Dense Breasts: Different Than the Rest: Evaluating the Timeliness and Feasibility of

Application of a Breast Cancer Screening Tool in a Primary Care Pilot Project

Kaitlin Gillespie Zuleta

A Project Report Submitted to

the Faculty of The School of Nursing at

The University of North Carolina at Greensboro

in Partial Fulfillment

of the Requirements for the

Doctorate in Nursing Practice

Greensboro

2023

Approved by:

Carolyn Hoskins Project Team Leader

Brandi Farrell Project Team Co-Leader

Dr. Wanda Williams DNP Program Director

Table of Contents

Dedication and Acknowledgments

I would like to thank the large support system for the completion of this project. Thank you to the staff at the primary care office utilized for this pilot, as well as all the Doctoral professors at University of North Carolina at Greensboro School of Nursing who supported this endeavor. Special thanks to Dr. Carolyn Hoskins who has acted as mentor and guide throughout this program. On a personal note, thank you to my spouse, Jesus Zuleta, for your unwavering love and assistance in everything and to my parents Russell and Pam Gillespie for the continuous care, love, and encouragement.

Abstract

Background: The best outcomes for cancer are directly related to early detection. Accounting for factors, including breast density, is highly important for decreasing mortality. **Purpose**: The purpose of the pilot project is to discern if there is an appropriate breast cancer screening for patients with dense breasts that can be utilized in primary care. **Methods**: A literature search performed to determine options for a screening tool. Once saturation was met the literature was used to choose one tool to be implemented into clinical practice. The Tyrer Cuzick was determined to fit the criteria of breast density as a screening factor. The tool was utilized by a Nurse Practitioner in a rural primary care practice**. Results**: The Tyrer Cuzick screening tool is effective in guiding clinical practice for women with dense breasts and in guiding adjunct imaging care. There were not enough patients who met inclusion criteria during the time frame to meet standards for clinical significance. **Recommendations and Conclusion**: The Tyrer Cuzick is a valuable tool for screening for lifetime breast cancer risk and can assist in guidance of necessity in adjunct screening and genetic testing recommendations. It would be beneficial if the screening could be streamlined for time management purposes. For replication, a larger sample size as well as a longer time frame would be beneficial for evaluating usefulness in clinical practice.

Background and Significance

In 2018, more than 250,000 women were newly diagnosed with breast cancer (*Breast Cancer Statistics*, 2021). Breast cancer is the leading cancer to be diagnosed and the second deadliest cancer in patients assigned female at birth. It is commonplace in the primary care setting to diagnose or extend the news to a patient that there is cause for concern for breast cancer. While screenings are much more common now, leading to earlier detection and higher survival rates, there are still major care gaps that need to be filled to decrease mortality related to breast cancer. Women have greater access to mammography and are more frequently screened in modern medicine than in any previous decade (CDC, 2021). While screening is more commonplace, current data supports women need further imaging with special significance placed on women with dense breasts, a clinical history of breast cancer, or a diagnosis pertaining to the breast tissue before age 50 (Monticciolo et al., 2018).

One of the factors that tend to cause abnormal or inconclusive screenings for breast cancer are dense breasts. Dense breasts are classified as an abundance of connective and glandular tissue to the ratio of fat in the breasts. The connective and glandular tissue create a matrix of more compact breast tissue that appears darker and more difficult to differentiate on a mammogram as opposed to non-dense breasts (National Institute of Health [NIH], n.d.). Over half of women who complete mammography are considered to have dense breasts and are determined to have dense breasts based on their Breast Imaging Reporting and Data System (BI-RADS) category. There are four different categories that breast tissue may be classified as; A, B, C, and D. Type A breasts are primarily fatty breast tissue and type B have patches of dense breast tissue. Type C have a high percentage of glandular and connective breast tissue and type D have extremely dense breast tissue. Women who have higher amounts of glandular tissue are

classified to have dense breasts and at increased risk for mammography being unable to appropriately detect cancerous regions. This is a significant concern considering women with dense breasts are statistically more likely to develop breast cancer. While the facts are recognized, research is currently ongoing about supplemental imaging for women with categorized dense breast tissue, and appropriate treatment (Mann, et al., 2022).

There are two main modalities that can be used adjunctly with mammography in women with dense breasts. The American Society of Breast Surgeons (2019) have guidelines that recommend whole breast ultrasounds and contrast enhanced breast magnetic resonance imaging (MRI). While the increased risks pertaining to dense breast tissue is acknowledged, there are no established guidelines on who should get supplemental imaging or receive genetic counseling referral. Supplemental imaging, if appropriately used has the potential to detect previously missed breast cancer and lead to early treatment. Earlier detection and treatment are key components to decreased mortality as well as financial and emotional burdens to families and healthcare systems.

