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ORIGINAL ARTICLE

Design, implementation, and evaluation of an intervention to improve referral to smoking cessation services in breast cancer patients

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Abstract

Purpose Smoking is a risk factor for poor outcomes following breast reconstructive surgery. This project aimed to design and implement an intervention to consistently refer all breast cancer patients to tobacco treatment services.

Methods In formative work, a set of processes for providers to consistently refer patients to a tobacco treatment specialist at the Nicotine Dependence Center (NDC) was designed. Elements included consistent documentation of smoking status, provider advice specific to the benefits of quitting to cancer care, referral to NDC using an "opt-out" strategy that emphasized smoking cessation as a standard part of breast cancer treatment, and reinforcement of the importance of the referral by multiple personnel. The number of referrals to the NDC and number of patients who attended their scheduled NDC appointment were measured before and 1 year after implementation. Qualitative evaluation was performed using semi-structured interviews with participating providers and patients regarding acceptability.

Results The proportion of smoking patients referred to the NDC increased from 29% (22/75) before the intervention to 74% (20/27) afterward. Among those referred, attendance at the consultation increased from 41% (9/22) to 75% (15/20). This occurred despite provider interviews revealing knowledge gaps about the referral process and evidence of provider adaptation to accommodate personal practice. Feasibility and acceptability of the intervention were high.

Conclusion These findings suggest that similar referral interventions for all cancer patients should be pursued with the aim of embedding tobacco dependence treatment seamlessly and consistently into the cancer treatment plan of every patient who smokes cigarettes.

Keywords Standards of care · Breast cancer · Health services research · Quality improvement

Introduction

Smoking is a risk factor for several perioperative complications, including cardiovascular, respiratory, and wound-related complications [15, 16]. The latter are particularly relevant to patients undergoing plastic surgeries requiring skin flaps [10]. For this reason, most plastic surgeons require a defined period of abstinence from cigarettes prior to

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performing breast reconstructive surgery after mastectomy in patients with breast cancer [7, 14]. This can represent a barrier for patients who smoke to pursue reconstruction.

Smoking cessation interventions are efficacious in helping surgical patients maintain perioperative abstinence. However, integration of these interventions into clinical practice has proven challenging [12], and few surgical patients receive counseling about tobacco cessation prior to surgery [9]. Potential factors contributing to this low reach include patient preoccupation with their cancer diagnosis and therapy, limited provider time, and that members of the care team may assume someone else has already addressed the issue. The prevalence of smoking appears similar in breast cancer patients and the overall population [3, 11], and approximately half of breast cancer patients continue to smoke after their diagnosis [11]. Considering the multiple benefits associated with tobacco abstinence [6, 16, 17], the lack of a consistent approach to providing tobacco use interventions to these patients represents a serious quality gap.

This project aimed to implement a referral process in the Mayo Breast Clinic such that every patient who smokes and receives breast cancer surgery at Mayo Clinic Rochester, regardless of intent to quit, would receive counseling at the Mayo Clinic Nicotine Dependence Center (NDC). To assess the feasibility and acceptability of this process, we (1) assessed current practices, (2) collaboratively designed a referral process to the NDC for breast clinic patients, (3) implemented this process, (4) assessed changes in practice, and (5) performed qualitative work.

Methods

Institutional oversight

The study of baseline data was approved by the Mayo Clinic Institutional Review Board. Post-intervention data collection (practice evaluation, as well as patient and provider feedback on the intervention) was reviewed by the Mayo Clinic IRB and determined to fall under the purview of quality improvement.

Setting

The Mayo Breast Clinic is an outpatient multi-specialty practice where patients with breast-specific concerns (both malignant and benign) are referred. A significant portion of the practice is comprised of external patients with new diagnosis of breast cancer who are referred to Mayo Clinic for diagnostic confirmation and/or treatment. "Providers," for the purposes of this intervention, refers to both physicians and nurse practitioners who care for these patients during the course of their diagnosis, treatment, and follow-up.

The NDC provides tobacco cessation education and treatment. At least five tobacco treatment specialists are available to see patients, typically on the same day of referral. Initial consultation entails a 45-min one-on-one visit, and up to three telephone follow-up phone calls. Treatment specialists are trained to provide both behavioral counseling and medication management and are overseen by a supervising physician for medication prescribing.

Pre-implementation assessment

Patients self-reported smoking status as part of the breast clinic intake form, completed on the date of their first visit. The medical records of patients who were identified as current smokers and seen in the breast clinic from January 1, 2012, to December 31, 2013, were reviewed to determine if (1) tobacco use was documented upon initial intake in the patient-provided information; (2) smoking status was mentioned in the clinical note by breast clinic provider and/or breast surgeon; (3) there was documentation of advice and/or assistance given regarding tobacco; (4) the patient was referred to the NDC; and (5) patients attended a NDC appointment.

