Use of a Point-of-Care Tool to Improve Nurse Practitioner BRCA Knowledge

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Background: Women who have been identified with a BRCA mutation benefit from a multidisciplinary, individualized medical evaluation to reduce their risk of developing cancers. Identifying women who would gain from testing for BRCA mutations is essential. Nurse practitioners (NPs) as primary care providers are important members of the healthcare team and are instrumental in identifying and referring women for testing. However, studies have shown that NPs lack knowledge about and confidence in identifying women at risk.

Objectives: This project was undertaken to increase NP knowledge about assessing women at risk for the BRCA mutation and determining whether such testing is appropriate. This was accomplished through a BRCA risk assessment tool developed as a mobile health technology (MHT) application using the Ontario Family History Assessment Tool, one of the tools recommended by the U.S. Preventive Services Task Force in its guidelines on BRCA-related cancer risk assessment, genetic counseling, and genetic testing to assist primary care providers in the assessment of women.

Methods: NPs attending an NP conference in the midwestern United States completed pre-test, post-test, and satisfaction surveys regarding use of the MHT application. The application included a point-of-care tool and educational information.

Findings: The participants demonstrated increased knowledge from pre- to post-test after use of the MHT application, with an overall positive evaluation.

Breast cancer is the most frequently diagnosed cancer in women, with about one in eight (or 12%) of U.S. women developing invasive breast cancer during their lifetime (American Cancer Society [ACS], 2016). Of the women diagnosed with breast cancer each year, about 5%-10% of the cases are attributable to the BRCA gene (National Cancer Institute [NCI], 2016). Women with a BRCA mutation have a substantially increased risk of breast cancer; anywhere from 45%-65% of this population will be diagnosed with breast cancer by age 70 years (NCI, 2016). In addition, these women have an increased risk of ovarian cancer—anywhere from an 11%-39% risk of developing the disease by age 70 years (NCI, 2016). Women who have been identified with a BRCA mutation can benefit from a multidisciplinary, individualized medical evaluation that can lead to medical and surgical interventions to reduce their risk for disease (Nelson et al., 2013). Nurse practitioners (NPs), along with other providers, are essential members of the healthcare team and are instrumental in identifying women who are at increased risk for BRCA mutations (Pruthi, Gostout, & Lindor, 2010).

The U.S. Preventive Services Task Force (USPSTF) has recommended, with fair evidence, referral for genetic counseling and evaluation for BRCA testing in women whose family history indicates an increased risk for the BRCA mutation (Nelson et al., 2013). In addition, routine referral for genetic counseling or BRCA testing is not recommended if the family history does not indicate an increased risk (USPSTF, 2015). The USPSTF recommendations regarding risk assessment, genetic counseling, and genetic testing are available online (http://bit.ly/1Efi3ux). A systematic review found that nurses did not demonstrate adequate or appropriate levels of knowledge and skills in genetic competency areas (Skirton, O’Connor, & Humphreys, 2012),
Thirty-seven participants evaluated the MHT. They were recruited after taking a pretest, participants used two simulated patient cases. Content for the MHT application was developed using the Ontario Family History Assessment Tool (Gilleon, Carson, & Hunter, 2000), a recommended risk tool for clinical evaluation, with the goal of providing point-of-care education to increase NP knowledge with demonstrated satisfaction in the use of the MHT application. This project evaluated the knowledge and skills of NPs, as well as the use and feasibility of, and satisfaction with, the MHT BRCA risk assessment application that used simulated clinical scenarios. The desired outcomes were an increase in pre- to post-test scores, with a minimum of 80% correct on the post-test in the areas of knowledge and skills; good to very good NP satisfaction with use of the MHT as a tool to assess a woman’s risk; and a 90% participant completion rate (involving using the MHT and finishing the evaluation). The development of this resource using MHT will improve NP practice by providing resources and education at the point of care and in the care of women.

