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What is the Evidence that Increasing the Length of Breastfeeding has on Risk Reduction of Breast Cancer

Jaci K. Phillips

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What is the Evidence that Increasing the Length of Breastfeeding
has on Risk Reduction of Breast Cancer

by

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An Independent Study
Submitted to the Graduate Faculty
Of the
University of North Dakota
in partial fulfillment of the requirements

for the degree of
Master of Science in Nursing

Grand Forks, North Dakota

May
2010

This independent study, submitted by Jaci Phillips in partial fulfillment of the requirements for the Degree of Masters of Science in Nursing from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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I dedicate this to my four beautiful daughters to whom I say follow your heart and dreams, to my Aunt Mary who fought such a hard fight against breast cancer and lost, to my mother who continues to fight and win against breast cancer and to all my nieces and great nieces who I hope will never have to go through the battle of breast cancer. I would also like to thank my husband for supporting me as I pursue my dreams.

Abstract

The focus of this study was to review the literature to determine if breast cancer incidence was reduced by breastfeeding duration. It is important for health care providers to present the benefits of breastfeeding to women of childbearing age and especially to those who are pregnant. This literature review will result in a pamphlet that will be available to health care providers to present to prenatal patients. Informing women about the benefits of breastfeeding and breast cancer risk reduction will promote their ability to make an informed decision on breastfeeding. The Health Belief Model is the framework that was used for this study. We know that a health behavior is an action shown by people perceiving the susceptibility of a health problem. It is important for women to understand that the benefits of breastfeeding outweigh the barriers of not breastfeeding to reduce and hopefully prevent breast cancer. A comprehensive review of the literature to identify the evidence related to duration of breastfeeding and reduced breast cancer risk. While studies reviewed different data and aspects of increased duration of lactation and the effects on reducing breast cancer risk there is not enough strong evidence to promote longer duration of breastfeeding to reduce the risk of breast cancer. While the literature is still out on risk reduction of breast cancer and breastfeeding there are many clinical guidelines that promote breastfeeding and breast cancer risk reduction. The American Academy of Pediatrics, American Dietetic Association and the Academy of Family Physicians all promote breastfeeding for the benefits to women and their babies.

CHAPTER I

Introduction

If breastfeeding reduces the risk of breast cancer, then why aren't more women breastfeeding? This independent project will look at the evidence regarding duration of breastfeeding and breast cancer risk reduction. The finding of this project will inform practice regarding guidance provided to women in support of breastfeeding as a breast cancer risk reduction strategy. Women need to be knowledgeable about this potential risk reduction so that they can make an informed choice about breastfeeding.

In the United States in 2008, there were 182,460 estimated new cases of breast cancer and 40,480 estimated deaths (National Cancer Institute 2008). The Centers for Disease Control and Prevention (CDC 2009a) report that breast cancer is the most common cause of death from cancer among Hispanic women and the second most common cause of death from cancer among white, black, Asian/Pacific Islander and American Indian/Alaska Native women. One in 8 women in the United States will have breast cancer in her lifetime. It is estimated that 800,000 new cases of breast cancer are diagnosed globally and that breast cancer is the most commonly diagnosed cancer among women worldwide (Li 2009). Wall (2007) reported that a study done in the state of Wisconsin illustrated that there would be a yearly savings of \$17,070,000 in breast cancer costs if the breastfeeding rates were at 50% of infants breastfeed exclusively for six months.

Breast cancer is a major concern to woman in the world and every woman deserves to know and understand what she can do to decrease her lifetime risk of breast cancer.

Risk factors for breast cancer include sex, age, family history, benign breast disease, hormones, early menarche, late menopause, pregnancies, not breastfeeding and first child after 30 years of age (Jernstrom et al., 2005). Some of these risk factors for breast cancer are modifiable and important for health care providers to present to women of child bearing age and pregnant women.

In a recent study by Stuebe, Willett, Xue & Michels (2009), they reported a 59% reduction in the incidence of premenopausal breast cancer with having ever breastfed among women with a first-degree relative with breast cancer. This was the first prospective study to show that family history of breast cancer is modified by the association between breastfeeding and breast cancer risk. This project will synthesize evidence about the effect of breastfeeding duration and the risk of breast cancer. The findings of this study will be disseminated so that women and providers can have up to date evidence on the effects of breastfeeding duration and the risk reduction of breast cancer.