Purpose

The purpose of the pilot project is to discern if there is an appropriate breast cancer screening for patients with dense breasts that can be utilized in primary care and determine the ease of use when implemented in practice. While there are many different screening tools available for use, finding one that can be included in primary care and that takes breast density into account is of the utmost importance. Medical care that is grounded in evidenced based methodology is a foundational tool for nursing and advanced practice providers, and this lack of guidance when caring for patients with a diagnosis of dense breasts is a critical gap. Taking steps

to determine options for patients with this diagnosis and promote early detection of potentially missed breast cancer is a necessity (Djulbegovic,& Guyatt, 2017).

Review of Current Evidence

A quarter million new breast cancer cases are diagnosed yearly. A brief overview of the financial aspect for patients and the healthcare system showed that, on average, within 24 months of diagnosis of breast cancer, patients had amassed medical costs between $71,000 and $182,000 depending upon stage of cancer and treatment modality (Blumen, Fitch, Polkus., 2016). Crippling debt to patients, financial strain on healthcare systems and difficulty affording treatments are just some of the financial struggles related to a formal breast cancer diagnosis. The mental and physical strain that depletes the immune system leaving patients open for opportunistic infections in combination with the complications related to cancer, further increase costs on both patient and healthcare systems.

When searching for supporting literature terms such as "dense breasts", "breast screening tools", and "guidelines for breast cancer screening" were used. When using search filters, it was easy to reach saturation regarding themes around when to screen for breast cancer. There are multiple reputable resources regarding diagnostic screenings and how this should be presented to patients with risks and benefits. There was also search saturation in reference to breast density and classification of dense breasts and options for adjunct imaging. When it came to legislation, it became more difficult as not all states have similar laws and insurance suggestions. Inclusion criteria was based on data within the past five years, mention of dense breast inclusion, and recommendations regarding either screening or imaging, 30 articles were found to meet inclusion, but less than half seemed to have good quality data collection or sample sizes of

statistical significance. None of the articles or literature reviewed had specifications for women being seen in a primary care setting.

This pilot project is to discern if there is an appropriate breast cancer screening for patients with dense breasts that can be utilized in primary care. Dense breast tissue makes for a difficult diagnosis with traditional mammography and is less specific for diagnostic cancer readings for patients with dense breasts (Mann., et al, 2022). Dense breasts can be genetic, caused by lifestyle factors, and are heavily correlated with body type. Over half of women are diagnosed with dense breast tissue during screening mammography, and there are multiple types of screening and risk assessment tools that can be utilized to determine if there is a need for supplemental imaging or genetic referral.

This pilot project will assist a primary care practice that currently has no routine policy or procedure in place to determine if patients with dense breasts should get supplemental breast imaging such as MRI or Ultrasound. This pilot project was also to determine the timeliness and usability in a primary care office during a normal clinical day and how this can guide patient centered care.

Legal and ethical implications for this project are that patients are more aware of their body and have increased knowledge of a previously undiscussed or unknown component of breast tissue. A law that was passed in 2019 that patients must be informed of their BI-RADs classification from radiology, which leads to discussions between providers and patients regarding supplemental imaging. This attempt at providing further patient education for patients is both ethical and necessary for patient centered care and shared decision making. In the study produced by Woof et al., (2021) there were many social and ethical implications discussed when talking to patients and utilizing the words "low risk" as this can give false implications that there

is no cause for concern or be socially misconstrued to make patients feel that routine screenings were not necessary. The recommendations for further imaging can also yield false negative results and cause patient distress for women with dense breast as is recommended adjunct imaging (Quinlan & Bardo., 2019). One study from Connecticut yielded an improved detection of breast cancer with the adjunct imaging over a retrospective review of ten years, following the implementation of dense breast legislation (Butler & Hooley, 2020). With the possibilities of understating or overstating the necessity of both routine and potential diagnostic screenings, there is a legal necessity for providers to carefully provide options with clear risk and benefits for the best course of shared decision making (Quinlan & Bardo, 2019).

Insurance, costs, and potential legal ramifications should be considered regarding further imaging. Providers must balance adding another potential cost to the patient unnecessarily versus the risk of missing a hidden cancer if further imaging is not completed. All these factors play heavily into the decision of whether extra screening and diagnostic imaging should be performed and having set guidelines, or a standardized approach will make some of these moving pieces easier for both patient and provider to work through as a care team to decide about further imaging.

