**Chapter 4: Data Analysis and Results**

**Introduction**

The purpose of this direct improvement project was to examine factors that decrease the risk of breast cancer recurrence. In this chapter the data that has been collected will be summarized and the statistical test used to present the results for the clinical question; can decreasing the risk of breast cancer recurrence be obtained through tailored lifestyle interventions that maintain a healthy BMI and weight control such as healthy eating and routine exercise improve long-term clinical result in breast cancer survivors? It has been projected that implementing a successful weight management intervention for breast cancer survivors may have even greater benefit than for individuals in the general overweight/obese population (Labyak et al., 2014).

The idea for this improvement project arose from findings of literature cancer recurrence, is cancer that has come back in the same or opposite breast or chest wall after completing the cancer treatments such as, surgery, radiation therapy and chemotherapy (Ahmad, 2013). Advances in early breast cancer detection and improve cancer treatment together have increased the breast cancer survivor population (Hall – Alston, 2015). Diagnostic imaging such as mammograms along with the advancements of cancer treatments such as chemotherapy is directly associated with the increase in breast cancer survivors. Approximately there are 2.8 million breast cancer survivors in the United States. As the diagnostic and treatment advancements increase the overall survival rate for breast cancer, the recurrent rate increases as well, there is a 3 %- 45% chance of breast cancer recurrence within the first five years after primary treatment (Stokes et al., 2008).

Chapter 4 information illustrates the findings of the quantitative research design utilizes objective theory testing through investigative research to establish the relationship between two variables (Creswell, 2013). In addition, the purpose of a quantitative research in health is usually to test a hypothesis such as determining the effect of an exposure on an outcome (Eddy, 2016). This determining factor could help identify the effects lifestyle habits such as unhealthy eating and insufficient or lack of physical activity related to the incident of breast cancer recurrence. This chapter summarizes the collected data, how it was analyzed and then presents the findings.

**Descriptive Data**

The data was collected utilizing two different instruments, patient’s health information chart and a questionnaire. The first data collection was gathered from 50 breast cancer survivors patient’s charts that has been diagnosed and treated at the Advocate medical group in Chicago utilizing the clinic breast cancer patients log book, patients were identified that fit the criteria for this study. Once the patients have been identified the data was collected from their electronic medical records, the information explored was data regarding their BMI, height and weight, diet and exercise. Secondly, 25 self- administering questionnaires were distributed with no identifiable characteristics to breast cancers survivor’s women aged 30 to 80 years old who have previously been diagnosed with breast cancer with stage one to stage three and have completed their primary treatment within five years of their initial diagnosis. In this report the results of the questionnaire will be presented first followed by the results of the patient’s health information charts. The data collection process began after receiving approval by the Institutional Review Board (IRB) committee. A site authorization letter had been reviewed and consent given to conduct the improvement project and collect data from breast cancer survivors through questionnaires and collecting personal health information from the breast cancer survivors charts without displaying any identifiable characteristics.

The questionnaires were completed by breast cancers survivors at the same healthcare facility in Chicago. All participants were informed prior to taking the questionnaire that there is no monetary appreciation for participating in this project improvement research.

The data collected from the two different instruments covered a 10-year spanned dating back to the year 2007 for each patient utilizing both instruments, examining the patient’s charts and at each questionnaire completed was explored. After reading and signing the consent forms breast cancer survivors between the ages of 3 to 80 were given a self-administered questionnaire. It took less than 10 minutes for each participant to read and sign the consent and HIPAA forms and complete the questionnaire and return it back to the investigator.

**Data Analysis Procedures**

Descriptive statistical analysis was used to analyze the data. The clinical question was the driving force. The data collected was used to identify, describe, and explore the association between breast cancer recurrence and lifestyle factors such as diet and exercise to reach or maintain an appropriate individualized BMI at a Chicago healthcare facility over a two-week period. The results can identify the benefits of implementing interventions into the patient’s care plan that decrease the risk of breast cancer recurrence such as diet and exercise. By providing written literature on the benefits of healthy eating and routine diet to help decrease the risk of breast cancer recurrence and scheduling consultation appointments with the nutritionists.

The ethical considerations were examined and approved by Grand Canyon University IRB committee. Permission was granted by the Advocate medical group healthcare facility to examine breast cancer patients charts to see if there is a relationship between obesity and breast cancer recurrence. A confidentiality form was signed and submitted to Advocate medical group facility and to Grand Canyon University IRB committee. To establish reliability and validity both instruments will be statistically tested, the questionnaire as well as the patient’s health information from their electronic medical record chart.