Background and Significance

The main focus of this study was to review the current literature to determine if breast cancer incidence was reduced by breastfeeding duration. If breast cancer is reduced by breastfeeding duration, then health care providers (HCP) can use the findings to present this evidence based information to women.

It is imperative that HCPs provide women evidenced based information on the benefits of breastfeeding. It is important to present the benefits of breastfeeding to women of childbearing age and to those who are pregnant before deciding if they are going to breastfeed or bottle feed. It is important for health care providers to be comfortable with discussing the benefits of

breastfeeding with pregnant women so that every woman understands the benefits of breastfeeding.

Clinical Guidelines for Family Practice (Uphold & Graham 2003, p.25) review the numerous benefits of breastfeeding and state that it is important to communicate benefits to pregnant women. However, they fail to mention any benefits for women who breastfeed; they only present the benefits to the infant. The American College of Obstetrics and Gynecologists (ACOG) (2007) presented a special report on breastfeeding that states that breastfeeding reduces the risk of breast cancer. ACOG (2007) states that the health benefits of breastfeeding and the health risk of not breastfeeding warrant professional cooperation and coordination among all HCP's to educate and encourage women and their families to breastfeed.

Purpose Statement

This project will synthesize the literature regarding the evidence of duration of lactation and the association with future risk of breast cancer. This information will be disseminated in a pamphlet that will be available to health care providers to present to prenatal patients. Informing women about the benefits of breastfeeding and breast cancer risk reduction will promote their ability to make an informed decision. The findings from this project may promote an increase in the duration of breastfeeding benefits to women.

The literature was examined to determine if there is substantial evidence that increased breastfeeding duration will reduce breast cancer evidence. It is essential for health care providers to educate women of childbearing age about breast cancer risk reduction so that they can make the important decision of whether to breastfeed or not.

Conceptual Framework

Disease and health threats can make us vulnerable. What causes women to perceive the seriousness or severity of breast cancer? Could it be the emotional aspect of breast cancer or the threat of breast cancer? The Health Belief Model is a framework that examines why some people who are illness free take action to evade illness where as others fail to take preventive actions. A health behavior is an action shown by people perceiving the susceptibility of a health problem, such as the disadvantage and the benefit. The Health Belief Model focuses on the attitudes and beliefs of an individual (Pender, Murdaugh & Parsons, pg. 318, 2007). This model theorizes on the assumption that people fear disease so much that they will focus on healthy actions to prevent disease.

The importance of the Health Belief Model is that it is necessary for women to understand that the benefits of breastfeeding outweigh the barriers. The expectation will be that women will practice healthy benefits such as breastfeeding to reduce and prevent disease such as breast cancer. A barrier to breastfeeding would be that Health Care Providers do not promote breastfeeding or they are not comfortable with discussing breastfeeding with patients. This may cause some women not to breastfeed due to lack of information about the benefits of breastfeeding.

CHAPTER II

Review of Literature

Introduction

Breast cancer incidence, prevalence and risk factors report how many women might be affected. Clinical guidelines provide standards which guide practice regarding anticipatory guidance to women about breastfeeding and breast cancer. There are many studies (Yang & Jacobson 2009, Hietala et al 2008, Huo et al., 2008, Shema et al., 2007, Kim et al., 2005, and Jernstrom et al., 2004) available that have been conducted on the association between duration of breastfeeding and the risk of breast cancer. A summary of these findings are presented in this chapter.

Concepts such as perceived susceptibility, severity, efficacy and barriers lead people to choose their readiness to act. Susceptibility shows that one in eight women will have breast cancer sometime in their life (CDC, 2009c). We know that breast cancer is very severe. In 2005 alone, 41,116 women died from breast cancer (CDC 2009c). Narod (2006), reported that BRCA 1 mutation carriers who breastfed for more than 1 year were 40% less likely to have breast cancer than those who breastfed for a shorter period. A study in Shanghai in the early 1980's demonstrated that there was a 63% risk reduction for those who reported a life time duration of lactation of more than 109 months of breastfeeding when compared to those who had never breastfed (Zheng et al., 1999). When Zheng and colleagues (1999) did a similar study they also showed significant reduction in breast cancer in those with prolonged lactation. Similar studies in the western population showed a lower reduction in breast cancer with breastfeeding which

Zheng and colleagues (1999) contributed to western population's shorter duration of lactation. These studies illustrate that breastfeeding has benefits against breast cancer.