Gaps in Literature

Overall, the women participating in the studies represented were predominantly white women or black women with little supporting data for other ethnic considerations. Asian women were particularly identified as having an increased risk of dense breasts, yet many of the models were expressly tested on black and white women (Pal et al., 2021). There are many reasons for lack of representation in research, including cultural divide, language barriers, and mistrust in westernized medicine.

The information between states proved to be ambiguous and inconsistent in the legislature. Some states had very stringent guidelines and others it depended upon the individual insurance (n.d., 2021). North Carolina was found to be one of the ambiguous states for madating what adjunct imaging must be covered under insurance (n.d, 2021). Without the assurance that insurance will cover adjunct imaging, it makes it difficult for states to provide proper data on the women with dense breasts who appropriately receive adjunct imaging and therefore creates knowledge gaps on the effectiveness and true necessity of adjunct imaging.

Other literature gaps include lack of evidence based adjunct screening guidelines for dense breasts.. There are many articles referencing different screening tools for breast cancer, and some of these do consider dense breast, but none of them have a standardized direction for the imaging to follow the dense breast diagnosis (Kurian et al., 2021). This lack of guidelines creates a gray area of uncertainty for radiologists and providers. There is even a difference on a state-by-state basis of who receives the results of the dense breast finding, be it patient directly or provider (Grayson et al., 2020). Inconsistencies in legislation, provider direction, and insurance coverage create many difficult discussions and decisions between patient and provider for next steps following a dense breast diagnosis.

A wide variety of articles and studies surrounding dense breast tissue were obtained with many articles utilizing different screening tools to describe appropriate supplemental imaging guidance. There are many facets that surround the finding of dense breast tissue besides the need for further imaging, however, and multiple articles were studies evaluating the attitudes of patients, radiologists, and providers regarding understanding and delivery of the news of a patient's breast density. The studies provided a better understanding for what concerns patients

had and the barriers providers were encountering in delivering information appropriately, as well as defining a plan of care to move forward.

Screening Tools

To understand the process moving forward, multiple screening tools that were geared towards diagnostic imaging were reviewed and assessed for current data and effectiveness to create a patient centered plan of care. Different models were prevalent throughout the studies including the Tyrer-Cuzick, BCSB, BOADICEA, and GAIL model. Each model had benefits and pitfalls as far as catering to specific demographics and ambiguity regarding adjunct screenings (OmranIssa et al., 2020). The further narrowing of which screenings to utilize came from a culmination of these studies and were also deciding factors in what types of further imaging may be necessary for patients as well as what discussions need to be had with patients.

The tools assessed for potential utilization for this pilot project include the Gail Model, Tyrer Cruzick model, and the BCBS Risk Calculator. These screening tools and models have research behind them and have been tested to be effective. Validation results published show that the inclusion of breast density, with other risk factors, increases the number of women accurately identified at higher risk of breast cancer. When compared to other widely used breast cancer-prediction models, the Tyrer Cuzick model has shown to have the best calibration and discrimination and was found to be the most comprehensive. Tyrer Cuzick is specifically designed to estimate the lifetime risk score of a female and was the only screening tool to take breast density categorization into consideration. Tyrer Cuzick was shown to be more sensitive to minority populations and specific in determination of additional imaging recommendations (Brentnall & Cuzick, 2020).

The need for dense breasts to be further examined cannot be understated. Early detection of potential cancer can happen with further imaging and early understanding of classes of dense breast tissue. Providers can reduce mortality from breast cancer if they have an evidenced based plan of action that is in line with patient values and needs. The difficulty in primary care comes with determining which screening tool gives the best direction in plan of care and how it is implemented into practice. Primary care has an abundant amount of work with limited time per patient. Having a screening tool that is efficient and easily utilized can make the difference between early intervention versus delayed diagnosis.

Conceptual Framework

This project is based on the Pender's Health Promotion Model (2020), which theorizes that health and education are essential aspects of an individual's wellbeing. Providing patients with information to further better their care as a preventative health measure and encourage autonomous decision making with provider information and support are critical in discussion of breast cancer screenings. According to the Pender's Health Promotion Model, patients have individualized life experiences that shapes reactions and choices moving forward. The holistic approach to life choices is especially pertinent to patients when faced with the informed risk of developing breast cancer, having hidden breast cancer, and seeking further imaging based on risk assumption (Pender's Health Promotion Model, 2020).

Patients should have shared decision making during any form of medical care, but the importance of providing a thorough risk-benefit analysis with patients is often underemphasized. Having a known follow up plan and having a plan of action in the event of certain results are the direct purpose of screenings and further imaging. The Pender model explains that health promotion is intended to encourage patient's wellbeing and overall vision of wellness. We

provide health promotion to not only prevent disease, but to identify problems early enough to intervene and give patients the best chance at living a quality of life that is both sustainable and supportive of life goals (Pender's Health Promotion Model, 2021).