A total of 19 questionnaires were received from breast cancer survivors at the healthcare facility in Chicago during late February and early March 2018. Race was not included in the questionnaire due to the focus is lifestyle factors that can decrease the risk of breast cancer recurrence through diet and exercise to acquire or maintain an appropriate BMI. In addition, 50 breast cancer patients electronic medical records were examined for age, weight, BMI and diagnose of breast cancer recurrence with five case studies.

**Results**

To investigate the association between obesity and breast cancer recurrence as a result of unhealthy eating and insufficient or the lack of exercise this quantitative report compared two groups of breast cancer survivors utilizing two different instruments for data collection. The first group of breast cancer survivors was at least 30 pounds overweight and was diagnosed with breast cancer recurrence. The second group was of average weight or below weight based on their height and this group was not diagnosed with breast cancer recurrence. A total of 25 questionnaires were prepared for distribution however only 19 were analyzed and 50 electronic medical record charts were investigated and analyzed from breast cancer survivors at the healthcare facility in Chicago during late February and early March of 2018. It first began by discussing with my chairperson if the subject was acceptable. Once acceptability was obtained permission from the operational manager at the Advocate medical group clinic was granted to collect on identifiable information from patient’s charts. In this chapter sample size along with frequency and percentages of demographic variable such as age group and other variables will be explained. The sample population was breast cancer survivors; women aged 30 to 80 years old who have previously been diagnosed with breast cancer stage one ( I ) to stage three (III ) and have completed their primary treatment within five years taking the survey. The risk of recurrence for patients with breast cancer has been reported to peak within the first five years after primary treatment (Stokes et al., 2008). With this knowledge the first five years is the best time to initiate interventions that decrease the risk of breast cancer recurrence. Patients were excluded that was presently undergoing breast cancer treatment such as such as chemotherapy and radiation. Patients were also excluded that were already past the five year treatment after their initial diagnosis.

All breast cancer survivors that participated in the survey were patients from the same healthcare facility in Chicago. The patients were at the clinic for their routine follow-up oncology or surgery appointment, the patients were asked if they would like to participate in the survey for breast cancer survivors and if they agreed and signed the consent form they were handed the questionnaire. The participants were informed that their information is anonymous, once they complete the surveys to return it back to the researcher. This study was approved by Grand Canyon University IRB department, consent forms and HIPAA forms were signed to illustrate the samples agreement to participate in the study and to inform them that their information will be kept confidential. The data collection is based on demographics such as age, and lifestyle factors such as diet and exercise habits, weight and their knowledge of breast cancer risk.

**Questionnaire**

The data collected from the questionnaire focus on the patient’s lifestyle factors such as diet and exercise, their BMI, if they had a recurrence, and their understanding of factors that increase the risk of breast cancer recurrence. The self-administered questionnaires were handed to the participants by the researcher. Only women who had breast cancer between the ages of 30 and 80 years old, the breast cancer stage must be between one and three and the participants must have completed their treatments within five years from being diagnosis can take the survey. The questionnaire has 12 questions, eight yes or no and not sure answers and four questions with check off answers. The purpose of this questionnaire designed was to encourage participants by being easy to read and can be completed quickly with basic language for a clear understanding and easy to follow directions. Also, verbal instructions were given to participants at the basic language level to minimize confusion and to establish clarity. The design was also chosen because it was inexpensive.

Questionnaires are most useful when there is a finite set of questions, they are much less expensive and time-consuming to administer then interviews also, and a larger and more diverse sample can be obtained with questionnaires (Lobiondo-Wood and Haber 2014). The style of the questionnaire was selected because it is easy and can be completed quickly. The entire questionnaire took less than 10 minutes to complete.

A total of 25 breast cancer survivors questionnaires surveys were prepared for distribution. The number of questionnaires was based on the breast cancer survivors that had follow-up appointments at the healthcare facility conducting the project. The breast cancer survivors had as scheduled follow-up appointment with either the surgeon or the oncologist. After looking at both physician schedule a combined total of 25 breast cancer survivor patients were scheduled over a two-week span. The population of breast cancer survivor’s patients scheduled for an appointment over the course of two-weeks starting from last week in February of 2018 until the first week in March 2018 that fit the criteria for this improvement project was a total number of 25.