Literature Review

Few studies have examined the knowledge and confidence of NPs in identifying women at risk for a BRCA mutation. Some studies acknowledged common areas of deficit, such as lack of knowledge, confidence, and incorporation into practice patterns, of all healthcare providers, including advanced practice nurses (Cox et al., 2012; Houwink et al., 2011; Sabatino, McCarthy, Phillips, & Burns, 2007) and NPs specifically (Edwards, Maradiegue, Seibert, Saunders-Goldson, & Humphreys, 2009). Educational interventions have shown positive results (Blazer, Christie, Uman, & Weitzel, 2012; Blazer et al., 2011; Carroll et al., 2009; Clyman et al., 2007). Studies of web-based programs have shown usefulness in terms of cost, accessibility, and time management for healthcare providers and patients (Free et al., 2013) and for healthcare providers, medical or nursing students, and patients (Mosa, Yoo, & Sheets, 2012).

Content for the MHT application was developed using the Ontario Family History Assessment Tool, as recommended by the U.S. Preventive Services Task Force, and after consulting with a genetic specialist at the Michigan Department of Community Health. Collaboration took place with an information technology company to create a smartphone and tablet application. Funding, through the Mid-Michigan Affiliate of Susan G. Komen for the Cure, was secured to pay for information technology work. Application was completed and beta tested. Revisions were made to the application based on feedback. Thirty-seven participants evaluated the MHT. They were recruited from a midwestern U.S. nurse practitioner conference. After taking a pretest, participants used two simulated patient cases to input data into the MHT application and answer patient questions using educational information in the MHT application.

Knowledge and Confidence

Two studies relied on the provider’s self-rating of knowledge, which was a weakness of the designs (Houwink et al., 2011; Sabatino et al., 2007). Another study (Edwards et al., 2009) found knowledge of breast cancer risk assessment and the use of risk assessment models lacking among NPs through the use of an objective test of clinical scenarios. A focus group in the Netherlands that included advanced practice nurses and physicians found that all providers needed and wanted more education in the area of genetics (Houwink et al., 2011). The major areas identified as important were related to lack of knowledge, assistance with family history taking and possible clinical issues, and ethical and psychosocial effects related to genetics, as well as to the available genetic referral services in the provider’s area (Houwink et al., 2011).

Another study of 147 NPs found that 71% (n = 104) had low confidence in obtaining an assessment of breast cancer risk (Edwards et al., 2009). More than half (n = 75) of NPs reported conducting breast cancer risk assessment with their patients, and 57% (n = 55) of the participants did not respond correctly to any of the knowledge questions (Edwards et al., 2009). In a survey of 2,191 primary care providers, physicians, naturopaths, NPs, and physician assistants (Cox et al., 2012), most (82%, n = 1,797) reported low confidence in personal knowledge of BRCA. Sabatino et al. (2007) surveyed all primary care providers, including NPs, within a health system (N = 107) and found that one of the most commonly reported barriers to assessing risk was a lack of confidence in knowledge (21%, n = 22).

Use and Referral

Cox et al. (2012), in a study of 2,191 primary care providers, determined that 68% (n = 1,490) had referred patients at risk without a personal history of cancer to a genetic specialist for BRCA testing in the past year, and that 56% (n = 1,223) had referred a patient with cancer to a genetic specialist for BRCA testing. Most commonly, the reason given for the referral was that the patient met practice guidelines (Cox et al., 2012). Sabatino et al. (2007) found that 35% (n = 37) of all providers (N = 107), including NPs,
reported referring patients to high-risk cancer clinics, and 21% (n = 22) discussed genetic testing with their patients. Of the high-risk patients that they saw, 58% (n = 62) communicated that risk, and 45% (n = 48) documented that risk (Sabatino et al., 2007).

A survey of 28 genetic counselors and geneticists (Rolnick et al., 2011) was conducted to gain their perspective on barriers in identification and referrals. Participants noted that improved family history documentation would increase appropriate referrals for genetic risk assessment; education of the providers was also considered to be important by half (n = 14) of the participants (Rolnick et al., 2011).