Methods

A rural primary care office in North Carolina was the site utilized for the pilot study with the providers giving feedback regarding ease of use. The population consisted of patients born female at birth within the practice who had been determined to have dense breasts on a previous screening mammogram. While many radiologists had voiced they preferred women to receive a letter directly telling the patients of their dense breasts diagnoses, there is still a widespread amount of opinions regarding how patients should be notified of breast density category (Grayson, et al., 2020).

This project is considered a quality improvement pilot study, as the framework utilized involves a noted medical issue without clear guidelines and utilization of known information to create an evidenced based plan of care. A plan of care was developed based on the identification of dense breasts and the risk shown with the screening tools. Following the discussion with the patient and the next steps determined with shared decision making and informative materials provided, the nurse practitioner involved in the pilot study provided an evaluation. These are clear concepts of the Plan-Do-Study-Act model that is a basis for a quality improvement project.

No budget was necessary for this project and no compensation was provided to patients or providers. The timeframe for this project consisted of 12 weeks, in which time 10 visits which fit the criteria for inclusion were met. Some of the most important resources utilized for this project are the expertise and office time of the primary care office. A Nurse Practitioner student was also a valuable resource in implementing screening.

The plan for implementation involved meeting with the provider and the support staff to give a brief overview of the screening tool that was determined to be the highest in both sensitivity and specificity. The office already had in place the use of other screening tools that had been laminated and patients used a dry erase marker to answer the questions provided, and a score recorded for the patient charts. The provider would then discuss the score with the patient. The Tyrer Cuzick model was the chosen model for this project. Staff were educated on how to provide the questionnaire for the screening and the providers instructed what information the patient should be given and what shared decision making should be had with the patient.

The intervention being made is the implementation of a screening tool and the evidenced based information to guide care for adjunct imaging. The outcomes were both qualitative and quantitative as the number of additional imagining and genetic referrals were measured as well as the comfort and opinions of the providers on how the project was implemented and ease of use in the office. The qualitative data collected from staff provided valuable feedback on gaps, future suggestions for changes, and ease of use. Quantitative data obtained for the number of patients referred to genetic counseling and/or the breast center as well as the lifetime risk score determined from the Tyrer Cuzick screening.

Design

Translational Framework

This project is a quality improvement project that follows the Plan-Do-Study-Act model (PDSA). The 'plan' is to improve upon a process within the primary care practice involving the screening, management, and shared decision making for women with dense breasts regarding imaging and genetic counseling. Implementation was achieved by reviewing the current relevant

research and establishing what is the most appropriate screening tool for implementation in practice. The 'do' follows mammography and a diagnosis of dense breasts, the Tyrer Cuzick screening will be implemented in the primary care office to assist in guidance of patient care. The number of women impacted within this healthcare setting was assessed to see how feasible it is to incorporate the screening into a busy clinical practice setting. Feedback was the 'study' portion from provider and staff and was instrumental in understanding the effectiveness and ease of use for the practice. As EPIC is the charting system in use for the practice, there was supporting evidence that the Tyrer Cuzick screening could be incorporated for charting ease. The 'act' followed the project completion and determined whether incorporation into practice was feasible.

Project implementation:

After discussing implementation, the provider was given a log to track necessary health information including patient age, breast density category, race, Tyrer Cuzick score, and what adjunct imaging the patient was ordered. There were many obstacles to implementation, including lack of staff required to perform the screening. An NP student in the office assisted in the implementation of the screening tool on predetermined patients who fit the inclusion criteria. There had also recently been provider turnover in the office, therefore there were no other providers able to attempt implementation which limited the number of screenings performed.

The Tyrer Cuzick screening tool takes into consideration breast density, family history, personal history, and is more sensitive than other tools when calculating lifetime risk scores on breast cancer. Multiple articles mention the Tyrer Cuzick screening as an overall well utilized screening and as being sensitive across racial groups and age groups due to the high volume of information obtained from the screening, as well as being one of the only current screening tools

that takes breast density into account (Kurian, et al., 2021; Pal, et al., 2021; OmranIsa, et al., 2020).

Results

As this is a quality improvement project that aims to determine the timeliness and feasibility of the utilization of Tyrer Cuzick screening in a primary care setting, the data analysis is an overview of biological females that met criteria for breast density on mammogram and whether the stakeholder felt it was feasible in a clinical practice day.