Breast Cancer Incidence and Prevalence

Breast cancer is the most common type of cancer among women in the United States (US). Each year in the US more than 192,000 women are diagnosed with breast cancer (National Cancer Institute 2009b). 1 in 8 women will be affected by breast cancer sometime in her life (Jernstrom et al., 2005). The most commonly diagnosed cancer in women is breast cancer. Worldwide nearly 1,000,000 new cases diagnosed per year (Andrieu et al., 2006). Breast cancer is the second leading cause of death in all women except for Hispanic women where it is the leading cause of death (CDC, 2009b). CDC (2009e) reports that in 2005 the incidence for breast cancer in the United States has decreased by 2.2% per year from 1999 to 2005. The incidence rates have only decreased by 0.6% among African-American women and remained the same among Asian/Pacific Islander women (CDC 2009e). The American Cancer Society (2009) states that 1 in 35 women have a chance of dying from invasive breast cancer in her life time, however there are more than 2.5 million breast cancer survivors in the US.

Breastfeeding Variables Influencing Risk for Breast Cancer


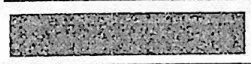


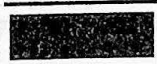

The American Cancer Society (ACS) explained that breastfeeding may slightly lower breast cancer risk, especially if breastfeeding is continued for 1.5 to 2 years (2009). The ACS reports that longer breastfeeding duration reduces breast cancer however this has been a difficult area to study due to the confounding factors such as length of breastfeeding, exclusive breastfeeding, smoking, nutrition and medication taken during breastfeeding, to name a few. Countries such as the United States, where breastfeeding for a long period is uncommon, has not shown statistical significant differences in breastfeeding duration and in breast cancer reduction.

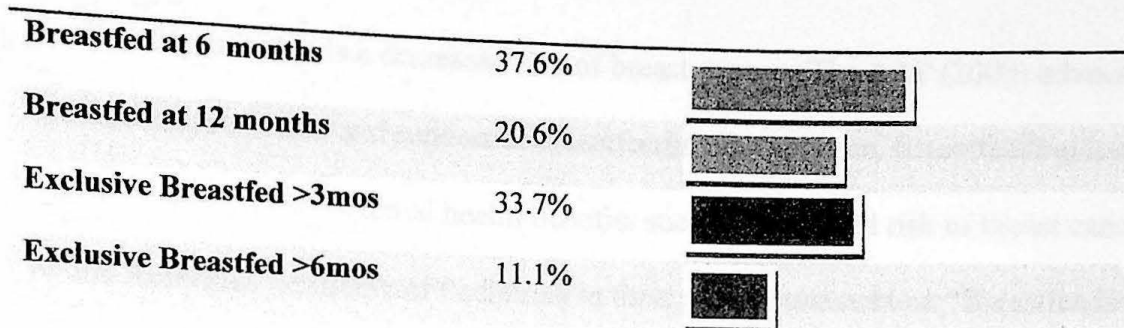
Increased duration of breastfeeding could be the explanation for risk reduction of breast cancer with breastfeeding in other countries.

Breastfeeding Rates

Breastfeeding rates among women in 2006 in the United States show that 73.9% of women ever breastfed, with 44.4% of women breastfeeding at 6 months and 22.7% of women breastfeeding at 12 months (CDC 2009c). The Centers for Disease Control and Prevention (2009c) reports that the "Healthy People 2010 Objectives" are for 75% of mothers to initiate breastfeeding, 50% of mothers to breastfeed their infants at age 6 months, and 25% of mothers to breastfeed their infants at 12 months. Healthy People 2010 Objectives set the goal for 40% of mothers to exclusively breastfeed through 3 months and 17% exclusively breastfeed through 6 months of age. The breastfeeding rates for women in Montana and North Dakota are shown below (Table I). Montana exceeds the Health People 2010 Objectives for breastfeeding rates at 3 and 6 months however, only 20.5% of Montana women are exclusively breastfeeding at 6 months. North Dakota, on the other hand, is below the expected Healthy People 2010 objective of ever breastfed, breastfed at 6 months and exclusive breastfeeding at 3 and 6 months.

