

A Randomized Controlled Trial Evaluating the Impact of Web-Based Information on Breast Cancer Patients' Knowledge of Surgical Treatment Options

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- BACKGROUND:** Previous research suggests that providing information to women newly diagnosed with breast cancer, during the gap between cancer diagnosis and their first surgeon consultation, may support decision making. Our objective was to compare patients' knowledge after the pre-consultation delivery of standard websites vs a web-based decision aid (DA).
- STUDY DESIGN:** We randomized women with stage 0 to III breast cancer, within an academic and community breast clinic, to be emailed a link to selected standard websites (National Cancer Institute, American Cancer Society, Breastcancer.org.) vs the Health Dialog DA (Clinicaltrials.gov NCT03116035). Patients seeking second opinions, diagnosed by excisional biopsy, or without an email address, were ineligible. Pre-consultation knowledge was assessed using the Breast Cancer Surgery Decision Quality Instrument. We compared differences in knowledge using *t*-test.
- RESULTS:** Median patient age was 59 years, 99% were white, and 65% had a college degree or higher, with no differences in demographics between study arms. Knowledge was higher in patients who received the DA (median 80% vs 66% correct, $p = 0.01$). Decision-aid patients were more likely to know that waiting a few weeks to make a treatment decision would not affect survival (72% vs 54%, $p < 0.01$). Patients in both arms found the information helpful (median score 8 of 10).
- CONCLUSIONS:** Although patients found receipt of any pre-consultation information helpful, the DA resulted in improved knowledge over standard websites and effectively conveyed that there is time to make a breast cancer surgery decision. Decreasing the urgency patients feel may improve the quality of patient-surgeon interactions and lead to more informed decision-making. (J Am Coll Surg 2017; ■:1–8. © 2017 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

The majority of the 230,000 women diagnosed annually with early stage breast cancer must face the difficult and highly personal decision between breast-conserving

surgery and mastectomy. It is essential that women feel empowered to actively participate in this decision because playing an active role in decision making leads to less

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decisional regret, improved postoperative body image, and better quality of life.¹⁻³ A critical component of preparing patients to participate in decision making is providing them with information about their breast cancer and their surgical treatment options.⁴

Previous research suggests that information may be most beneficial to patients if they receive it during the informational gap between their cancer diagnosis and the first surgeon consultation.^{5,6} However, delivering information within this narrow window can be challenging. Online delivery is one way to address this challenge.⁷ In our multidisciplinary breast program, we successfully developed an implementation strategy that facilitates routine delivery of a web-based decision aid directly to patients in the informational gap before the first surgical consultation.⁸ Our pilot project demonstrated that this approach was feasible and highly acceptable to both patient and clinic stakeholders.

However, simply having a feasible strategy to deliver pre-consultation information to patients is insufficient to justify routine use of this approach in practice. It is also critical to understand how delivering pre-consultation information to patients before the surgical consultation may influence outcomes relevant to patient decision making, such as knowledge. Additionally, we wanted to understand what format of web-based information may be most beneficial to patients. One option would be to share links to selected, high-quality websites that are available online, but that women may not find on their own.⁹ A second option would be a decision aid. Decision aids have proven efficacy at improving knowledge.¹⁰⁻¹² However, many decision aids are commercially developed and, therefore, have a cost associated with their use. Understanding the relative benefits of pre-consultation delivery of a web-based decision aid vs other forms of web-based information would be highly beneficial in justifying the additional expense. The objective of this study was to compare patients' knowledge of their surgical options after pre-consultation delivery of either a web-based decision aid or links to selected standard websites.

METHODS

Study design and study sample

This study was a randomized, blinded, prospective trial (Clinicaltrials.gov NCT03116035). From April 2014 to June 2016, we randomized women newly diagnosed with stage 0 to III breast cancer, seen within an academic and community breast clinic, to receive via email a link to either a web-based decision aid or selected standard websites. Patients were eligible if they were female, had stage 0 to III breast cancer, were 18 years of age or older,

and were considering breast surgery within our breast program. We excluded patients who had recent contact with a breast surgeon, including those coming to our center for a second opinion, diagnosed by excisional biopsy, or with recurrent cancer. This exclusion was to minimize bias based on previous experience with or discussions about breast cancer, both of which could increase knowledge. Additional study-specific exclusion criteria included the inability to read or comprehend health information in English (the web-based materials were available only in English) or patients lacking decision-making capacity (eg with dementia). Finally, patients had to have a valid email address. The University of Wisconsin Human Subjects Committee approved the study protocol, and all participants provided informed consent.

Intervention

Patients were randomized by a research coordinator (JT) in a 1:1 fashion to receive either a decision aid or selected standard websites. Block randomization with a block size of 6 was used. We used a decision aid developed collaboratively by the Informed Medical Decisions Foundation and Health Dialog (Foundation for Informed Medical Decision Making and Health Dialog).^{13,14} Originally created as a DVD, it was converted to a web-based platform based on user feedback requesting flexibility in mode of delivery. The web-based decision aid uses static didactic information written for an eighth grade reading level, and video clinical vignettes to promote consideration of personal values and preferences. It includes modules for invasive cancer, noninvasive cancer, and reconstruction, and patients had access to all modules. It has been used successfully in academic and community settings to increase knowledge and decrease decisional conflict.¹⁵⁻¹⁸

The standard websites were rated as high quality⁹ and were developed and supported by nonprofit organizations. The included sites were: breastcancer.org; the American Cancer Society, www.cancer.org/cancer/breastcancer/index; and the National Cancer Institute, www.cancer.gov/cancertopics/types/breast. Each patient received links to all 3 sites.

Study procedures and measures

Usual clinic flow

In the 2 clinics participating in this study, most patients undergo the diagnostic work-up that leads to their breast cancer diagnosis without meeting a surgeon. Patients are either called back for additional imaging after an abnormality is identified on their screening mammogram or referred directly to breast imaging by their primary care provider after identification of a palpable mass. Usual clinic flow is for a nurse or nurse navigator to

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