Referral intervention development

The process by which patients are identified as smokers and referred to the NDC is hereafter referred to as the "referral intervention" that was implemented in the clinical practice of the breast clinic. This notation is distinct from the actual tobacco use intervention described above delivered by the NDC.

The study team initially observed several patient visits to better understand the flow of patients through the breast clinic. Diagrams of patient flow were created and possible intervention points were identified**.** The Consolidated Framework for Implementation Research (CFIR) [4], an organizational framework to evaluate implementation effectiveness, was used to identify salient features to be considered in the design. The goal was to incorporate an "opt-out" approach to referral, as opposed to the more common "opt-in" approach taken to tobacco treatment where patients are asked if they wish to be treated and offered assistance only if they report that they are ready to quit. This approach has been proposed as a way to reach more smokers who would benefit from treatment, compared with techniques such as the "5A's" that assesses a patient's willingness to quit before offering resources [2, 13]. In this approach, tobacco treatment is considered an integral and standard part of cancer treatment.

A referral intervention was designed based on these observations and extensive discussions with breast clinic personnel (Supplemental Digital Content 1). Major elements addressed included (1) a clinical assistant confirming smoking status with the patient during the rooming process and documenting

this status on the visit summary sheet for the provider; (2) the provider (physician or nurse practitioner) again asking the patient about smoking and advising them specifically of the risks of smoking and cancer surgery; (3) referral of the patient to the NDC for counseling using an "opt-out" approach (for example, "All of our breast cancer patients here at Mayo who use tobacco meet with a tobacco treatment specialist as routine part of their care"); and (4) documenting the conversation and referral in the clinical note. Documentation templates and order sets in the electronic medical record were updated to help facilitate these changes in practice. Surgeons and surgical nurse educators were also instructed about how to reinforce the importance of abstinence and the NDC referral.

Referral intervention evaluation

Quantitative evaluation

The referral intervention was implemented in July 2015. One year after implementation, medical records were reviewed for all breast cancer patients who identified as current smokers during their initial breast clinic visit from July 2015 through August 2016 (inclusive) to again assess the five elements evaluated in the pre-assessment.

Qualitative evaluation

This assessed the feasibility and acceptability of the referral intervention both for patients and for providers after implementation using semi-structured interviews of patients and providers. Providers were invited to participate in an approximately 15-min interview after their regular staff meetings. Patients were invited to complete an approximately 10-min telephone interview within 7 days of their breast clinic visit (the patient interview script is provided as Supplemental Digital Content 2). Consecutive patients were approached regardless of whether or not they were referred to the NDC. Interviews were audiotaped for later analysis. For patient interviews, we were particularly interested in the experience of being referred (or not) for smoking cessation services and how beliefs, cognitions, and emotions served either as barriers or facilitators to the use of such services. For providers, we attempted to solicit both potential barriers and facilitators that might affect feasibility or acceptability of the intervention.

Analyses

Descriptive statistics were used to evaluate the number of patients who were referred and attended NDC consults, with comparisons before and after implementation made using paired *t* tests.

For qualitative data, thematic analysis of interview transcripts began with two study team members reading the transcripts and making notes in the margins related to concepts in the data. These notes were compared against CFIR constructs, in order to understand how participant responses might inform our understanding of intervention implementation. A codebook was developed that included both CFIR constructs and emergent codes that described other concepts in the data. Two study team members first independently applied the codebook to the transcripts. They subsequently met to review each coded transcript and discuss and resolve any discrepancies. Final coded transcripts were entered into NVivo software (NVivo 10.1, QSR International Pty Ltd.) to facilitate data organization and queries. Team members summarized the analysis in memos that described individual, system, and intervention themes.

Results

Pre-implementation assessment

From January 1, 2012, to December 31, 2013, 345 patients self-reported tobacco use on the breast clinic intake form, completed at the time of their first breast cancer visit, and 83 (24%) of these patients went on to have breast surgery. Upon review of the medical record, 75 (90%) of these patients were confirmed to be actively smoking cigarettes at the time of their breast clinic appointment, as noted in a separate patient-provided information form completed at the time of the visit.

Breast clinic physicians and surgeons documented smoking status in all initial clinical notes excepting one (74/75, 99%). Documentation of advice to quit was less common (54/75 [72%] among breast clinic providers, 21/75 [30%] among breast surgeons, and 12/21 [67%] among plastic surgeons). Documentation of any resource offered to assist patients in quitting was evident in 29 (39%) patients, almost always by the breast clinic provider (only 1 patient was offered a resource by a surgical provider). In 22/29 (76%) of these cases, the suggested resource was the NDC, although only 9/22 (41% of patients offered) actually agreed to schedule a consult. Of the 9 patients who accepted a consult, all attended.