Table I.

<u>Montana</u>	Percent	0.0 % - 100.0 %
Ever Breastfed	82.7%	
Breastfed at 6 months	56.8%	
Breastfed at 12 months	30.6%	
Exclusive Breastfed >3mos	40.8%	
Exclusive Breastfed >6mos	20.5%	
North Dakota		
Ever Breastfed	71.1%	



The percentage of children ever breastfed in 2006 in the States of Montana and North Dakota (CDC 2009d).

Clinical Guidelines

The National Institute of Health (NIH) (2009) states that clinical guidelines are developed for practitioners to give best practices for health care delivery from systematically reviewed medical literature with evidenced-based guidelines. Clinical guidelines provide a role for treatment modalities and specific diagnostics to diagnosis and manage patients (NIH 2009). Recommendations are not fixed, but are evidence-based for practitioners to follow in conjunction with their own judgment in managing their patients. Clinical guidelines are written by an expert panel formed by committees and reviewed by intended practitioners (NIH 2009). The American Academy of Family Physicians (AAFP) (2009) Annual Clinical Focus (ACF) studied clinical guidelines to: (1) get the most current evidenced-based medicine, (2) focus on patients, families and communities to improve their health, (3) provide learning aids to all members of the AAFP, (4) have high quality and clearly focused educational materials for patients and (5) partner with other organizations for a common goal in health care that strengthens professional relationships and organizations.

American Academy of Pediatrics

The American Academy of Pediatrics' (AAP) policy statement, on breastfeeding and the use of human milk states that there are maternal health benefits to breastfeeding (2005). Among

the benefits included is a decreased risk of breast cancer. The AAP (2009) advocates for the promotion, protection and support of breastfeeding for children. Breastfeeding is a high priority for the AAP (2009). Maternal health benefits such as decreased risk of breast cancer, is affirmed by the American Academy of Pediatrics in their policy statement on "Breastfeeding and The Use of Human Milk" (AAP 2005). The AAP strongly suggests that breastfeeding be promoted, supported and protected for the improved health outcomes of mothers. Development of formal training in breastfeeding and lactation in medical schools, residency and for practicing pediatricians is an important part of the guidelines supported by the AAP. The AAP (2005) also recommends collaborative work with the obstetric community to make sure that women receive accurate and adequate information throughout the perinatal period to make an informed choice about breastfeeding. The AAP strongly encourages women to breastfeed for at least 6 months.

American Dietetic Association

Medical and nutrition experts recommend breastfeeding for baby's optimal growth and development but they also mention that there are benefits to moms. The American Dietetic Association (ADA) (2008) emphasizes that women who breastfeed have a lower risk of developing pre-menopausal breast cancer, ovarian cancer and osteoporosis. Improved maternal outcomes such as reduced risk of breast and ovarian cancer are associated with breastfeeding. The ADA (2009) reports that while breastfeeding rates are slowly increasing there are still factors such as; (a) knowledge deficit, (b) beliefs and (c) attitudes of mothers and their families that have a great impact in breastfeeding practices. They also state that breastfeeding support is especially deficient which that can influence initiation, duration and exclusivity of breastfeeding. Breastfeeding is an important public health strategy for improving maternal morbidity and helping to control health care costs (ADA, 2009). Reasons for breastfeeding are numerous, but

some factors that determine whether a mother will choose breastfeeding are supportive hospital staff and practices and lack of knowledge about breastfeeding. The ADA (2009), suggest that women should be counseled enthusiastically about the benefits of breastfeeding and make breastfeeding family centered. Supporting legislation to eliminate barriers to breastfeeding as well as advocating for policy changes that support breastfeeding (ADA 2009).