However, 22 questionnaires were distributed to breast cancer survivors due to time constriction. Of these breast cancer survivors’ respondents, zero was male, all were female, and three did not provide a response. Out of the 22 questionnaires distributed, three respondents did not return the questionnaires back to the investigator. Therefore, 19 questionnaires were acceptable for this improvement project. The data gather from these questionnaires were analysed by using Spss version number 24. The result of data collection used in this quantitative data was statistical analyzed, the word statistics, in its broadest meaning, refers to a collection of mathematical methods for organizing, summarizing, analyzing, and drawing conclusion based on data assembled in the study (Polit, 2010).

This descriptive research was utilized in a cross-sectional survey to identify any characteristics of a correlation between two variables. The aim of survey research is to produce information about a large population from a sample of that population through surveys such as questionnaires. The goal of sampling strategies in survey research is to obtain a sufficient sample that is representative of the population of interest (Ponto, 2015). The particpates were all women between the ages of 30 to 80 years old who have previously been diagnosed with breast cancer stage one to stage three and have completed their primary treatment within five years taking the survey.

Although, 22 out of 25 participants participated in the questionnaire 19 were acceptable. The 19 questionnaires were completed by the participants providing an 86.36 % response. See table 1 for frequency and percentage of age of the respondents.

|  |  |  |
| --- | --- | --- |
| Table 1  *Patient’s Demographics* | | |
| Age Frequency Percentage | | |
| 30 – 40 | <1 | < 1 % |
| 41 – 50 | 1 | 5.3 % |
| 51 – 60 | 5 | 16 % |
| 61 – 70 | 9 | 47.4 % |
| 71 - 80 | 4 | 21.1 % |
| Total | 19 | 100 % |

The breast cancer survivor’s age ranged from 30 to 80 and within the age group 30- 40 years old there were no participants to respond in this age group. The largest percentage of the age group was between age 61 and 70. The patient’s demographics shows <1 % of the of the respondents were between the ages 30 – 40 years old while, 5.3 % age range from 41 – 50 years old. In addition, the largest age group is 47.4 % with ages ranging from 61 – 70 and the 71-80 age group is 21.1 %. This could be as a result that more women between the ages 65 to 80 years old are diagnosed with breast cancer. Overall more women age 61 to 70 years old completed the questionnaire in comparison to other ages. Also, the participants were asked how many years ago they were diagnosed with breast cancer and do they think what they eat is related to health problems such as breast cancer. Out of 19 questionnaires received all respondents had completed their initial treatment within five years of their diagnosis. See table 2.

|  |  |  |
| --- | --- | --- |
| Table 2  *Patients completed treatments within five years of their diagnosis* | | |
| Completed treatment Frequency Percentage | | |
| Completed  Not completed | 19  < 1 | < 1 %  < 1 % |
| Total | 19 | 100 % |

Breast cancer survivors who have previously been diagnosed with breast cancer stage one to stage three frequency and percentages is shown in table 3.

Table 3

|  |  |  |
| --- | --- | --- |
| *Breast cancer stage* | | |
| Stage | Frequency | Percentage |
| Stage I | 3 | 52.6 |
| Stage II  Stage III | 10  4 | 31.6  10.5 |
| Total | 19 | 100 % |

The questionnaire asked participants if they were 30 pounds of more overweight. This question is significantly indicated in this study because the clinical question seeks an association with a high BM I and the risk of breast cancer recurrence. Epidemiological studies suggest an association between nutritional status and breast cancer incident that is body weight, body mass index (BMI and waist circumference may be risk factors for developing breast cancer (Amaral et at., 2010).

Out of the 19 respondents 12 of women’s admitted that they were 30 pounds or more overweight. This means about a thrid of the participants are 30 pounds overweight which is obese as noted in table 3.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 3  *More Than 30 Pounds Overweight*   |  |  |  | | --- | --- | --- | | More than 30 pounds | Frequency | Percentage |  |  |  |  | | --- | --- | --- | | Yes | 12 | 63.2 % | | No | 7 | 36.8 % | | Total | 19 | 100 % | |

Overweight accounts for 30% increase in a women’s risk in developing breast cancer, while physical activity accounts for an approximately 30% decrease in breast cancer risk and mortality (Labyak, et al., 2014). Lelièvre and Weaver (2013) article identifies a connection between breast cancer and the environment, and suggests the environment may be relate to the impact of diet on the epigenome of the breast epithelium before tumor development.14 out of 19 responded that they believe their food choice could be related to developing cancer. See table 4 . This question on the questionnaire is in response to the third research, a diet that includes a large amount of soy consumption might decrease the risk of premenopausal breast cancer, and there is growing evidence that suggest an elevated level of fruit and vegetable consumption might also decrease the risk of hormone receptor-negative breast cancer (Breast Cancer Facts & Figures, 2015-2016). The result of these findings is sustained by studies connecting a reduce breast cancer risk to higher blood levels of carotenoids, a micronutrient found in fruit and vegetables (Breast Cancer Facts & Figures, 2015-2016).