Referral intervention implementation

Pre-implementation assessment data were initially introduced at a breast clinic staff meeting, allowing providers to give feedback about the proposed referral intervention. During the initial planning meeting, plastic surgeons raised concerns about patients who smoke receiving nicotine replacement therapy (NRT) around the time of reconstructive surgery. Current requirements from plastic surgeons include 4–6-week nicotine and tobacco abstinence prior to reconstruction, and this was serving as a barrier to tobacco interventions because

of the integral role of pharmacotherapy, including nicotine replacement, as part of a quit plan. In order to address this concern, two of the authors performed and published a review of the current clinical literature about the use of nicotine replacement therapy in the perioperative period [8]. Conclusions from this review were that there is currently no evidence of risk of nicotine replacement therapy in humans around the time of surgery, and policies that restrict its use should be re-examined. The evidence and conclusions were presented to breast clinic physicians and surgeons, which helped facilitate discussion. As a result, plastic surgeons agreed to consider waiving the NRT restriction on a case-by-case basis.

Information about the NDC, the counseling process, and its availability (including the possibility of same-day requests) was presented to breast clinic staff members. The concept of an "opt-out" approach was discussed in staff meetings and a suggested script was shared with all providers, as well as a copy of the "Standard Operating Procedures" for the intervention (Supplemental Digital Content 1). A module outlining the basics of the intervention, including suggested verbiage for referral, was created and posted on the department webpage, which could be accessed at any time for current providers to review the process or new providers to become oriented to the NDC referral process. Intervention updates were presented approximately every 3 months to inform them of their current progress and inspire continued intervention fidelity.

Post-intervention evaluation

Quantitative evaluation

Forty-five patients self-reported current smoking as part of the standard intake call for new breast clinic patients 1–14 days prior to their first visit and were seen in the breast clinic from July 2016 to August 2017. Of these patients, 15 who reported smoking at this intake call reported having quit by the time of their breast clinic appointment. Of the 30 patients who were still smoking at the time of their visit, 23 (76%) were referred to the NDC, a significantly increased proportion compared with before the intervention (29%, $p < 0.0001$, chi-squared test). Among those referred, 17 (74%) attended the NDC consult, again an increased proportion compared with pre-intervention attendance (41%, $p = 0.026$, chi-squared test).

Qualitative evaluation

Semi-structured interviews were performed with 12 providers (physicians and nurse practitioners) and 10 patients. Five of these patients reported having been referred to the NDC, and 4 of these 5 reported having attended or planning to attend that visit. All subjects approached agreed to participate. Interview responses were consistent among providers, with patients expressing a more wide range of perceptions. Responses from both patients and providers could be broken down into three major categories: System or contextual factors, personal decision factors, and intervention-level factors. Within these categories, there were themes identified that served as either facilitators or barriers to NDC referral.

System-level factors The most common theme identified was the importance of the plastic surgery requirement that patients be nicotine and tobacco free for 4–6 weeks prior to breast reconstructive surgery, which served as a facilitator. This was consistently reported among providers as the primary means that the topic of smoking cessation was introduced. Patients also frequently discussed this requirement as the main reason they expected that smoking would be addressed at their visit. The second most common system-level theme among the providers was related to the "perception of team roles," namely the assumption that previous providers had already discussed smoking status with the patient.

Personal decision factors Factors that were barriers to providers referring patients included light smoking (a few cigarettes a day), advanced cancer, perception of emotional instability, the presence of several comorbid medical conditions, and geographical distance (patients from out of state or international patients). Facilitators of referral mainly centered on the patient's interest in having reconstructive surgery. Most providers did not follow the script verbatim for the intervention, but adapted the main points of the suggested script to achieve the same goal. For example, several providers brought in their own personal experiences with friends or family who smoke, or referred to experiences with other breast cancer patients who had found a visit with our tobacco counselors beneficial. This adaptability allowed providers to still achieve the intervention objectives while making the conversation fit their practice style.

Intervention-level factors Intervention-level factors elicited in patient interviews included perceptions about the smoking discussion with the breast clinic provider. Many patients expressed gratitude that their smoking was not "front and center" in the discussion, since their primary concern was their recent breast cancer diagnosis. No patients reported feeling surprised that their provider discussed their smoking or offered an NDC consult, especially after the plastic surgery requirement for abstinence was discussed. However, many were not able to accurately recall what the NDC consult entailed. In fact, a consistent theme in both the patient and provider interviews was a lack of knowledge (and in some cases even misconceptions) about what happens after referral to a tobacco treatment specialist. The type of provider seen, the length of the visit, content of the therapy (behavioral versus pharmacologic), format of the visit (individual versus group), and follow-up method (in-person visits versus phone

calls) were not clear to many providers and virtually all patients interviewed. In some cases, these misperceptions resulted in patients declining the consult.

