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Detection of Breast Cancer in African American Women Using Walk-in Mammography

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Abstract

Problem: Breast cancer is a life-threatening condition, in which the prognosis could potentially worsen with a delay in the detection and commencement of treatment. Scheduling patients for mammograms continues to allow for long wait times that exist in screening mammography. Lower rates of participation in scheduled screening mammograms contributes to the increased rate of advanced breast cancer diagnosis that exit in African American women and threatens their health outcomes. The purpose of this project was to implement walk-in mammography to increase participation for early breast cancer detection.

Methods: An observational descriptive design with a retrospective chart review. A PDSA cycle was used in the implementation of walk-in mammography for this quality improvement project.

Result: A total *N*=228 mammograms (walk-ins and scheduled screenings) was completed in April, May, and June 2021.There were 8.8% (*n*=20) positive cases, 1.7% (*n*=4) were in advanced (III and IV) stage. A significant positive correlation was observed between stages I-IV and walk-in and scheduled patients (r_s = 0.59, p = .002, 95% CI [0.25, 0.80]). There was no significant difference seen based on an alpha value of (0.05, U = 60.5, z = -1.75, p = .080) from stages I-IV for patients screened in the scheduled only group and those screened after walk-in screening was introduced.

Implications for practice: Increased awareness that scheduled and walk-in mammogram screenings can enhance early detection of breast cancer diagnosis for patients particularly African American women.

Keywords: mammography, breast cancer, African American, late-stage diagnosis, walk-in mammograms, scheduled mammograms, barrier to mammography.

Detection of Breast Cancer in African American Women Using Walk-in Mammography

In the United States, breast cancer (BC) is the most diagnosed non-skin cancer and the second most common cause of death in African American (AA) women (Rebner & Pai, 2020). AA women are 1.4 times or 40% more likely to die of BC than white women (Center for Disease Control and Prevention [CDC], 2020). BC is associated with broad-spectrum risk factors including genetic predisposition (e.g., familial history and physiological history), lifestyle (e.g., dietary, and physical activity habits), and environmental factors (e.g., environmental carcinogens and hormones). Explaining BC's etiology can be challenging because risk factors vary between ethnic groups and racial origins (Midha et. al., 2020).

The incidence and mortality cases of BC has steadily increased, from 2017-2020, there was an increase from 250,530 to 276,480 in the number of patients who were diagnosed with BC; and about 42,000 women died each year from the disease (American Cancer Society [ACS], 2018; 2019; 2020). The ACS (2020) predicted 284,200 new cases would be diagnosed in 2021 and 44,130 deaths will be recorded.

As aforementioned, AA women are 40% more likely to die from breast cancer than the white population and their survival five years post-diagnosis is less likely (CDC, 2020; National African American Breast Cancer Survivorship Organization [NAABCSO] (2020). While 92% of AA women agree that breast health is important, 25% of them have discussed breast health with family members and only 17% have tried to understand their risk of breast cancer (NAABCSO 2020). In 2019, 33,840 AA women were diagnosed with BC and 6,540 died from the disease (NAABCSO, 2020). AA women are also more likely to be diagnosed with late-stage breast cancer due to low participation in

screening procedures such as mammograms (Davis et al., 2017). This disparity is attributed to later-stage diagnosis, delay in receiving treatments after diagnosis is made, and receiving substandard treatment (CDC, 2020).

Having women receive a regular screening mammogram is the most reliable way to find BC early before symptoms start (Rebner & Pai, 2020; NAABCSO, 2020). Breast cancer gene (BRCA) mutation and the triple-negative (TN) subtype of BC occurs earlier than 45 years and are more common in AA. The TN subtype is often more aggressive and needs to be taken very seriously to reduce the incidence of aggressive breast cancer at a younger age (Rebner & Pai, 2020).

The CDC reported that the cost of treatment of BC is higher than the cost of treatment of any other type of cancer (CDC, n.d.). The total annual medical cost of BC in the United States is $16.5 billion and 13% of all cancer treatment costs are for BC. A woman with employer-sponsored coverage who is diagnosed with early-stage BC is expected to pay more than $5,800 out-of-pocket payment including premium. Annual losses due to missed workdays and disability are more than $1000 for BC survivors (CDC, n.d.).