Distinctly, the largest percentage of participants who believe their food choice could be related to health problems such as developing cancer was 73.7 %. While 10.5% of the respondents did not believe the food they consume could be responsible for health problem. Lastly, 15.8% of the breast cancer population at this healthcare facility was not sure if food was related to health problems. However, the mean was 11, the average breast cancer survivor participant believe food is related to health issue.

Table 4

*Participants believe food is related to health problems*

|  |  |  |
| --- | --- | --- |
| Believe | Frequency | Percentage |

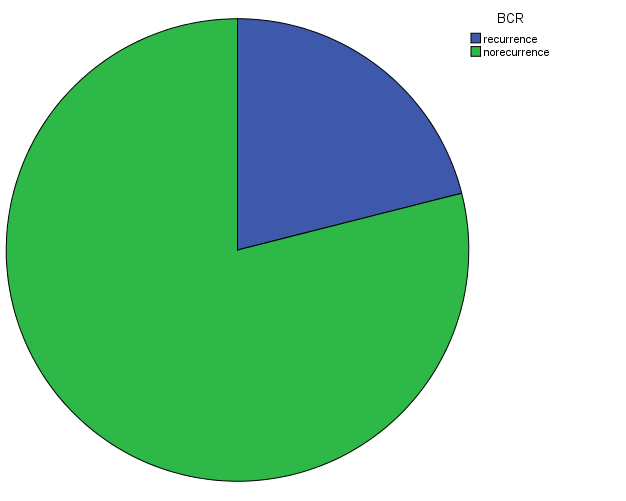
|  |  |  |
| --- | --- | --- |
| Yes | 14 | 73.7 % |
| No | 2 | 10.5% |
| Not sure  Total | 3  19 | 15.8 %    100 % |

In a study done by Ansa et al., (2016) the risk of breast cancer recurrence is connected to lifestyle behaviors such as excessive body weight, physical inactivity, and poor eating habits such as excessive calorie intake. Breast cancer survivors should be taught and understanding how the foods they eat can be linked to breast cancer recurrence. Identifying factors that decrease the risk of breast cancer recurrence could possibly prevent breast cancer recurrence by having interventions that decrease the patient’s risk. Also it would save the patient from going through the mental agony and hardship of being diagnosed with recurrent breast cancer (metastatic). In addition, identifying factors that decrease the risk of breast cancer recurrence can decrease the out-of-pocket costs for the patient as well as the overall health care costs of the patient being treated again for the same disease. In a study done by Stokes et al., (2008) the analysis suggests that each case of breast cancer recurrence cost $16,389 on average.

The participants were asked about the amount of physical activity they obtain during an average work day such as do they sit most of the time or are theyvery active. The significant of this question is to establish a link between inactivity and an increased risk for breast cancer recurrence. Out of the 19 participants 10 admit to being very active and six admit to being fairly active while two indicated that they were somewhat active while one admits to a very little physical activity as seen in table 5. The majority of the breast cancer patients participating in the survey admit to being very active.

|  |  |  |
| --- | --- | --- |
| Table 5 | | |
| *Daily Activity* | | |
| Active | Frequency | Percentage |
| Very active | 10 | 52.6 |
| Fairly active  Some what active | 6  2 | 31.6  10.5 |
| Mostly no physical activity  Total | 1  19 | 5.3  100 % |

Most of participants believed that fresh fruits and vegetables help prevent diseases like cancer. The majority of participants responded to the answer this question on the survey believe that fresh fruits and vegetable could help prevent diseases such as cancer was 11, while eight respondents were not sure and one out of the 19 of participants did not answer this question. Participants were asked if there cancer returned after they completed treatment. Because the criteria for taking the questionnaire all patients had to be completed their treatment within five years from taking the survey. Therefore if anyone participant had a reoccurrence it would have occurred within the first five years of their initial diagnosis. Figure 1 represents four respondents out of 19 who answered on the questionnaire that they were overweight and had a recurrence of breast cancer.