Patient Perceptions

In a study of 5,915 patients and their families affected by a genetic condition (Harvey et al., 2007), 64% (n = 3,786) reported receiving no genetic information from their providers. In addition, 34% (n = 2,011) indicated that their provider lacked interest, willingness, and knowledge about the genetic condition in their family, whereas 15% (n = 887) did research and educated the provider about the condition (Harvey et al., 2007).

Bellcross, Leadbetter, Alford, and Peipins (2013) randomly surveyed 2,524 women in a large health system and found that, although about 6% (n = 151) of the participants had a family history fulfilling one or more of the USPSTF patterns (first- or second-degree relatives with a history of breast cancer, cancer diagnoses aged younger than 50 years, bilateral breast cancer, ovarian cancer, both ovarian and breast cancer, Ashkenazi Jewish heritage with a relative with breast or ovarian cancer) and should be identified for genetic testing, about 22% (n = 552) had been identified and referred for genetic counseling.

Effects of Genetics Education

Studies found that education and support are helpful in improving the knowledge and confidence of providers (Carroll et al., 2009) and that web-based education has been effective and feasible (Blazer et al., 2011, 2012). The Genetics Education Project was created to assist primary care providers with obtaining knowledge in genetic care; it involved an interactive workshop with 29 clinicians to improve knowledge, confidence, and awareness of genetic services and the primary care role (Carroll et al., 2009). Post-workshop, significant improvement was noted in participants’ self-rated knowledge and confidence in their skills; assessments in who should be referred for genetic counseling; discussions of the benefits, risks, and limitations of genetic testing, and confidence in their being a resource for genetic disorders. Two web-based genetics education programs (Blazer et al., 2011, 2012) were effective in increasing knowledge, skills, referral, and confidence with risk identification.

An HMD (2015) workshop summary to evaluate improving genetics education identified the gap that exists between the information available to inform healthcare providers and what actually happens in the healthcare setting. Because clinicians can be overwhelmed by the amount of information available, the HMD (2015) suggested solutions in educational approaches, including point-of-care tools that healthcare providers can use for on-the-spot learning.

Quality Improvement Project Development

Although MHT applications have not been tested specifically in the area of risk assessment, they have been helpful in other areas of clinical practice, particularly with clinical decisions (Free et al., 2013; Mosa et al., 2012). Just-in-time educational tools may facilitate education for providers (HMD, 2015).

Therefore, a tool—the MHT application—was developed to assist in decision making with education for clinical use by NPs in appropriately identifying women at the point of care. This quality improvement project was completed to evaluate a point-of-care resource for providers in assessing women at risk for a BRCA mutation. A description of the process of development and testing is described in Figure 1. A summative assessment providing feedback and information during the instructional process and measures of participant progress were conducted throughout the project. A summative assessment, which was product oriented and assessed knowledge after using the MHT application, was completed at the end of the project.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>X</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>This application is easy to use.</td>
<td>10</td>
<td>19</td>
<td>6</td>
<td>1</td>
<td>4.05</td>
<td>0.742</td>
</tr>
<tr>
<td>This application will be useful for me in my clinical practice.</td>
<td>6</td>
<td>15</td>
<td>12</td>
<td>3</td>
<td>3.66</td>
<td>0.849</td>
</tr>
<tr>
<td>This application increased my knowledge of appropriate risk assessment.</td>
<td>12</td>
<td>18</td>
<td>6</td>
<td>–</td>
<td>4.16</td>
<td>0.867</td>
</tr>
<tr>
<td>This application increased my confidence in appropriately assessing BRCA mutation risk among my patients.</td>
<td>8</td>
<td>21</td>
<td>7</td>
<td>–</td>
<td>4.02</td>
<td>0.644</td>
</tr>
</tbody>
</table>

MHT—mobile health technology; NP—nurse practitioner

Note: A five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used for evaluation. No participants indicated “strongly disagree” for any of the statements.
Methods
Following consultation with the University of Iowa Human Subjects Office, the institutional review board considered the quality improvement project to be exempt. Permission was granted to test the MHT application at the conference planning committee of the Ann Arbor chapter of the Michigan Council of Nurse Practitioners in December 2013.