The mammogram screening rate at the proposed project site has declined since the beginning of 2019; women no longer keep their mammogram appointments. Women have expressed different reasons for not keeping their mammogram appointments, but it has been observed they keep other appointments. Currently, the clinic is down by -7.5% from where they were in 2019 putting them at a 55.1% participation rate. Out of the 2,382 AA women registered in the clinic as eligible for mammograms in 2020, only 1,312 women were screened, while 1,070 women were not screened. Those unscreened

are mostly women who are between ages 45-65 years. The purpose of this quality improvement (QI) was to utilize walk-in mammograms in addition to the existing scheduled mammograms to increase participation in mammogram screening for the detection of BC and to determine the stage at diagnosis. The aim was to increase the number of AA women ages 35-65 years who receive mammograms in the Midwestern outpatient clinic by 10% in three months. The primary outcome identified the number of walk-in mammograms completed over a three-month period, while the secondary outcome identified the number of patients who screened positive for BC, age at diagnosis, stage of cancer when diagnosed, and whether they were diagnosed during a walk-in or a scheduled mammogram. The study question guiding this QI project was, in women ages 35-65 years, what was the effect of walk-in mammograms compared to scheduled mammograms in increasing mammogram participation over a three-month period?

Literature Review

A review of the literature was conducted using several scholarly search engines. The scholarly search engines include the Medical Literature and Retrieval System (Medline), Psychological information (PsychINFO), the Cumulative Index to Nursing and Allied Health Literature (CINHAL), and Public/publisher MEDLINE (PubMed). Publications searched range from 2015 to 2020, the initial search yielded 28 articles. A refined search was made using the key terms such as *breast cancer*, *mammogram, mammography, African American women, walk-ins,* and *barriers to mammography.* The Boolean operators used included “mammogram” OR “mammography” AND “breast cancer” AND “African American women”. There were 18 publications selected after the

refined search. Nine of these publications were from CINHAL, five were from Medline and four publications were from PubMed. Inclusion criteria were AA women ages 35- 65 years; AA women who have not had a mammogram in the past 12-months or have not been diagnosed with BC; uninsured/underinsured AA women (i.e. income at or below 200 percent of the federal poverty level for household income or no insurance to cover program), patients with Medicaid insurance, and self-pay patients. AA women less than 35 years, AA women who had a bilateral mastectomy or unilateral mastectomy, lumpectomy, breast cancer, receiving chemotherapy, and patients in hospice care were excluded.

BC is the second most common cancer among women in the United States and the second leading cause of cancer death in the world (CDC, 2020; Gathirua-Mwangi, 2016). In a randomized controlled trial study, AA women were found to have a lower incidence of BC but the death rate remains higher than other racial groups despite the advancement made in the detection and management of BC (Copeland, et al., 2018; Gathirua-Mwangi, 2016). About half of AA women are diagnosed with BC in a later stage than the white population due to low participation in screening mammography (Davis et al., 2017; Gathirua-Mwangi, 2016). Early detection decreases BC death rate and increases the total number of deaths prevented by improving the probability that patients could qualify for breast surgery without needing chemotherapy (Lee et al., 2017; Gathirua-Mwangi, 2016).

The U.S. Prevention Services Task Force [USPSTF] (n. d.) suggested some changes about when women should begin mammograms and the frequency. Following this modified rule, the USPSTF recommended screening mammograms every two years for women ages 40- 49 years based on individual decisions but encouraged women who

are at higher risk for BC (i.e. women with a family history of breast cancer) to begin screening at age 40 years and biennial screening is recommended for women 50-74 years (USPSTF, n. d.). Subsequently, the American College of Obstetricians and Gynecologists (ACOG) supported yearly mammography for women 40-years and older. Different associations such as ACS and American College of Radiology (ACR) likewise suggest yearly screening mammograms for women 40-years and those older (Lee et. al., 2017; USPSTF, n. d.).