Discussion

The main findings of this study are that (1) routine "opt-out" referral to tobacco dependence treatment can be successfully incorporated into a cancer center clinical practice with significant improvement in the number of patients receiving tobacco treatment, (2) patient and provider acceptance was high; and (3) ignorance regarding the content of the NDC intervention among both patients and providers may represent a barrier to successful referral which could be addressed.

Quantitative outcomes

After implementation of the referral intervention, the proportion of patients both referred to and attending NDC counseling significantly increased. This intervention was designed to address several of the barriers to successful referral, including identification of smoking status, streamlining referral mechanisms, and encouragement of NDC attendance by multiple healthcare personnel. It also identified the breast clinic provider as being primarily responsible for initiating and encouraging referral. It is possible that the general awareness of the NDC and encouragement to use the services were enough to affect behavior change on the part of the providers, and presentations at staff meetings about the intervention process may have provided the education necessary to inspire more frequent referrals. The increased enthusiasm on the part of the provider may have been conveyed to the patient and thus inspired more frequent acceptance of the referral offer.

Qualitative outcomes

Despite the improvement in quantitative outcomes, our qualitative evaluation suggests that providers were not implementing the intervention with high fidelity. Our efforts to educate providers about this intervention generally affected provider awareness about nicotine counseling services, but our specific intervention-level components (such as the script for providers to use in suggesting an NDC consult) were generally not used. In fact, when asked, many providers had forgotten or were not aware that these components were available, but they did describe conversations with patients that generally addressed the suggested topics. This finding suggests that provider training could be improved.

The major intervention facilitator reported by both patients and providers was the requirement by the surgeons for preoperative tobacco abstinence. Providers viewed this requirement as a mechanism to introduce and de-personalize the topic of smoking cessation with patients. Consistent with the CFIR model of implementation, a conducive "intervention climate" is one of the core elements of successful program implementation [4]. Providers reported being more comfortable sharing the plastic surgery requirement with patients because it represented an external mandate, rather than a personal recommendation. Once the provider shared this requirement with the patient, it opened the door for the provision of smoking cessation resources. Patients reported that the abstinence requirement made the smoking cessation discussion a logical and accepted part of their treatment. This additional external requirement (beyond the usual motivations to quit) may also reduce the stigma associated with smoking, helping patients to feel less singled out for their behavior and more supported by their provider to meet this requirement. It could be argued that focusing on a single rationale for abstinence such as the success of reconstructive surgery may minimize many other important reasons for cancer patients to quit smoking, such as the lower rates of treatment success (radiation therapy, chemotherapy, and surgery) [17], exacerbation of treatment side effects in patients who continue to smoke [5], and the increased risk of secondary cancers [1]. Also, patients may quit smoking only to receive surgery, then resume when reconstruction is complete. Other cancer patients demonstrate this pattern; relapse to smoking is often delayed (in order to complete treatment) compared to the general population of smokers who usually relapse within the first week of a quit attempt [5]. Though the abstinence requirement facilitated referral in this clinical setting, referral may prove more difficult in other settings where no such requirement exists. If this intervention is expanded to other clinical practices, identifying the most salient motivator of behavior change in each specific clinical population and tailoring the intervention accordingly may be beneficial, even if that factor does not address the most objective medical risk of smoking in that population.

Another noteworthy finding from the qualitative work was that the "opt-out" approach to referral was well accepted by both providers and patients in this setting. Although this approach needs further evaluation [13], we were encouraged by this acceptance and the relatively high rates of referral and attendance achieved. This occurred despite a lack of knowledge on the part of both patients and providers regarding what was involved in an NDC visit. We speculate that educational efforts directed in this area could further increase the utilization of these services. The ultimate goal would be that referral to treatment resources would become a routine and integral component of cancer treatment.

Limitations

There were several limitations to this study. It was performed in a specific, relatively small clinical population of patients at a large referral center in the upper Midwest, and the findings

may not be applicable to other populations or institutions. It is also possible that providers were aware that someone would be "monitoring" their referral practices as part of this intervention, and so were more likely to perform referrals for that reason alone. Finally, although tobacco treatment is known to be efficacious, it will be important in future work to examine the effect of the referral intervention on the ultimate goal of sustained abstinence from smoking.

Conclusions

The impact of this referral intervention was significant in terms of increasing the number of breast cancer patients who received individualized tobacco dependence treatment during a time at which they were at a particularly high risk for complications from smoking cigarettes. Similar referral interventions for all types of cancer patients should be pursued with the aim of embedding tobacco dependence treatment seamlessly and consistently into the cancer treatment plan of every patient who smokes cigarettes.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Disclaimer The authors have full control of all primary data and will agree to allow the journal to review this data if requested.

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