

Reducing Mammography-Associated Anxiety with Rapid Reporting

Barton MB, Morley DS, Moore S, et al. Decreasing women's anxieties after abnormal mammograms: a controlled trial. *J Natl Cancer Inst* 2004;96:529-38.

Study Overview

Objective. To compare the effects of an immediate reading of mammograms (ie, radiology intervention) and an educational intervention that taught skills to cope with anxiety for women undergoing mammography.

Design. Prospective controlled trial.

Setting and participants. Women older than 39 years without prior histories of breast cancer were recruited from 7 mammography sites in Boston at the time of scheduled mammography screenings. Participants were assigned to radiology intervention, the educational intervention, both, or no intervention. Abnormal mammograms were defined as those with recommendations for further testing (ie, additional views, ultrasound, or biopsy). Women subsequently diagnosed with breast cancer in the next 12 months were excluded. Thus, all abnormal mammograms in the study were false-positive mammograms.

Intervention. Women assigned to the radiology intervention were notified about the results of their mammograms within 7 days of their mammogram. The education intervention consisted of a brief videotape with a clinical vignette and a pamphlet designed to reduce anxiety associated with screening mammography. These materials presented information about breast cancer risk, false-positive mammograms, explanations of follow-up, tips for coping with uncertainty, and a glossary of terms used in mammography readings and procedures.

Main outcome measures. The Impact of Events Scale (IES) and the Hopkins Symptom Checklist subscales for Anxiety (HSC-A) and Depression (HSC-D) in structured telephone interviews were used to assess the psychologic status of all women with abnormal mammograms and a random sample of women with normal mammograms at 3 weeks and 3 months after screening. Using an intent-to-treat analysis, baseline characteristics were compared among women by mammogram result and intervention. All statistical tests were 2-sided.

Main results. 8543 eligible women were assigned to 1 of 4 in-

tervention groups. 6801 (80%) had normal mammograms, and 1742 (20%) women had abnormal mammograms that were later classified as false-positive. Women with abnormal mammograms had higher IES and HSC-A scores than women with normal mammograms (mean IES scores, 4.97 [95% confidence interval (CI), 4.47-5.50] and 1.82 [95% CI, 1.51-2.14], respectively; $P < 0.001$; mean HSC-A scores, 1.14 [95% CI, 1.12-1.15] and 1.11 [95% CI, 1.09-1.13], respectively; $P = 0.002$). Among women with false-positive mammograms, those who had received the radiology intervention reported less anxiety than those who had not (mean IES scores, 4.42 [95% CI, 3.73-5.07] and 5.53 [95% CI, 4.82-6.28], respectively; $P = 0.026$). The educational intervention was not associated with any difference in psychologic outcomes. Three months after the mammogram, anxiety levels of women with false-positive mammograms remained higher than those of women with normal mammograms (mean IES scores, 2.34 [95% CI, 1.99-2.69] and 1.15 [95% CI, 0.87-1.47], respectively; $P < 0.001$). At 3 months after mammography, the group that received both interventions had the lowest percentage of women reporting anxiety ($P = 0.036$). Overall, at 3-month follow-up, approximately 28% of women who had false-positive mammograms reported any anxiety symptoms compared with approximately 18% of women with normal mammograms (difference, 9.9% [95% CI, 6.3%-13.6%]; $P < 0.001$). After controlling for age, prior false-positive mammograms, family history of breast cancer, education level, race (none of which were independently statistically significantly associated with the outcome), and clinical site, logistic regression analysis found that women who received the radiology intervention had IES scores that were 20% (95% CI, 3%-33%) lower than women who did not.

Conclusion. Immediate reading of screening mammograms, but not an educational intervention targeting coping skills, was associated with less anxiety among women with false-positive mammograms 3 weeks after mammography.

Commentary

Mammography is an important screening tool in the diagnosis of breast cancer and likely accounts for some of the reduction in cancer-related mortality over the last decade. However, the

positive predictive value of a mammogram is less than 4%, with most abnormal readings caused by benign conditions [1]. False-positive readings come at the cost of significant anxiety for women and may limit the usefulness of screening by ultimately impairing compliance with future testing.

Barton et al sought to assess the roles of 2 interventions to help reduce anxiety and stress associated with false-positive mammogram results. The authors found that false-positive results were associated with an almost 80% increase in anxiety compared with women who received normal results, and this persisted in over a quarter of these women at 3 months. In terms of the 2 interventions, immediate mammogram interpretation was associated with an improvement in anxiety scores; however, the education intervention had no significant effects.

The study's merits include its large size, prospective design, and multicenter setting. As well, the analysis controlled for multiple variables and is bolstered by a high (75%) interview participation rate. The authors correctly point out potential weaknesses of the study, which include biases associated with the selection of a unique population insured by 1 health plan and recall bias during interviews at 3 weeks and 3 months. Additionally, the mammographers found more false-positive results than one might have anticipated for an average population (20% versus 11%, respectively). Each of these weaknesses limits the applicability of the results to women at large.

A somewhat surprising finding was that free, user-

friendly, informative educational materials offered no measurable benefit in terms of anxiety reduction. It could be argued that the IES and HSC tools and/or interviewing techniques missed a true benefit, or that the other cohorts had access to other unmeasured resources negating any true benefit of the tape or pamphlet. It also is possible that too much information created more anxiety for women already facing an abnormal result.

Nonetheless, these results suggest that objective rapid feedback from testing significantly helps reduce anxiety inherent to cancer screening. Educational materials in this study offered no measurable benefit in terms of anxiety reduction, raising the question of how best to allocate resources to help address patient anxiety and stress associated with cancer screening.

Applications for Clinical Practice

Rapid reporting of mammographic screening results may help reduce anxiety associated with testing while minimizing loss to follow-up.

—Review by David R. Spiegel, MD

References

1. Brown ML, Houn F, Sickles EA, Kessler LG. Screening mammography in community practice: positive predictive value of abnormal findings and yield of follow-up procedures. *AJR Am J Roentgenol* 1995;165:1373-7.

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