Oeffinger et al. (2015) recommended annual mammogram screening to begin at age 40 years, women who have no health issues, with 10 years or more life expectancy are also encouraged to continue yearly mammogram screening. There is strong evidence of benefits of annual mammography screening for AA women aged 40 years and older due to high incidence of BC deaths (ACS, 2018; 2019; Gathirua-Mwangi, 2016; Oeffinger et al., 2015). It is important for AA women to participate in screening mammography because AA women have high mortality than white women. The recommendation by ACS (2020) was to initiate screening mammography at age 40 years for average-risk and age 30 for high-risk AA women. Before 2016 in the United States, 7% of AA women diagnosed with BC were under the age of 40 years (Rebner & Pai, 2020). Lack of mammography screening has been identified as one reason why AA women are often diagnosed with BC later than the white population (Gathirua-Mwangi, 2016; Rebner & Pai, 2020; Lee et al, 2017).

Rebner and Pai (2020) and NAABCSO (2020) supported yearly mammogram screening and emphasized the need for risk assessment and genetic counseling since BRCA mutation is higher in AA women than the whites. AA women who are at risk of

BC known as BRCA1 or BRCA2 gene mutation, or have a first-degree relative with BRCA1 or BRCA2 gene mutation who have not had genetic testing, must get a breast magnetic resonance imaging (MRI) screening as an adjunct to mammography (ACS, 2020). Women who had radiation therapy to the chest between the ages of 10 and 30-years, have Li-Fraumeni syndrome, Cowden syndrome, or Bannayan-Riley-Ruvalcaba syndrome, or a first-degree relative with one of the syndromes mentioned above are encouraged to undergo a breast MRI.

AA women have expressed some factors constituting barriers to getting their mammograms as; fear of cost, fear of mammography related pain, fear of getting bad news because of family history of BC, not having health insurance, lack of transportation, and co-morbid medical conditions (Wells et al., 2017). Similarly, radiation exposure was also identified as a reason for not participating in getting their mammography. Some programs that can help to alleviate the fear of cost such the Show Me Healthy Women (SMHW). This program SMHW provides free breast screening for residents who are Low-income and uninsured over the age of 35-years (Wells et al., 2017). Wells et al. (2017) reported women continued to report negative experiences and psychological obstacles despite no cost associated with receiving mammography. ACS (2020) discussed the benefits of mammography outweigh any possible harm from radiation exposures. Following the report of benefits and disadvantages of mammography, Loberg et al. (2015) emphasized the need for more education for women, stating the need to balance information about the benefits and harms of mammogram screening so women can make an informed decision. In a similar study, Well et al. (2017) reported women who are knowledgeable about the importance of mammography screening and BC are more likely to follow the guidelines

for screening. Lee et al. (2017) also reported the response to mammography screening was higher in the areas with educational programs in place compared to the national rate. The recommendation was to educate women about the need for routine screening either through activities such as the media, lectures, or physician recommendations (Lee et al., 2017; Loberg et al. 2015**;** Well et al., 2017). All the publications reviewed identified mammography as a standard procedure for early detection of BC and encouraged instituting educational programs to make women aware of the benefits of mammograms, thereby dispelling the myths about the harms of mammography (ACS, 2020; Lee et. al., 2017; Loberg et al., 2015; Oeffinger et al., 2015; Well et al., 2017).

In addition to scheduled appointments, implementing walk-in mammograms was intended to increase participation in screening mammography, it was expected that compliance will increase as a result and BC will be detected early among AA women who receive care at the Midwestern suburban outpatient clinic. Walk-in mammography was introduced as additional means of increasing participation in mammograms in this QI project. Wang et al. (2020) conducted a case-control study evaluating the connection between the introduction and usage of the Pink Card walk-in mammography service with the ability to undergo walk-in screening. The Pink Card service provides a doctor-delivered reminder during an office visit that a woman is due for mammography screening. The outcome was the Pink Card walk-in mammogram screening service, especially for racial or ethnic minorities and Medicaid-insured patients, enhanced screening access. The expansion of this initiative will help eliminate inequalities and improve participation in screening for BC. When screening for other health conditions it was found that same day/ walk-in screening was beneficial. Walk-in or same day were also found to be helpful in

eliminating the driving time, increasing flexibility, increasing efficiency and sustainability of preventive screenings. Walk-in was also found to eliminate several barriers to screening which resulted in an increase in compliance to treatments (Ward, Tse, Shittu, & Promrat, 2019; Neufeld & Case, 2013). Patients reported increased satisfaction and quality of care due to timely access to care (Ansell, Crispo, Simard, & Bjerre, 2017).

