Combining Women’s Cancer Screening Examinations Shows a Positive Impact on Colorectal Cancer Screening Rates

Marianne T. Ritchie
Apeksha Shah
Bilal A. Asif

Colorectal cancer (CRC) is the 3rd most common cancer among women. Though colonoscopy screening effectively prevents and detects this malignancy, women often delay CRC screening due to time committed to other highly emphasized gender specific screening, embarrassment, preference for women endoscopists, and inconvenience. We designed PINK PLUS™, a program combining three women’s screenings in one visit; mammogram, gynecology exam (GYN) and pre-colonoscopy visit (GI). A successful pilot resulted in 75% returning for colonoscopy. The program expanded to include 3 options (mammogram/GI, GYN/GI, mammogram/GYN/GI) and showed even greater CRC screening adherence (77%) PINK PLUS™ is a flexible and convenient program demonstrating a high rate of compliance with colonoscopy, which could serve as a national template aimed at increasing adherence to all women’s cancer screenings, especially in underserved communities, by combining these life-saving screenings into one visit.

INTRODUCTION

Timely colorectal cancer (CRC) screening can detect and remove precancerous polyps before they become cancer1,2 and find CRC at an early stage, when a cure is more likely.3 Yet according to the American Cancer Society,3 only 60% of women over age 50, the recommended age to begin CRC screening, undergo screening with endoscopy (colonoscopy or sigmoidoscopy). Lower still is the adherence rate among women ages 50 to 64 (55%). As a result, CRC is the third leading cause of cancer death in US women and a major public health risk. Women are less likely to undergo CRC screening than men even though CRC mortality rates are similar (4.6% for men vs. 4.2% for women).3 Barriers to screening in women differ from those in men but are not clearly understood.4,5 Lack of physician recommendation has been cited as a barrier to CRC screening,6,7 along with embarrassment, expense, discomfort, fear of results, and inconvenience.8 Past sexual abuse may also deter women from colonoscopy, as it may stir unwanted memories.9

(continued on page 52)
Patient education appears to play an important role. In one study, women were invited to have a conversation about CRC screening while visiting a health care center for a mammogram. Capturing the attention of patients during the visit for mammography led to increasing their CRC screening rates, especially when the program included navigation.10

Previous studies have also shown that women who engage in other cancer prevention behaviors are more likely to undergo CRC screening.8,11 For women who had a mammogram within 2 years or Papanicolau smear within 3 years, the likelihood of CRC screening increased from 24% to 60.6% and from 33.3% to 56%, respectively.11

Yet women who practice other forms of preventive care may still avoid CRC screening. CRC screening rates for women lag behind screening rates for breast cancer by about 10% and cervical cancer by about 20%.12 This lag may result from a lack of public awareness that CRC is both common and preventable,11 and that CRC occurs about equally in men and women. It may also reflect increased general awareness of the benefits of breast cancer screening and cervical cancer screening compared to CRC. Finally, the higher rates of screening for breast and cervical cancer may simply reflect differences in the ease of completing these tests compared to CRC screening.

Gender-related distinctions also exist in location of colonic neoplasia. Women are more likely to have purely right-sided polyps and tumors.13 Surveillance, Epidemiology, and End Results Program (SEER) data show CRC in the right colon more often in women (45%) than in men (36%).14 Another factor that increases the risk for proximal cancers is cholecystectomy, which is more commonly performed in women than in men.11 These data should be considered when...
making screening recommendations.

Another consideration is ethnicity. Hispanic women have the lowest risk while black women manifest the highest rates of CRC, similar to the white male population. There also appears to be a more proximal distribution of CRC and adenomas in African Americans (AA).

Based on what is known about CRC screening barriers and behaviors among women, we created PINK PLUS™, a program that aims to enhance screening rates and compliance by combining screening for breast, cervical, and CRC in one setting. The objective of this report is to describe the implementation of PINK PLUS™ and to detail its impact on screening rates among patients who enrolled in the program.