Ten biologic born females met the inclusion criteria for this project. While this number does not create statistically significant data for the purposes of the general population, it is useful in the context of a pilot project in continuing with adjustments as part of the PDSA model. The overall feedback from the provider was that it was a "useful tool" for primary care with "good information gathering" properties. The provider reported it really "changed her thinking" in the way that they looked at breast density and the quality of screening tools utilized, and she was even tempted to screen all her biologic female patients using the Tyrer Cuzick as she felt it was comprehensive enough to be utilized on patients even without having class C/D breast density.

Qualitative Data

The qualitative data was feedback given from the provider about the Tyrer Cuzack screening tools use in practice. It was reported to be a thorough assessment tool that gave good information about lifetime breast cancer risk. The screening was also deemed to be time consuming and with the current state of healthcare, difficult to implement without proper staffing and the electronic access for the electronic medical record. As it was one provider providing the qualitative feedback, no analysis was necessary just synthesis in relation to the screening tool in practice.

The provider reported that the tool was "useful" in opening narrative between biological born females regarding lifetime breast cancer risks. She reported that it seemed to be a "valuable tool" in giving a numerical reference for patients to keep in mind and be vigilant in their care. While shared decision making was always utilized to determine if further imaging was necessary for care, it also provided a good segue into teaching patients what dense breasts are, as well as getting genetic screening for high-risk patients. The provider reported that "being proactive, instead of reactive is always the goal of primary care providers."

Quantitative Data

Quantitative data collected was in reference to the number of patients screened and the demographics of said patients. A sample size of ten (n=10) was obtained as the provider in the primary care office works only one day a week at this specific practice. Part of the project was to determine lifetime risk scores of the patients who met the inclusion criteria. Twenty percent of the biological women screened with known class C or D breast density had greater than 20% lifetime risk score, which shows a positive correlation between the breast density and lifetime breast cancer risk. Eighty percent of those screened during this pilot were Caucasian with 10% African American and 10% Hispanic. While this is a rural health primary care setting and does not make the findings generalizable for global patient care, it does give a guiding direction for care for this specific population.

Demographics

The average age of those in the project was 53.1 years old, eight being non-Hispanic white, one being black, and one being Hispanic. This project occurred at a rural primary care setting in North Carolina.
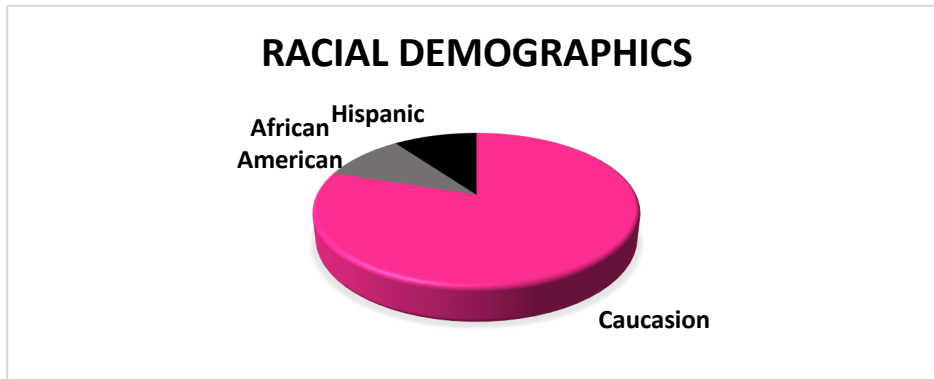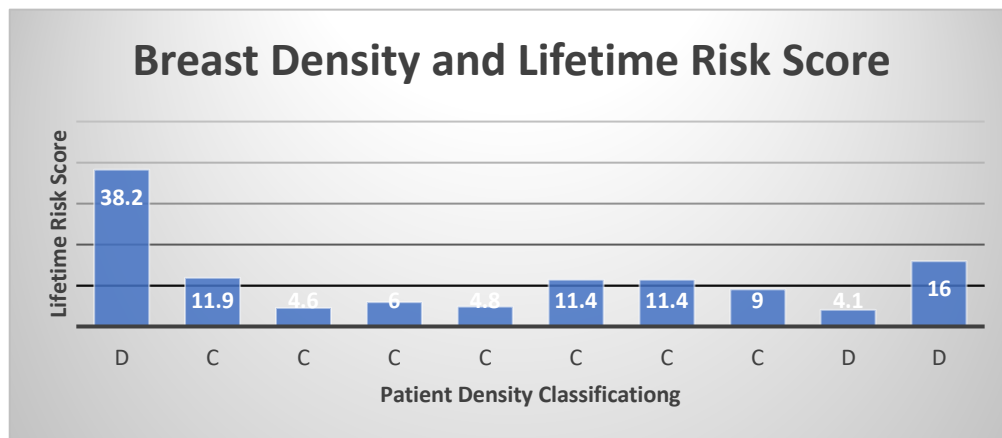
Figure 1

Racial Demographics

Figure 2

Breast Density Classification and Lifetime Risk Score

Timeliness

While the screening was a wealth of information for the practice, it did prove to be time consuming. At this time with the current challenges of the office, there would not have been the resources available to appropriately do this screening, due to its length, without the aid of an office NP student. Primary care has an average of 15 to 30 minutes to accomplish a visit, and since the screening takes up roughly ten minutes, it did hinder the timeliness of patient visits.