The evidence-based model that guided this project was the Institute for Healthcare Improvement (IHI) Model for change framework using the Plan -Do-Study- Act (PDSA) cycle. PDSA cycle consists of four-step model which provides a framework for developing, testing, and implementing change that led to quality improvement. Derived from the scientific method, the PDSA cycle directs the desire to take immediate action that tests change and builds on the learning from the test change before change is implemented (Little, Lloyd, Murray, & Provost, 2016). The “plan” was to introduce walk-in mammograms in addition to the existing scheduled mammograms to increase participation in mammography in AA women, detect BC, and identify the stage when the diagnosis was made. The “do” involved implementing the walk-in mammogram and collecting data; “study” involved evaluating the impact of walk-in mammograms, comparing data, and examining changes. The presentation of findings or recommendations to the subcommittee of the Midwestern outpatient clinic Board of directors was done in the “act”.

Methods

Design

This quality improvement project used an observational descriptive study design. A retrospective review of medical records was conducted from April 2021 to June 2021.

Setting

A Midwestern suburban outpatient clinic provides primary care services in different specialties including women's health, adult medicine, pediatrics, podiatry, dental, optometry, and radiology. The clinic serves a low-income population and has four locations across the Midwestern State. This organization provides service to predominantly AA patients regardless of their ability to pay. This organization has been in existence since 1968 and provides about 2,400 mammogram screenings annually. The radiology department has two radiologists, and three technicians and is equipped with ultra-modern equipment.

Sample

A purposeful sampling method was employed to gather data. The inclusion criteria included AA women ages 35-65 years who have not had a mammogram in the past 12 months or more, patients with Medicaid or no insurance and have never been diagnosed with BC, and self-pay patients. AA women, who are less than 35 years, had been diagnosed with BC, had a bilateral mastectomy or unilateral mastectomy, lumpectomy, receiving chemotherapy, and patients in hospice care were excluded.

Procedures

In September 2019, there was a meeting between the investigator, the BC navigator, the quality improvement department, the radiology department, and the providers all of whom are the stakeholders. The project was started at the main site where the radiology department was located. Walk-in screening mammograms were implemented as a means of increasing the participation of AA women aged 35 to 64 years in screening mammograms for BC detection.

- The week prior to implementation of walk-in mammography, posters on benefits of mammogram, walk-in mammography days and times was posted at the front desks in all the departments of the clinic, hallways, common areas, and in the patient's rooms at strategic locations so patients could see them
- Flyers on BC, mammograms, and the proposed walk-in screening mammogram was given to every patient that came to the clinic
- An assigned staff person sat beside registration at the main lobby and talked to patients after check-in about BC, walk-in mammograms, assigned days and times and handed out pamphlets on BC and mammograms (Appendix A)
- Patients were seen by the providers in the women's health and adult medicine department and a clinical breast exam was done
- Patients were sent to the radiology department for screening mammograms where screenings were completed
- Data collected by the primary investigator were, number of mammograms completed from April to June 2021, number of patients who tested positive for BC, age at diagnosis, and the stage at which the diagnosis was made
- The primary investigator collected and analyzed data using the intellectus statistics software application
- Recommendations were presented to the subcommittee of the Midwestern outpatient clinic Board of directors.

Data Collection /Analysis

A retrospective medical record review was conducted from April 2021 to June 2021. Data collected were the number of patients screened, age, number of walk-in or scheduled mammograms, number of BC found, and stage at the time of diagnosis. A comparison was made in the same three-month period in the preceding year of walk-in mammograms. An excel spreadsheet was prepared for data collection and analysis (Appendix B). Patient identifiers were not included to maintain confidentiality.