METHODS

PINK PLUS™ is a program that offers women bundled cancer screenings in one visit at one location by all women health care providers. A pilot at the Thomas Jefferson University Breast Imaging Center was promoted with campus flyers and university intranet announcements. Twelve women participated, each undergoing a mammogram, gynecology examination (GYN) and pre-colonoscopy visit (GI), all within 2.5 hours. A gastroenterologist conducted the GI visit; a history and physical followed by an explanation of the preparation and risks of colonoscopy. Based on positive feedback from the initial cohort, the program was expanded to include several screening combination options during evening hours (mammogram-GI, mammogram-GYN-GI) and daytime hours (mammogram-GI, GYN-GI). At the end of each brief GI visit, patients were scheduled for colonoscopy. Patients were considered ineligible because they were not due for screening, not medically stable, or had insurance issues. A retrospective chart review of all PINK

---

**Figure 2.** Relevant Family History of CRC screened PINK PLUS patients.
Combining Women’s Cancer Screening Examinations Shows a Positive Impact on Colorectal Cancer Screening Rates

A SPECIAL ARTICLE

Improving women’s health. A major strength of the program is convenience. With one phone call, a patient can have up to three cancer screenings in one place on one day, during daytime or evening hours. We showed that the practice of combining two or three cancer screening examinations in one visit improved CRC screening rates in the women who participated in PINK PLUS™. CRC screening was included in each of the three PINK PLUS™ options offered because of the three screenings, CRC has the lowest adherence rates. To our knowledge, no other program adds CRC screening with other women’s cancer screenings in one clinical setting.

Our program’s bundled approach to women’s cancer screenings was built on findings that women who adhere to screening for breast and/or cervical cancer are more likely to undergo CRC screening. In particular, one study found that women who had breast and cervical cancer screenings were four times more likely to undergo endoscopic CRC screening.

Scheduled colonoscopies completion rate 100%

RESULTS

In all, 118 women (average age 57.1 years) participated in the program. Eighteen were excluded because they were ineligible for CRC screening (Table 1). Of the 100 remaining women, 77 returned for colonoscopy screening (77%) (Figure 1). Of those individuals who returned for colonoscopy screening, 28 (36.4%) had undergone a prior colonoscopy. Of these patients, 15 (19%) had a personal history of colon polyps (Table 2). A majority of patients had no family history of CRC or polyps; 16 (21%) had a family history of only CRC and an additional 5 (6%) had a family history of both CRC and polyps (Figure 2). On colonoscopy, 35 patients (45%) had a normal examination, 26 patients (34%) had adenomatous polyps, and 15 patients (19%) had hyperplastic polyps. Of those who underwent mammography, 10% had abnormal findings, defined as new mass or lesion detected on mammogram. Of these 77 patients who underwent colonoscopy, most (61%) had the colonoscopy within 3 months, and an additional 14% had colonoscopy within 3 to 6 months (Table 3).

DISCUSSION

Past attempts to enhance screening rates by media campaigns, fecal occult-blood tests, and other methods have met with limited success, especially in medically underserved communities. By bundling women’s cancer screenings, PINK PLUS™ provides an innovative approach to improving women’s health.

A major strength of the program is convenience. With one phone call, a patient can have up to three cancer screenings in one place on one day, during daytime or evening hours. We showed that the practice of combining two or three cancer screening examinations in one visit improved CRC screening rates in the women who participated in PINK PLUS™. CRC screening was included in each of the three PINK PLUS™ options offered because of the three screenings, CRC has the lowest adherence rates. To our knowledge, no other program adds CRC screening with other women’s cancer screenings in one clinical setting.

Our program’s bundled approach to women’s cancer screenings was built on findings that women who adhere to screening for breast and/or cervical cancer are more likely to undergo CRC screening. In particular, one study found that women who had breast and cervical cancer screenings were four times more likely to undergo endoscopic CRC screening.