*Figure 1.* The above pie graph illustrates the relationship of being overweight and breast cancer recurrence. The blue pie slice represents the obese respondents who have been diagnosed with breast cancer recurrence within five years of completing their initial treatment. It is estimated that 5 to 15 percent of breast cancer patients will have a recurrence within 10 years after having a mastectomy. The green pie slice represents the respondents that did not have a breast cancer recurrence within five years of completing their initial treatment.

The questionnaires ask the participants how many servings of fruits and vegetables they believe they need per a day. The multiple-choice answers on the questionnaire range from zero-to-four or more servings a day. See table 6. Six respondents out of the 19 questionnaires distributed replied on the survey that they did not think any number of fruits and vegetable servings were needed every day. Nine respondents out of the 19 questionnaires distributed replied by checking off the answer, 1-3 servings a day is needed. Lastly, four respondents out of the 19 questionnaires distributed replied that they believe four or more servings per day are needed.

|  |  |  |
| --- | --- | --- |
| Table 6 | | |
| *Daily serving of fruit and vegetable* | | |
| Daily serving | Frequency | Percentage |
| None | 6 | 52.6 |
| 1 -3  4 or more | 9  4 | 31.6  10.5 |
| Total | 19 | 100 % |

To gain a better understanding of the breast cancer survivor population, a question on the questionnaire as can fresh fruits and vegetables help prevent diseases like cancer. See table 7. The answers on the questionnaire were multiple-choice yes, no or not sure. The majority of the respondents answered yes which were 11 participants out of 19 questionnaires distributed. Less than 1% responded to the (no) answer. Eight participants responded, they were not sure if fresh fruit and vegetables could help prevent diseases like cancer.

Table 7

*Participants believe fresh fruits and vegetables help prevent diseases such as cancer*

|  |  |  |
| --- | --- | --- |
| Believe | Frequency | Percentage |

|  |  |  |
| --- | --- | --- |
| Yes | 11 | 73.7 % |
| No | <1 | 10.5% |
| Not sure  Total | 8  19 | 15.8 %  100 % |

The participants were asked if they think too much sugar could lead to being overweight and overwhelming amount of respondents replied yes 17 out of the 19 questionnaires distributed. Two of the participants responded no to the question while less than 1% answered not sure. This question was asked on the questionnaire to gather information regarding the breast cancer survivors participant knowledge of what food or food substance can lead to being overweight. This question on the questionnaire is in alignment with the clinical question number 2 that asks can eating a healthy diet maintain a appropriate weight and BMI. See table 8.

Table 8

*Respondents believe too much sugar can lead to being overweight*

|  |  |  |
| --- | --- | --- |
| Believe | Frequency | Percentage |

|  |  |  |
| --- | --- | --- |
| Yes | 17 | 73.7 % |
| No | 2 | 10.5% |
| Not sure  Total | <1  19 | 15.8 %  100 % |

This question on the questionnaire was also asked to gather information regarding breast cancer survivor’s knowledge regarding the type of food such as foods high in that could affect their overall health conditions. This question was also based on the relationship with the clinical question number 2. The frequency and percentage of the respondents that believe some health conditions can be caused by consuming a diet high in fats. As shown in Table 9 the frequency and percentage of the respondents answers. The multiple choice answers were written as, yes, and no, and not sure. Out of the 19 questionnaires distributed 12 responded yes they do believe some health conditions are caused by eating too much fat, three respondents replied no they do not believe some health conditions can because by eating too much fat. Lastly, four respondents replied they were not sure if some health conditions could be cause by consuming a diet high in fat.

Table 9

*Respondents believe some health conditions can be cause by eating too much fat*

|  |  |  |
| --- | --- | --- |
| Believe | Frequency | Percentage |

|  |  |  |
| --- | --- | --- |
| Yes | 12 | 73.7 % |
| No | 3 | 10.5% |
| Not sure  Total | 4  19 | 15.8 %  100 % |

**Charts**

A total of 50 patient charts were investigated electronically from breast cancer survivors at the healthcare facility in Chicago during late February and early March of 2018. The data collected from the patient’s charts focus on whether the patient had breast cancer recurrence or not, if they had completed their treatment within five years of their initial diagnosis, the patient’s height, weight, year of the diagnosis and the stages were accessed, and the patients BMI were evaluated and compared with the incidents of breast cancer recurrence.