Approval Processes

Approval from the Midwestern outpatient clinic was obtained in September 2020. The approval from the doctoral committee, the Institutional Review Board (IRB) of the University, and the university graduate school was also obtained. There were minimal risks associated with this project and the benefits were increasing participation and breast cancer identification.

Results

In 2019 prior to the implementation of walk-in mammography, a total number of 170 patients were screened for BC in April, May, and June out of which four patients tested positive for BC. In 2021, a total number of 228 patients were screened in April, May, and June with 20 patients testing positive for BC, 14 were walk-in patients while six were scheduled patients. A 34.1% increase was seen after walk-in mammography was introduced as shown in (Appendix C). There were 152 walk-in patients screened and this represents 70% of the entire population screened. More patients were screened in 2021 after the implementation of walk-in than in 2019 (Appendix D). Patients in their 50s were among the highest population that screened positive for BC and represent 38% of

the sample size screened; subsequently, patients in their 60s and 40s represented 25% of the sample size. Less than 40 years of age represented 5% of positive cases perhaps due to the recommendation guideline preventing women less than 40 years of age from screening. In this study, women less than 40 years of age were screened because of family histories or patient's complaints of breast pains and lumps (ACS, 2020; Rebner & Pai, 2020)

To understand if there was a correlation between stages I-IV in walk-in and scheduled patients, a spearman correlation analysis was conducted. Cohen's standard was used to evaluate the strength of the relationship, where coefficients between .10 and .29 represent a small effect size, coefficients between .30 and .49 represent a moderate effect size, and coefficients above .50 indicate a large effect size. The correlation coefficient between stages I-IV and Walk-ins/ scheduled was 0.59, indicating a large effect size. Based on alpha value of 0.05 and a *p* value of .002, a significant positive correlation was observed between stages I-IV and walk-in and scheduled patients (r_s = 0.59, p = .002, 95% CI [0.25, 0.80]) (Appendix F).

A two-tailed Mann-Whitney two-sample rank-sum test was also conducted to examine whether there were significant differences in stage I-IV between April to June 2019 and within the same period in 2021. There were 20 observations in group two (2021) and four observations in group one (2019). The result of the two-tailed Mann-Whitney U test was not significant based on an alpha value of 0.05, U = 60.5, z = -1.75, p = .080. The mean rank for group one was 17.62 and the mean rank for group two was 11.47. This suggested the distribution of stages I-IV for group one (Mdn = 3.00) was not

significantly different from the distribution of stages I-IV for group two (Mdn = 1.00) categories. (See Appendix G)

Discussion

As mentioned in the result section 20 patients tested positive for BC out of which 14 were walk-ins and out of the 14 walk-ins 12 were detected at stage one. Depending on how aggressive the cancer diagnosed is, a long wait time can be dangerous. Findings from these results show that most late diagnoses (stages III and IV) were seen in scheduled patients (n= 4). Mammography has always been a scheduled procedure but keeping mammography as a scheduled only procedure can result in delayed diagnosis of BC but making mammogram schedule flexible for patients to walk-in can increase participation and enhance early diagnosis of BC. The implication to practice is increased awareness that mammogram screenings can enhance early detection of breast cancer diagnosis for African American women and implementation of walk-ins can increase participation in screenings. A 34.1% increase in mammogram screening was achieved during the course of the study which exceeded the aim of a 10% increase within a three-month period. The recommendation is to make the mammogram schedule flexible to accommodate walk-in patients.

Conclusion

The effect of walk-in mammograms compared to scheduled mammograms in increasing mammogram participation was conducted in this study. Scheduled patients were noted to have more advanced staged BC (three and four) than walk-in patients stage (one and two). Scheduling patients for a mammogram is important in detecting BC,

however, the implementation of walk-ins might help to increase screening opportunities and allow for early detection of BC for AA women.