Academy of Family Physicians

Academy of Family Physicians (AFP) (2007) supports breastfeeding and states that physicians should be familiar with the health effects of breastfeeding on women and children. The AFP states that family physicians have a unique role in promoting breastfeeding and breastfeeding education and support and should integrate promotion strategies into visits. Part of the Academy of Family Physicians (2009) mission is to produce and distribute learning aids to students and residents in training, to make available high quality, clearly focused patient education materials to benefit patients and to increase awareness of the family physician's role in the expanse of family medicine. In a Breastfeeding Policy Statement from the AFP (2007) it is stated that breastfeeding is a physiological norm for both mothers and their children and they recommend that babies be breastfed exclusively for the first six months of life. The AFP (2007) also states that breastfeeding beyond the first year offers considerable benefits to both mother and child, and family physicians should have the knowledge to promote, protect and support breastfeeding. AFP points out that women in developed countries who do not breastfeed have increased risk of breast cancer. They maintain that further studies with more consistent definitions of breastfeeding intensity and duration are needed.

United States Preventive Services Task Force

The United States Preventive Services Task Force (USPSTF) reviewed 43 primary studies on maternal health outcomes of breastfeeding and found that a history of lactation was associated with a risk reduction of breast cancer (Agency for Healthcare Research 2007). The USPSTF also states that a history of breastfeeding is associated with a reduction of many diseases in mothers from developed countries (Agency for Healthcare Research 2007).

Breastfeeding and Risk Reduction of Breast Cancer

Nine studies were reviewed on breastfeeding and risk reduction of breast cancer. These were all were quantitative studies. After a thorough, comprehensive review of the literature, five case control studies (Huo et al., 2008, Shema et al., 2007, Kim et al., 2005, Meeske et al., 2004, and Jernstrom et al., 2004) were identified for review. Three cohort studies (Hietala et al., 2008, Andrieu et al., 2006, and Symmans et al., 2005) and one systematic review (Yang 2008) were reviewed. All of these studies were within the last 5 years and were mainly hospital and population based clinical trials.

Cumulative Breastfeeding and Breast Cancer Risk

In a systematic review, Yang and Jacobsen (2009) examined 30 case control studies and one cohort published between 1999 and 2007. Studies were conducted in 18 countries. They acknowledged that previous studies hypothesized that reduction in the risk of breast cancer was primarily achieved through two mechanisms. These mechanisms were by facilitating differentiation of mammary cells and reducing lifetime number of ovulatory cycles by breastfeeding.

While one half of the studies that Yang and Jacobsen (2009) reviewed found that duration of cumulative breastfeeding was significantly protective against breast cancer, other studies have not consistently found that breastfeeding confers significant protection against breast cancer.

When extracting data for this review they analyzed the author, study years, study country, sample size, age of participants, breastfeeding characteristics, the adjusted odds ratio (OR) and the 95% confidence interval (95% CI) for ever breastfeeding verse never breastfeeding and breast cancer with confounding adjustments.

Twenty seven of the 31 studies calculated an OR for ever verses never breastfeeding, with eleven showing a significant protective association for decreased risk of breast cancer with increased duration of breastfeeding. Twenty four of the studies reviewed duration of breastfeeding and risk reduction in breast cancer. Thirteen of these studies found a significant protective association with extended duration of breastfeeding. .

Some challenges of this review were the lack of a standard protocol for grouping the lifetime number of months of breastfeeding for analysis. Some studies used year intervals while some used 6 months intervals, with 1-2 month increments of breastfeeding. Yang & Jacobsen (2009) could not conclude a relationship between breastfeeding and breast cancer incidence rates. Yang & Jacobson (2009) stated that with further research on expanded confounders and the ranges of breastfeeding duration, further conclusion on the influence of protection from breast cancer by breastfeeding duration could be determined

While the studies did not yield consistent findings for the association between ever breastfeeding or the association of cumulative breastfeeding duration and breast cancer, there were at least one half of the studies that showed protective effects in breastfeeding duration and breast cancer risk reduction. Due to the inconsistency of duration the authors concluded that it was difficult to compare the studies. Half of the studies showed significant protective effects against breast cancer with duration of cumulative breastfeeding