The Data was collected from 50 breast cancer survivors using their electronic medical record chart who had completed their treatment within five years of their initial diagnosis. The patient’s race was not included in the demographic due to the clinical question race does not play a significant factor. However the patient’s age is included in the demographics utilized for this project. The ages range from 30 to 80 years old and all charts investigated were female. Table 10 shows the age the participants that were diagnosed with breast cancer.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | Table 10  *Patient’s Demographics* | | | | Age Frequency Percentage | | | | 30 – 40 | 2 | 4.0% | | 41 – 50 | 4 | 8.0% | | 51 – 60 | 13 | 26.0% | | 61 – 70 | 22 | 44.0% | | 71 - 80 | 9 | 18.0% | | Total | 50 | 100 % | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Most of participants 44.0 % were between the ages 61 –70 years old. Again, as seen in the responses from the questionnaire, you this could be as a result that more women’s between the ages 65 to 80 years old are diagnosed with breast cancer. Also, the age group 30 – 40 had the smallest responds at 4.0%. While the respondents in the age group 51 – 60 were 26.0% and nine respondents in the 71 -80 made up 18.0%. The breast cancer survivor’s electronic medical record was explored for any link between the patient’s BMI and the risk of breast cancer recurrence. As shown in table 11.   |  |  |  | | --- | --- | --- | | Table 11 | | | | *Body mass index (BMI)* | | | | BMI | Frequency | Percentage | | Underweight: BMI is less than 18.5. | 1 | 2.0 % | | Normal weight: BMI is 18.5 to 24.9. | 11 | 22% | | Overweight: BMI is 25 to 29.9 | 8 | 16 % | | Obese: BMI is 30 or more. | 30 | 60 % | | Total | 50 | 100 % |   Of the 50 patient’s chart investigated eight breast cancer patients (4%) had a breast cancer recurrence within five years after completing their initial treatment. This data answers the first research question regarding the percentage number of breast cancer survivors that have recurrence within five years after completing treatment? 50 breast cancer patient electronic medical records were investigated for their diet and exercise activity. All 50 breast cancer patients EMR revealed that 49 breast cancer survivor patients were encouraged to eat healthy and exercise regularly although no specific diet plan or exercise plan were addressed. However, there was one chart of a breast cancer survivor’s patient who was also diagnosed with diabetes was placed on an 1800 calorie a daily diet. Inferential statistics. Statistics that rely on the law of probability to help researchers draw conclusions about whether relationships and characteristics observed in a sample are likely to occur in the population (Polit, 2010). As shown in figure 2 and 3 and 4      *Figure 2 correlates* the connection between obesity and breast cancer recurrence. Out of the 50 charts investigated 27 patients were obese and out of the 27 obese breast cancer survivors eight had breast cancer recurrence. Compared with the same 50 charts, 21 breast cancer survivors were at average weight or below and out of the 21 breast cancer survivors two had breast cancer recurrence.    *Figure 3 this* figure also illustrates how the same 50 breast cancer survivor’s charts can be divided into two groups of breast cancer survivors. Group one seen in figure 2 was 27 obese breast cancer survivors, meaning they were at least 30 pounds overweight and among them were eight cases of breast cancer recurrence. Group two shows 21 breast cancer survivors at an average or below weight had two incidents of breast cancer recurrence among them.  *Figure 4* illustrates an increased number of breast cancer recurrences among the obese breast cancer survivors. |

National Breast Cancer Foundation'

University Family Medicine Center 

**Case study 1**

46-year-old black female diagnosed with breast cancer and have an extremely and unusually strong family history of breast cancer. Hereditary accounts for only 5%–10% of all breast cancer cases. It is cause by a gene pathogenic mutation known as Breast Cancer 1 and Breast Cancer 2 (BRCA1 and BRCA2). Her mother, four out of her five sisters, three out of her eight nieces and a 29 year old great niece. Many of the patient’s family members diagnosed with breast cancer are obese, the mother the four sisters the three nieces however, the 28-year-old great-niece is not obese. The patient’s mother is 70 years old, although she is obese her BMI is unknown, and she is on her third diagnoses of breast cancer. The patient’s mother was first diagnosed at the age 45 with right breast cancer and was treated surgically with a lumpectomy. At the age 62 the patient’s mother was diagnosed with left breast cancer with lymph node involvement. Her treatments consist of a left mastectomy and left node dissection. She was also treated with chemotherapy and a hormonal pill that she took over the course of five years. In 2016 the patient mother is now at the age 70 and has been diagnosed again with recurrent metastatic right breast cancer. Her treatment began with neoadjuvant chemotherapy. The oldest sister was first diagnosed with right breast cancer at the age 45 years old and was treated with the lumpectomy and radiation therapy for six weeks. She is also overweight but her BMI is unknown. At the age of 52 the oldest sister was diagnosed right breast recurrence, there was no indication that she modified her lifestyle to include healthy eating and routine exercise because she remained overweight. The oldest sister treatment for breast cancer recurrence was a right mastectomy. The second oldest sister is also overweight with an unknown BMI; she was diagnosed with bilateral breast cancer at the age of 47. The second oldest sister received neoadjuvant chemotherapy treatment, prior to having a bilateral mastectomy. The third born sister was also the third sister to be diagnosed with breast cancer. She is also overweight and was diagnosed with left breast cancer at the age of 44. The third sister diagnosed with breast cancer was treated with neoadjuvant and eventually with the left breast mastectomy with reconstructive surgery. Three years later the third sister diagnosed with breast cancer was diagnosed with right breast cancer. For this right breast cancer occurrence the patient treatment consist of a right mastectomy. One of the 46-year-old black female (case study) younger sisters was diagnosed with right breast cancer. This sister was also overweight at the time of her diagnosis and her treatment was a surgical right breast lumpectomy with radiation treatment. The case study patient was also overweight at 208 pounds with a height of 5’3 and BMI of 36.85 when diagnosed with left breast cancer. Because of the strong family history of breast cancer, the case study patient received genetic counseling and test positive for BRCA1. Due to the case study patient BRCA1 test result the patient’s treatment consist of bilateral breast mastectomy and a total hysterectomy.