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Appendix A

Figure 1: Breast cancer Pamphlet

DO YOU KNOW?	MYTHS	FACTS	Mammogram Screenings
1. **Detection of breast cancer is a death sentence**	✖	☐	Early detection can help save lives
2. **Mammogram machine pops breast tissue that form caner**	✖	☐	The compression of the mammogram machine is a less invasive procedure that causes no harm to breast tissue
3. **The bigger your breast the more likely you are to have breast cancer**	✖	☐	The size of the breasts does not increase the risks off breast cancer
4. **Diagnosis of breast cancer leads to breast loss**	✖	☐	Early diagnosis can help save the breast
5. **All breast lumps are cancerous**	✖	☐	Not all breast lumps are cancerous

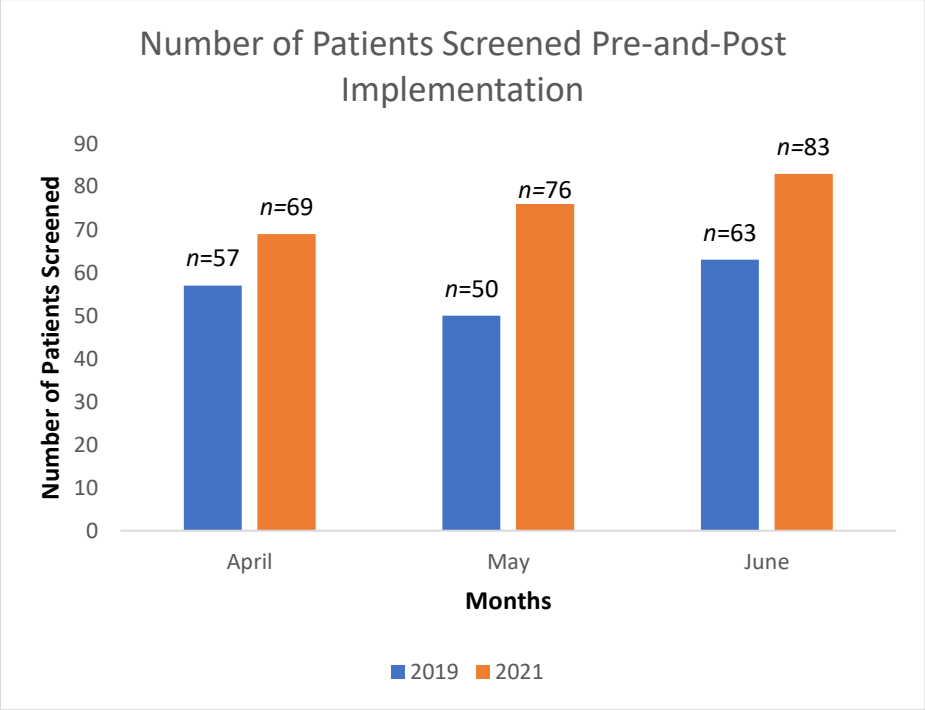
Appendix B

Table 1: Excel Spread sheet for data collection

	Number of Patients	Age	Walk-in-1/Schedule-2	Breast Cancer (Y/N)	Stage (I-IV)
April 2019	57	62	2	Y	4
		39	1	Y	1
		47	1	Y	2
		51	1	Y	1
April 2021	69	48	1	Y	2
		60	2	Y	2
		58	1	Y	1
		59	1	Y	1
		62	2	Y	2
May 2019	50	38	2	Y	3
		47	2	Y	4
-		45	1	Y	1
		51	1	Y	1
		53	1	Y	1
May 2021	76	57	2	Y	3
		58	2	Y	2
		60	1	Y	1
		62	1	Y	1
June 2019	63	37	2	Y	3
		47	2	Y	1
		51	1	Y	2
June 2021	83	57	1	Y	1
		46	1	Y	1
		60	2	Y	2