Several studies have identified a primary care physician (PCP) recommendation as a strong predictor for cancer screening adherence. Studies also show that some women consider their Obstetrician-Gynecologist (OB-GYN) doctor as their PCP. PINK PLUS™ enables OB-GYN doctors to refer patients for double or triple screenings, which will help boost CRC screening rates. In addition, there is an association between the risks for CRC and gynecologic cancers. Approximately 10% of patients with both endometrial cancer and CRC are due to the Lynch Syndrome (inherited CRC syndrome) but in the majority of cases, no genetic disorder is found.

(continued on page 56)
If endometrial cancer is diagnosed before age 50 or ovarian cancer before age 65 (especially before age 50) there is a marked increase in CRC risk.\(^9\) PINK PLUS\(^{TM}\) considers these related risks by combining these screening options in one visit. Screening recommendations should also reflect these effects on CRC risk.

PINK PLUS\(^{TM}\) was also based on capturing opportunities for physicians to provide patients with education about preventive cancer screening. One program that bundled education about breast, cervical and CRC led to positive changes in knowledge and attitude about screenings.\(^{17}\) Another study added CRC screening education at the time of a mammogram and resulted in improved CRC screening rates.\(^{10}\) The PINK PLUS\(^{TM}\) education advantage also includes a full explanation of risks and benefits of various screening tools, and particularly, of colonoscopy over fecal immunochemical testing (FIT) screening\(^{18}\) or flexible sigmoidoscopy. Colonoscopy enables visualization of the entire colon, and unlike screening tests for other women’s cancers (breast, cervical), is both diagnostic and therapeutic. Precancerous polyps can be removed and prevent the progression to malignancy.\(^1\)

PINK PLUS\(^{TM}\) enables physicians to focus on the specific needs of women that relate to CRC screening, addressing the potential for different risk factors and presentations in women than in men. Adenomas and CRC in the proximal colon are more common in women, especially African American women under age 40,\(^{19}\) or those who are post-cholecystectomy.\(^{11}\) Women are also more likely to have flat (sessile serrated) polyps with advanced pathology and cancer,\(^{13}\) which also have a predilection for the proximal colon. Smoking is a significant risk for colorectal adenomas and CRC for both men and women, but recent studies show that female smokers are more susceptible than male smokers in developing sessile serrated polyps and proximal CRC, as well as an earlier age of onset and death from CRC.\(^{13}\) Upon learning about the several factors that increase the likelihood of proximal colon neoplasia, women understand why colonoscopy is the most optimal screening tool because it enables visualization of the entire colon.

PINK PLUS\(^{TM}\) can also eliminate obstacles that may reduce screening rates for some patients. A recent decline in incidence and mortality from CRC that has been noted in white patients has not been paralleled in minority communities. CRC incidence rates are about 20% higher in blacks than in non-Hispanic whites and death rates are 40% higher, according to data from 2009-2013.\(^3\) Age appropriate Hispanics are less likely to undergo CRC screening (45%) than non-Hispanic whites (61%), as reported in a study from 2013.\(^{20}\) Racial and ethnic disparities in CRC result from several factors including differences in socioeconomic status and levels of education, differences in behavior that increase risk (smoking, obesity) and underuse of screening.\(^{7,19,21}\) Obstacles to screening include lack of health insurance and health care, language barriers and lack of physician recommendation.\(^{6,7,21}\)

### Table 2. Cancer Screening and Personal Malignancy Screening for PINK PLUS Patients (2011-2017)

<table>
<thead>
<tr>
<th>Cancer Screening Endoscopic Findings</th>
<th>0% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Exam</td>
<td>45% (35)</td>
</tr>
<tr>
<td>Adenomatous Polyps</td>
<td>34% (26)</td>
</tr>
<tr>
<td>Hyperplastic Polyps</td>
<td>19% (15)</td>
</tr>
<tr>
<td>Other</td>
<td>1% (1)</td>
</tr>
<tr>
<td>Mammographic Findings</td>
<td></td>
</tr>
<tr>
<td>Abnormal Mammography</td>
<td>10% (8)</td>
</tr>
<tr>
<td>Personal Polyp/Cancer History</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>78% (60)</td>
</tr>
<tr>
<td>Colon Polyps</td>
<td>19% (15)</td>
</tr>
<tr>
<td>Breast Cancer</td>
<td>1% (1)</td>
</tr>
<tr>
<td>Cervical Cancer</td>
<td>1% (1)</td>
</tr>
</tbody>
</table>