The project director invited, via email, all conference attendees to participate in the quality improvement project about four weeks prior to the conference. The attendees were offered the option of prescheduling time to participate or scheduling on the day of the conference. Fourteen participants scheduled a time prior to the event, and 23 attendees were recruited the day of the event. During beta testing, the time to test the application and complete the forms was found to be about 20 minutes. The scheduled times were before the conference, during breaks and at lunch, and after the conference. Two tables were set up in the entrance to the conference with chairs to provide a simulated clinic environment. Each participant was given a tablet to use for the evaluation with the application preloaded.

Evaluation of the Application
Evaluation of this project was conducted by collecting data for evaluation along with having participants complete a satisfaction survey. Demographic information (age, years in practice, location of practice, type of patients seen, type of health professional, educational preparation) was obtained from the participants, and they completed a seven-question test of their BRCA knowledge. The participants were then given two clinical scenarios in succession. Both scenarios involved simulated patients who would typically be seen by a primary care provider; participants used the MHT application to assess the patients and answer their questions, as well as to determine if a referral for genetic counseling or testing was appropriate. They then used the “referral resources” and “risk information” screens to assist them in answering patient questions. The participants also completed a seven-question post-test, a satisfaction survey, and an evaluation of their confidence in assessing women for a BRCA mutation.

Findings
The participants were attendees of a NP conference in Michigan (N = 36). Most participants (n = 20) had less than 10 years of experience as NPs. A majority of participants (n = 31) owned either a smartphone or a tablet, and many (n = 28) reported using medical applications in the clinical setting. The evaluation of the project included quantitative and qualitative data. The improvement from a pretest score mean of 5.12 out of 7 possible points (73% cumulative test score) to a post-test score mean of 6.03 out of 7 possible points (86% cumulative test score) was statistically significant, with a p value of 0.006.

The satisfaction survey showed that most participants (n = 29, 81%) agreed or strongly agreed that the application was easy to use (see Table 1). A majority also agreed or strongly agreed that the application would be useful in clinical practice (n = 21), that the application increased their knowledge of appropriate risk assessment (n = 30), and that the application increased their confidence in assessing risk (n = 29).

Discussion
The outcomes of this project showed that a point-of-care resource in the form of a smartphone and tablet application can be an effective resource for NPs. The evaluation of the application showed an increase in provider BRCA knowledge through comparison of pre- and post-test results. The satisfaction survey showed that the application was satisfactory for providers, and that they thought it would be useful for them in their clinical practice. Those surveyed agreed that use of the point-of-care resource increased their knowledge of appropriate risk assessment and their confidence in assessing risk.

Limitations
Evaluation of this MHT application was completed using a simulated patient. The case scenarios were used with evaluation at an NP conference, and the MHT was not evaluated in real time in a clinical setting. The evaluation was completed by NPs as a convenience sample. Because this was a quality improvement project, the measures were not validated. Future plans include an evaluation of the application with other providers, including physicians and physician assistants, and testing of the MHT application in the clinical setting.

Conclusion
This quality improvement project demonstrated that an MHT application is helpful and satisfactory when used by NPs in the assessment of women at risk for a BRCA mutation. In addition, it can be an effective method of providing resources for NPs in assessing women for a BRCA mutation. Ultimately, this will lead to improved care for women through appropriate identification of those at risk for a BRCA mutation.

References
with a family history meeting the 2005 USPSTF recommendation for BRCA genetic counseling referral. Cancer, Epidemiology, Biomarkers and Prevention, 22, 728–735.