Appendix C

Figure 1

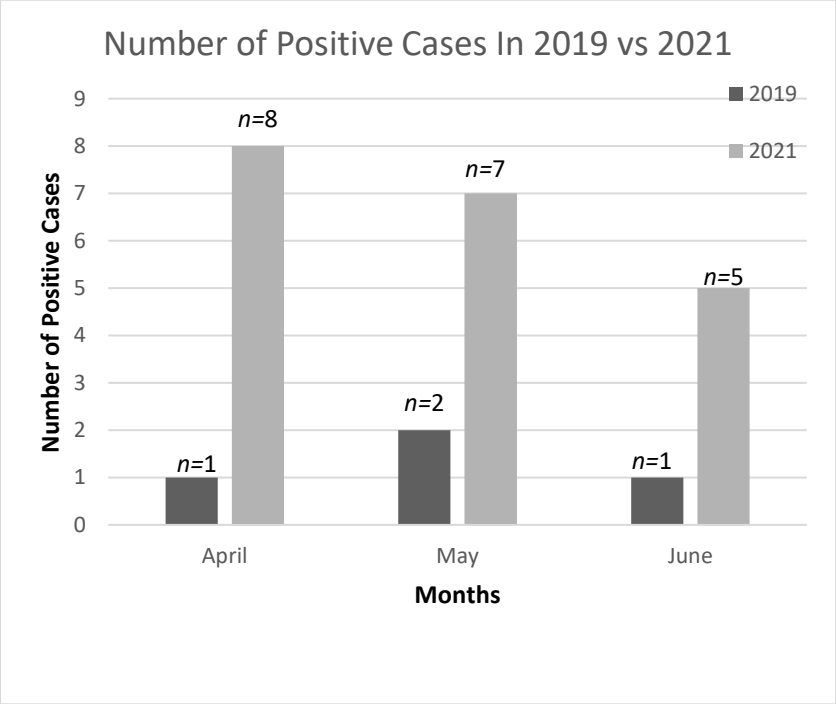


	2019	2021
April	57	69
May	50	76
June	63	83
Total	170	228

$$\% \text{ increase} = \frac{228-170}{170} \times 100 = 34.11765\%$$

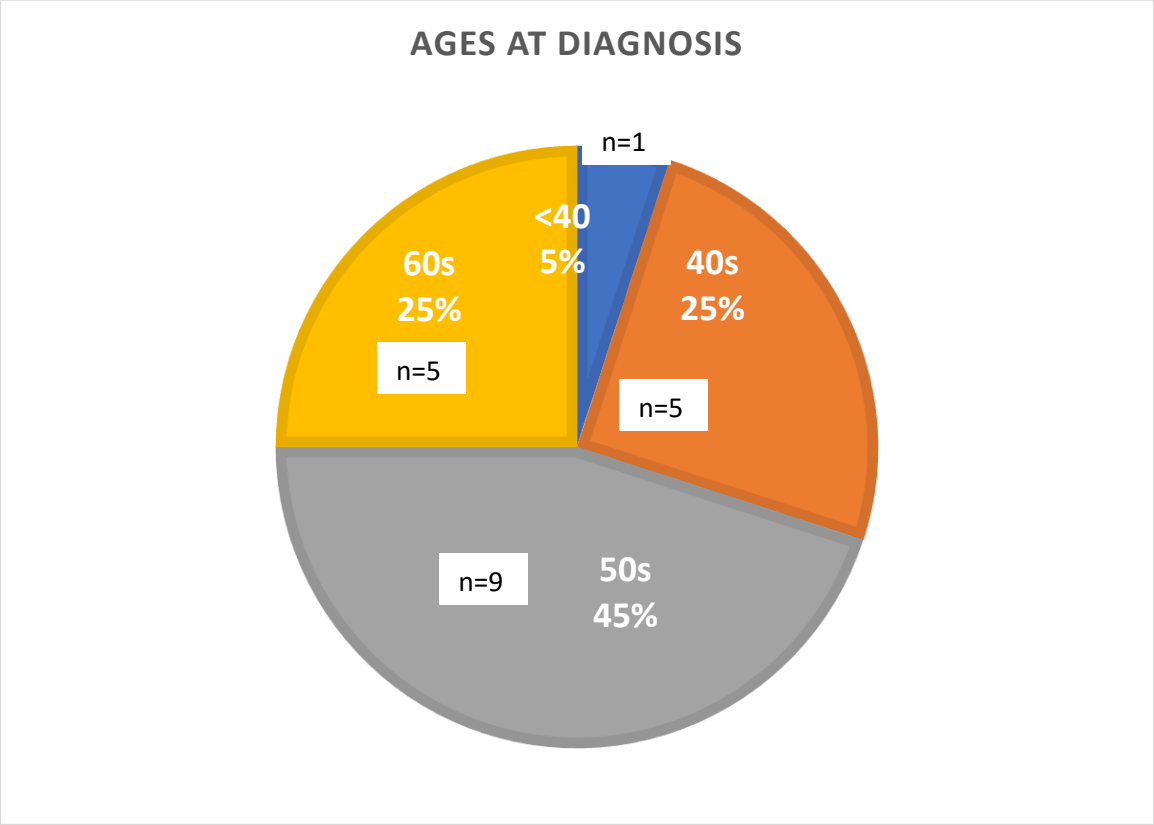
Appendix D

Figure 2



Appendix E

Figure 3

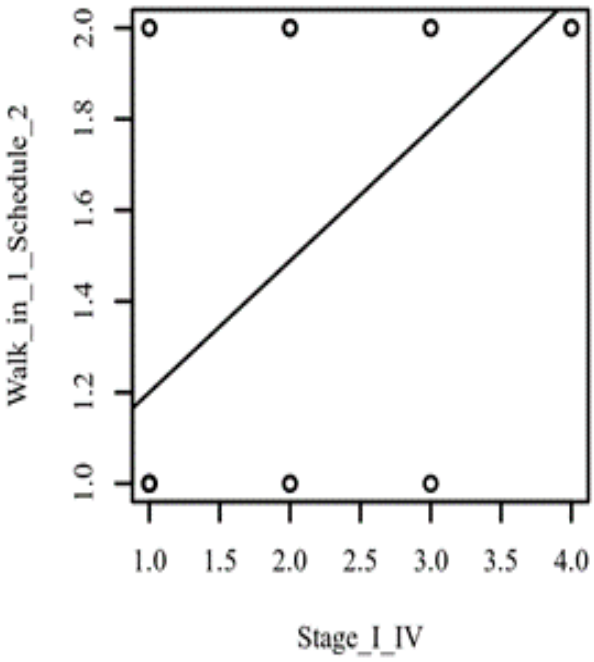


Age	Incidence	%
<40	1	5