Although, the case study patient genetic testing proved to be positive for a hereditary link between the case study patient family and breast cancer, obesity cannot be completely ruled out as a contributing factor. The statistic probability the case study patient having a breast cancer recurrence due to overweight and obesity is approximately 9.5 %. The case study patient sister that was not diagnosed with breast cancer has a healthy weight and BMI is within normal limits. The case study patient’s 29 year old great niece diagnosed with breast cancer also has a healthy weight and BMI is within normal limits. The case study patient’s niece treatment consists of a left lumpectomy. The case study patient’s great niece has an increase risk of breast cancer recurrence due to hereditary and age, not to obesity and a high BMI. However, there are other factors that could contribute to the case study patient’s great niece increased risk of breast cancer recurrence such as age (being diagnosed younger than 60 years old), and positive lymph node involvement where the cancer has spread outside the breast area and into the lymph node, which is part of the immune system.

The standard weight types based on the adult BMI

|  |  |
| --- | --- |
| **BMI in kg/m2** | **Weight Category** |
| Below 18.5 | Underweight |
| 18.5 to 24.9 | Normal |
| 25.0 to 29.9 | Overweight |
| 30.0 to 39.9 | Obese |
| 40.0 or higher | Severely obese |

National Institutes of Health

**Case study 2**

A 60-year-old overweight 258 pounds black female with a height of 5‘7 and a BMI of 40.44 was diagnosed with stage II left breast cancer in 2015. This case study patient has no known family history of breast cancer, ovarian cancer, colon cancer or prostate cancer. However, this patient did work the night shift. Night shift work is associated with modifiable breast cancer risk factors. This case study patient is the first known family member to be diagnosed with any cancer. This patient was diagnosed with ductal carcinoma in situ with a grade three in two different areas in the same breast. The treatment for this patient was a left mastectomy with adjuvant chemotherapy. After this patient completed the chemotherapy the patient weight increased to 270 pounds with a BMI of 42.29. Due to the increase in body weight and BMI there is no indication that the patient adapted a lifestyle of healthy eating and physical activity to decrease and maintain a BMI less than 30. Two years from the initial diagnosis and 2017 patient was diagnosed with breast cancer recurrence to the left chest wall that must test the side to the left lung.

Age was not a major factor for this patient’s breast cancer recurrence because the incident of breast cancer increases with age, starting at the age 60 years old and for African-Americans the incident for breast cancer starts at age 55. Heredity was not a major factor for this patient developing breast cancer recurrence because she is the first family member to be diagnosed. The probability of this patient’s breast cancer recurrence is 9.5% due to being overweight. Being overweight increase the production of hormones such as estrogen and progesterone even in postmenopausal women. An increase production or prolong estrogen and progesterone in the body has been linked to the development of breast cancer.

