed.

The performance indicators in Finland were at a level similar to those in other European screening programmes, but the centre-specific differences were wide. Variability in episode sensitivity was associated with variability in recall. No association between the level of recall and the mortality outcome could be found. The overall effect estimates on breast cancer mortality in Finland were comparable to those of the randomised trials.

To conclude, organised mammography screening in Finland has been effective. Extension of invitations to women aged 60–69 will decrease breast cancer deaths among the elderly. Due to inconsistency in the relationships between the estimates of performance and outcome, breast cancer mortality remains the most reliable means to evaluate the success of mammography service screening.

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ISSN 0284-186X print/ISSN 1651-226X online
DOI: 10.1080/02841860802321956