Discussion

Evaluation of Outcomes

Of the ten patients screened with the Tyrer Cuzick following a diagnosis of class C and D breast density, over fifty percent of the sample scored greater than 10% lifetime risk for breast cancer. Two patients were referred to genetic counseling and three were suggested for adjunct imaging, including either breast MRI or Ultrasound.

The provider felt the screening was instrumental in creating and open dialogue with her patients regarding the necessity for further evaluation of dense breast tissue. They felt like it created a purposeful reason to address breast density and the potential for missed breast cancer, as well as empower her patients to feel more informed regarding their bodies. She did have many concerns regarding the screening and how feasible it is to keep the screenings going within the practice, as well as ways it can be streamlined to better promote patient care.

Further input from the provider was that following the ordering of an MRI, there was push back from an insurance standpoint for patients who were supposed to have an MRI per their risk score. Some of the ICD billing codes utilized to attempt to gain insurance approval are listed in the Table 1 with the verbiage and meaning. These are pertinent for further investigation that may occur with subsequent projects in achieving approval of MRI following mammography.

Table 1

ICD 10 Codes with Meanings

ICD Code	Meaning
793.80	Abnormal Mammogram
R92.2	Inconclusive Mammogram Dense Breasts

Z12.39	Encounter for other screening for malignant neoplasm of breast
Z80.3	Family history of malignant neoplasm of breast

The Plan-Do-Study-Act (PDSA) model was the translational framework for this project. The planning portion was done with the providers and investigators creating a plan of action and determining which screening tool should be utilized in clinical practice. The "do" was accomplished with the assistance of a Nurse Practitioner (NP) student within the office as the staffing challenges would have otherwise made this project even more difficult to implement.

Study was done by way of obtaining both quantitative data of the women served within the office that met the inclusion criteria for the project and qualitative data from the provider related to the ability to use in practice. Approval for adjunct imaging, coding metrics, and sustainability were all evaluated within the primary care office setting. The act portion of this will come with further projects and determining a standardized approach to present to primary care offices. This project will need replication and adjustment.

The conceptual framework, Pender's Health Promotion model, stood true in the aspect that the provider explained risk and benefits to patients and provided detailed reasoning for screenings. Adjunct imaging was a shared decision-making effort between provider and patient, while keeping with the ideal of health promotion and disease prevention or early detection. Continuing to promote individualized care was supported as the Tyrer Cuzick specifically uses patient factors in determining a lifetime risk score.

Barriers identified

Staffing is an ongoing barrier that healthcare continues to face. The office utilized for this pilot project was going through transition with little support staff, two of the providers leaving, and the process of obtaining new staff, leaving only two providers in office. In the setting of the COVID-19 pandemic, there is limited staff availability and office constraints that continue to be problematic for healthcare.

Information technology (IT) was unable to acquire the Tyrer Cuzick screening tool to be pulled into the charting system, Epic, which created more work and time for charting results for both the NP student assisting in doing the screening, and the provider in charting results. Though there are multiple resources that talked about the utilization of the tool in Epic for cancer screenings, there seemed to be no assistance on obtaining it for primary care offices at this time. Discussions were had with the oncology outpatient department in the area who voiced they have also requested access to the Tyrer Cuzick screening in Epic to no avail. Outpatient oncology stated they would continue to try to gain access.

While it is not expressly an aim of this project, there were multiple follow up issues regarding insurance and patient adjunct screening. While the patient's Tyrer Cuzack score would be elevated, several over 20% lifetime risk of cancer, there was still insurance coverage denial on obtaining Breast MRI, which is the recommendation for dense breasts and a greater than 20% lifetime risk score. This is relevant regarding replication and charting factors for patient care moving forward. Not only should documentation be explicit in explaining the need for the MRI, but also the lifetime risk score.

Strengths to overcome barriers

While the number of screenings performed does not provide statistical significance for practice, the number of women impacted in just this rural primary care office could translate well to larger practices and be an important implementation for women's health moving forward.

The perseverance of the provider and the determination to give the most evidenced based care, despite critical staffing difficulties was a strength at this site. The willingness of the Nurse Practitioner student to work with the provider and appropriately screen identified women was also a strength.