**Case study number 3**

A 45-year-old overweight 242 pounds black female with a height of 5’7 and a BMI of 38.03 was diagnosed with right breast cancer; stage II, invasive ductal carcinoma with lymph node involvement. This patient had no known family history of breast cancer. The patient treatment began with neoadjuvant chemotherapy (chemotherapy prior to breast surgery). The neoadjuvant was given to treat:

* patients systemically (through bloods circulation)
* shrink the tumor
* to cure

Once the neoadjuvant therapy was completed the patient had a right breast radical mastectomy and after the surgical mastectomy site was healed the patient began radiation therapy to the site to help decrease the chance of local recurrence. However, in eight months the patient was diagnosed with breast cancer recurrence. The patient weighed 241 pounds at the time of her diagnosis of breast cancer recurrence. Although this patient has no known family history of breast cancer, she was diagnosed with breast cancer under the age 60 years old which is a risk for breast cancer recurrence. The patient remained overweight with a BMI of 37.75. Although this patient had of the factors that increased her risk for breast cancer recurrence she also had a high BMI greater than 30 which is also an increase risk for breast cancer recurrence.

**Case study number 4**

A 51-year-old black female with a healthy weight and BMI was diagnosed with stage III invasive ductal carcinoma. This case study patient’s height was 5'5" and weight was 135 pounds with a BMI of 22.49. She was treated with neoadjuvant chemotherapy and one year later prior to have the surgery she was diagnosed with breast cancer recurrence. This case study patient maintained her weight at 135 pounds and a BMI of 22.49. She had one maternal cousin that had been diagnosed with breast cancer at the age of 62. Therefore, heredity was not associated with this patient breast cancer diagnosis because she was not a first-degree relative and she was diagnosed greater than the age of 60. This patient’s weight was insignificant to her breast cancer recurrence because she had an appropriate weight and a healthy BMI. However, this patient was only 51 years old at the time of her initial diagnosis there for her breast cancer recurrence can be associated with her age less than 60 years old and the aggressiveness of her disease being diagnosed with stage III breast cancer.

**Case study number 5**

A 90 year old white female diagnosed with breast cancer recurrence five years after completing treatment. This case study patient was first diagnosed with left ductal carcinoma in situ breast, stage I, in two different regions of the breast therefore, this patient had a left breast mastectomy treatment five years prior to being diagnosed with breast cancer recurrence. The patient's height is 5’6 and weighs 126 pounds with a BMI of 20.34. She is the only known member of her family to be diagnosed with breast cancer. Therefore, heredity is not associated with the patient’s breast cancer recurrence. However, the patient age is greater than 60 years old therefore, age can be linked with an increased risk of breast cancer recurrence, because breast cancer recurrence is associated with an increase in age. Therefore, the probability of the case study patient is due to age and not related to being overweight because she has a healthy weight of 126 pounds and a healthy BMI of 20.34 study patient. Also, this case study patient breast cancer recurrence may have been due to her first breast cancer diagnosis because, being diagnosed with a previous breast cancer increased the risk for breast cancer recurrence.

**Case study number 6**

A 72-year-old overweight 184 pounds white Jewish female with a height of 5’5 and a BMI of 30.26 was diagnosed with left breast cancer; stage II, invasive ductal carcinoma with lymph node involvement. This case study patient was diagnosed with left breast cancer recurrence three years after completing the initial treatment. She was first treated at the age 69 with breast conservation, a left breast lumpectomy with six weeks localized radiation.

**Summary**

The purpose of this improvement project was to describe patterns and link interventions such as healthy eating and exercise resulting in a healthy BMI associated with breast cancer recurrence. A total of 25 breast cancer survivors questionnaires surveys were prepared for distribution. However, 22 questionnaires were randomly distributed to breast cancer survivors due to time constriction. Of these breast cancer survivors’ respondents, zero was male, all were female, and three did not provide a response. However, of those who provided a valid response, was 86.36 %. The largest percentage of the age group was between age 61 and 70. All of the responses had been previously diagnosed with breast cancer and all responses had completed their treatment within five years of their initial diagnosis. Of the 19 participants that took the questionnaire four had a recurrence. From the 50 survivors charts eight oh beast survivors had a recurrence while the average weight and below had two breast cancer recurrences. These findings show a relationship between overweight and the increased risk for breast cancer recurrence.

The purpose of this DNP improvement project is to answer the clinical question: can breast cancer recurrence be decreased or even prevented through a tailored lifestyle such as modifying diet and exercise. This direct improvement project examines evidence-based practice that a lifestyle of healthy eating and regular exercise regimen has been linked to long-term survivorship. Can eating healthier and exercising regularly decrease the risk of breast cancer recurrence by measuring adherence to diet and exercise recommendations if there is a relationship between obesity and breast cancer recurrence, and if adapting a lifestyle that includes an appropriate diet and routine exercise could decrease the risk factors associated with breast cancer recurrence.