### Table 3. Frequency of Average Time from Initial PINK PLUS Appointment to Colonoscopy (2011-2017)

<table>
<thead>
<tr>
<th>Time Period</th>
<th>0% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 30 Days</td>
<td>23% (18)</td>
</tr>
<tr>
<td>1 Month to 3 Months</td>
<td>38% (29)</td>
</tr>
<tr>
<td>3 Months to 6 Months</td>
<td>14% (11)</td>
</tr>
<tr>
<td>Greater than 6 Months</td>
<td>25% (19)</td>
</tr>
</tbody>
</table>
Since the ACS recommends mammography at age 45 with the option to begin at age 40, PINK PLUS™ is an ideal program to identify at-risk patients and facilitate earlier CRC screening when needed. This would include patients with a family history of CRC or colon polyps, inherited CRC syndromes, or those with a personal history of inflammatory bowel disease. In addition, CRC incidence has increased steadily in patients under age 50, from 6% in 1990 to 11% in 2013. Most of these cases (72%) are found in patients in their 40s. The risk for developing CRC at a younger age is particularly high for African Americans. In 2017, the Multi-Society Task Force of Colorectal Cancer recommended initiating CRC screening for African American patients at age 45. More recently, the American Cancer Society updated their guidelines by adding a qualified recommendation that all average-risk patients should begin CRC screening at age 45. Should the United States Preventive Services Task Force also change their national guidelines to begin CRC screening at age 45, PINK PLUS™ will facilitate the screening of these younger patients who are also undergoing mammography.

PINK PLUS™ offers several other advantages aimed at improving cancer screening rates. The convenience of “one-stop shopping” with daytime and evening hours appeals to women of all socioeconomic strata and education levels. One visit with multiple screenings saves costs for transportation and childcare. A face-to-face visit with the gastroenterologist and a navigator is more likely to win the trust of a patient whose cultural fears or a language barrier might otherwise obviate access to screening.

Direct-access-colonoscopy is a growing trend which eliminates an office visit prior to the procedure. With PINK PLUS™, a brief GI visit may also increase the appeal of CRC screening for those patients who are more comfortable meeting the endoscopist before examination day. PINK PLUS™ is staffed by all women health care providers which may eliminate embarrassment as a barrier. In general, data show that women are more compliant than men in utilizing health care services. If PINK PLUS™ draws women for screenings, perhaps it will bring additional family members for preventive health services.

Our report on PINK PLUS™ has some limitations. This summary does not describe a formalized study and the cohort includes a small number of patients. Also, patients were not surveyed to learn whether the convenience of PINK PLUS™ enhanced their adherence to screenings. In addition, for those with a personal history of colon polyps, their procedures were considered surveillance and not screening examinations; however the program still facilitated a convenient follow-up plan. Lastly, for patients who did not return for colonoscopy, it would have been helpful to give each one a FIT kit so some form of screening could have been documented.

Looking to the future, we see PINK PLUS™ playing an important role in addressing shifting U.S. demographics. By the year 2050, more women will be heads of households, living under the poverty level, and facing food insecurity and lack of adequate health care. Rates of CRC are predicted to increase among women, and CRC screening efforts should reflect and address their specific needs. Gender differences in location of CRC in women, along with racial and socioeconomic disparities, should be considered in future strategies for screening, prevention and treatment protocols.

To learn more about the effectiveness of PINK PLUS™ for improving screening rates for women’s cancers, particularly CRC, we plan to conduct a prospective, randomized study with a large primary care group with a diverse population. Based on our findings to date, we believe that the program can have a positive impact on screening rates by increasing convenience, accessibility and education. With the success at our institution, PINK PLUS™ could serve as a national template for other health care institutions with the same goals.

References
Combining Women’s Cancer Screening Examinations Shows a Positive Impact on Colorectal Cancer Screening Rates

A SPECIAL ARTICLE