The ease in charting the risk score that was calculated is also a strength as the NP student was able to complete the screening in the room with the patient and write down the computed lifetime risk score. Incorporating this into charting was simple, but may have benefitted from having the specific criteria, such as familial history included as well. The hope moving forward is that it will be incorporated into EPIC for better charting and ease of use.

Longevity and Dissemination

The findings and data were published onto a tri-fold poster to present to key stakeholders and designated members of the healthcare system. Suggestions for longevity included incorporating the Tyrer Cuzick screening into the electronic medical record, enabling patients to fill it out prior to their visit so a score could be discussed during their visit, and more education to radiologist on verbiage for follow-up imaging. Staff and patient education were also critical components for longevity as there has to be an understanding of the need for change to occur within practice setting, especially that of a busy primary care clinical day.

While the hope for further pilot projects at other sites remains, for this to be a quality improvement measure that remains within this office there has to be the ability to utilize staff or a tablet of some sort as it currently stands to complete the Tyrer Cuzick screening during their

visit. As this is a busy clinical practice, the time constraints are lofty. The other plan moving

forward would be to work with radiology to obtain necessary 'recommendation' wording that

would assist in insurance coverage of adjunct imaging. Interprofessional communication may be

one key to obtaining easier coverage for breast MRI for patients with a greater than 20% risk of

developing breast cancer based on Tyrer Cuzick screening.

Conclusion

Primary care providers are at the front line of health care and prominent proponents of

breast cancer screenings and early detection. Having established guidelines lead the way for

providing safe and evidenced based driven care, yet there are no established guidelines following

diagnosis of dense breasts. This pilot project can lay the groundwork for further providing a

structure in assisting patients with early detection of breast cancer. The Tyrer Cuzick screening

tool is an effective tool in determining lifetime risk score of developing breast cancer and takes

into consideration breast density. The utilization of the lifetime risk score helps determine

adjunct imaging recommendations.

Moving forward more primary care offices will become more inundated with the need to

manage care for patients with dense breasts and having a starting pathway will be essential.

Breast cancer can affect anyone, and any process that can decrease mortality should be utilized in

practice. If a 10-minute screening is the catalyst to detecting breast cancer then those 10 minutes

may be responsible for saving a life.

References

Blumen, H., Fitch, K., & Polkus, V. (2016). Comparison of treatment costs for breast cancer, by

      tumor stage and type of service. *American health & drug benefits*, *9*(1), 23.

Bowles, D., & Quinton, A. (2016). The Use of Ultrasound in Breast Cancer Screening of

      Asymptomatic Women with Dense Breast Tissue: A Narrative Review. Journal of

      medical imaging and radiation sciences, 47(3S), S21–S28.

      https://doi.org/10.1016/j.jmir.2016.06.005

Butler, R. S., & Hooley, R. J. (2020). Screening Breast Ultrasound: Update After 10 Years of

      Breast Density Notification Laws. *AJR. American journal of roentgenology*, *214*(6),

      1424–1435. https://doi.org/10.2214/AJR.19.22275

Breast cancer statistics. (2021, June 8). Centers for Disease Control and Prevention.

      https://www.cdc.gov/cancer/breast/statistics/index.htm

Brentnall, A. R., & Cuzick, J. (2020). Risk models for breast cancer and their validation.

      Statistical science: a review journal of the Institute of Mathematical Statistics, 35(1), 14.

      https://doi:10.1214/19-STS729

Dense-Breast-Info.org. (2021, June 6). *Comparative Analysis of State Density Inform Efforts and

      Insurance Coverage*. Dense Breast Info. Retrieved January 25, 2022, from

      https://densebreast-info.org/wp-

      content/uploads/2021/12/Table.laws_.insurance.ALPHA_.6.30.21.copright.pdf

Djulbegovic, B., & Guyatt, G. H. (2017). Progress in evidence-based medicine: a quarter century

      on. The lancet, 390(10092), 415-423.

Froelich, M. F., & Kaiser, C. G. (2021). Cost-effectiveness of MR-mammography as a solitary

      imaging technique in women with dense breasts: an economic evaluation of the

prospective TK-Study. *European radiology*, *31*(2), 967–974.

https://doi.org/10.1007/s00330-020-07129-5

Baird, G. L., Dibble, E. H., Mainiero, M. B., Miles, R. C., & Lourenco, A. P. (2020). Dense

breast notification letters: what do breast radiologists think?. *Journal of Breast

Imaging*, *2*(3), 225-231.

Horný, M., Cohen, A. B., Duszak, R., Jr, Christiansen, C. L., Shwartz, M., & Burgess, J. F., Jr

(2020). Dense Breast Notification Laws: Impact on Downstream Imaging After

Screening Mammography. *Medical care research and review : MCRR*, *77*(2), 143–154.