40s	5	25
50s	9	45
60s	5	25
	20	

Appendix F

Figure 4

Spearman Correlation Results between Stage I-IV and Walk-in-1 /Schedule- 2



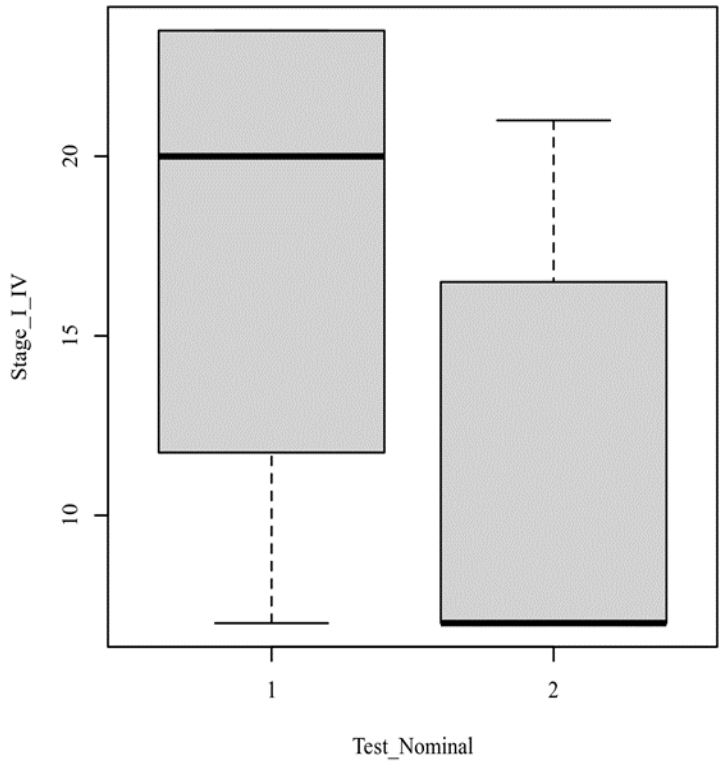
P = .002

Statiscally significant

Appendix G

Figure 5

Two-Tailed Mann-Whitney U Test Result between stages I-IV by Test Nominals



P = .080

No statistical difference