Kurian, A. W., Hughes, E., Simmons, T., Bernhisel, R., Probst, B., Meek, S., Caswell-Jin, J. L.,

John, E. M., Lanchbury, J. S., Slavin, T. P., Wagner, S., Gutin, A., Rohan, T. E.,

Shadyab, A. H., Manson, J. E., Lane, D., Chlebowski, R. T., & Stefanick, M. L. (2021).

Performance of the IBIS/Tyrer-Cuzick model of breast cancer risk by race and ethnicity

in the Women's Health Initiative. Cancer, 127(20), 3742–3750.

https://doi.org/10.1002/cncr.33767

Mann, R. M., Athanasiou, A., Baltzer, P. A., Camps-Herrero, J., Clauser, P., Fallenberg, E. M.,

... & European Society of Breast Imaging (EUSOBI). (2022). Breast cancer screening in

women with extremely dense breasts recommendations of the European Society of Breast

Imaging (EUSOBI). European Radiology, 32(6), 4036-4045.

Monticciolo, D. L., Newell, M. S., Moy, L., Niell, B., Monsees, B., & Sickles, E. A. (2018).

Breast Cancer Screening in Women at Higher-Than-Average Risk: Recommendations

From the ACR. *Journal of the American College of Radiology : JACR*, *15*(3 Pt A), 408–

414.

National Comprehensive Cancer Network. Guidelines for BRCA-related Breast and/or Ovarian

      Cancer Syndrome. Version 2.2017 http://www.NCCN.org.

National Institute of Health. (n.d.). *Dense breasts: Answers to commonly asked questions*.

      National Cancer Institute. Retrieved September 29, 2021, from

      https://www.cancer.gov/types/breast/breast-changes/dense-breasts

Pal Choudhury, P., Brook, M. N., Hurson, A. N., Lee, A., Mulder, C. V., Coulson, P.,

      Schoemaker, M. J., Jones, M. E., Swerdlow, A. J., Chatterjee, N., Antoniou, A. C., &

      Garcia-Closas, M. (2021). Comparative validation of the BOADICEA and Tyrer-Cuzick

      breast cancer risk models incorporating classical risk factors and polygenic risk in a

      population-based prospective cohort of women of European ancestry. *Breast cancer*

      research : BCR, *23*(1), 22. https://doi.org/10.1186/s13058-021-01399-7

Pender's Health Promotion Model. (2020, July 21). Retrieved October 17, 2021, from

      https://nursing-theory.org/theories-and-models/pender-health-promotion-model.php

Quinlan, C., & Bardo, D. M. E. (2019). Patient-friendly summary of the ACR appropriateness

      criteria: Breast cancer screening. *Journal of the American College of Radiology*, *16*(2).

      https://doi.org/10.1016/j.jacr.2018.08.006

Risk model tutorial: Densebreast-info, inc.. DenseBreast. (2021, December 26). Retrieved

      February 9, 2022, from https://densebreast-info.org/for-providers/risk-model-tutorial/

Spalluto, L. B., Roumie, C. L., Bonnett, K. R., Schlundt, D. G., DeBenedectis, C. M., & Wilkins,

      C. H. (2018). Women's response to state-mandated language in dense breast notification.

      The breast journal, 24(6), 1046–1050. https://doi.org/10.1111/tbj.13119

The American Society of Breast Surgeons. (2019, April 10). *Consensus statement on screening*

      mammography [PDF]. Retrieved September 8, 2021, from

https://www.breastsurgeons.org/docs/statements/Position-Statement-on-Screening-Mammography.pdf

Woof, V. G., McWilliams, L., Donnelly, L. S., Howell, A., Evans, D. G., Maxwell, A. J., & French, D. P. (2021). Introducing a low-risk breast screening pathway into the NHS Breast Screening Programme: Views from healthcare professionals who are delivering risk-stratified screening. *Women's Health*. https://doi.org/10.1177/17455065211009746

Zhang, L., Jie, Z., Xu, S., Zhang, L., & Guo, X. (2018). Use of Receiver Operating Characteristic (ROC) Curve Analysis for Tyrer-Cuzick and Gail in Breast Cancer Screening in Jiangxi Province, China. Medical science monitor : international medical journal of experimental and clinical research, 24, 5528–5532. https://doi.org/10.12659/MSM.910108

Schrager, S., & Burnside, E. (2019). Breast Cancer Screening in Primary Care: A Call for Development and Validation of Patient-Oriented Shared Decision-Making Tools. *Journal of women's health (2002)*, *28*(2), 114–116. https://doi.org/10.1089/jwh.2017.6775