Breastfeeding and Breast Cancer in High Risk Women

Hietala, Olsson & Jernstrom (2008) explored the relationships between prolactin levels, breastfeeding duration, milk production and breast cancer gene (BRCA) carrier status in young healthy women from high risk breast cancer families. This study looked at women who carry the BRCA1 and BRCA2. High prolactin levels have been associated with increased breast cancer risk. Their problem statement was clearly defined however they did not indicate a hypothesis for this study. The data resulted from a questionnaire which relied on the women's memory of duration of breastfeeding and confounding factors such as smoking, medication and oral contraceptive use. Data from questionnaires with information on reproductive and lifestyle factors as well as body measurements and plasma prolactin levels were collected during women's cycle phases. Women that belonged to high risk breast cancer families with BRCA 1 or 2 could include women in the family with a diagnosis of breast cancer or one women in the family below the age of 50 with breast cancer, two women in the family with breast cancer or one woman with breast cancer before age 40 and/or one women in the family with breast cancer below the age of 30. Breastfeeding durations were ranked for better distribution. Mann-Whitney U test, the univariate analysis and Spearman rank correlation were used to compare breastfeeding duration and continuous variables. Two Hundred and sixty nine women were enrolled in this study. Median breastfeeding duration of the first child was 5 months with a total median duration of 9.5 months. The authors explored breastfeeding with subsequent children and only showed an association with breast cancer risk reduction with breastfeeding duration of the first child. This study also investigated milk production and reported that those with lower milk production had higher levels of prolactin. This study also demonstrated that women with BRCA 1 status were more likely to have insufficient milk production. Hietala, Olsson & Jernstrom (2007) did not find

an association with breastfeeding other children and breast cancer risk reduction other than the first child

Hietala, Olsson & Jernstrom (2008) reported that further studies were needed on the biological significance of breastfeeding duration of the first child in women with high risk family history of breast cancer such as BRCA1 and BRCA2 mutations as well as women from the general population. There were missing data but this was included in the multivariate analysis to avoid loss of power and reduce the bias. This study illustrated complete confidence in breast cancer risk reduction of 7% for every 12 months of breastfeeding with and 95% CI and a p-trend of 0.005.

Questionnaires were used for in-person interviews of 819 breast cancer cases and 569 community controls between 1998 and 2006. This was a hospital case control study and a randomly selected ballot of community members. Inclusion were females 18 years and older with the absence of any cancer and ability to give consent.

Breastfeeding duration was categorized into less than 24 months, 25-48, 49-72, 73-96 and 96 and greater and then further dichotomized with parity as less than 12 months and greater than or equal to 12 months. Confounding factors such as hormonal contraceptive, alcohol, and BMI were analyzed. T-tests, Wilcoxon rank sum and continuous variable data tests were performed as well as logistic regression modes to look for relationships with variables.

Shema and colleagues (2007) reported that breastfeeding was one of the modifiable factors in preventing breast cancer but that there needed to be a clear understanding on the proposed carcinogenic mechanisms, so further studies were suggested.

This study examined the association between history of breastfeeding and risk of breast cancer in women who carried BRCA 1 and BRCA 2 gene mutations. This study included women

from the International BRCA 1/2 Carrier Cohort Study (IBCCS) a large population based study in Europe.

The retrospective analyses were based on 1601 women 1187 with BRCA 1 and 414 with BRCA 2 mutation during January 1997 through December 2002. A questionnaire was administered by mail, by an in-person interview at the time of genetic counseling or through a telephone interview. Data collected included whether a woman breastfed and the total lifetime duration in months. Breast cancer risk was analyzed by modified Cox proportional hazards regression model as opposed to a standard Cox model to minimize bias of hazard ratio (HR) as women in this study were selected from high risk families and were susceptible to breast cancer.

This study showed a risk reduction of breast cancer when comparing women who breastfed to those who did not. While their goal was not to find statistical significance they did feel their study to be reliable and valid to meet all criteria for causality between breastfeeding and breast cancer risk reduction.

Andrieu et al (2006) reported that never having breastfed or breastfeeding for more than 12 months showed no association of breast cancer risk reduction in the entire cohort. This study evaluated total months of breastfeeding for each pregnancy and it was reported that the midpoint of 3-5 months duration of breastfeeding was used for analysis.

Breastfeeding duration was analyzed as a fixed covariate using age of the women when she first breastfed until she was diagnosed with breast cancer. Cases were similar with respect to year of birth, age at first birth, age at last birth and duration of breastfeeding years.

Data was collected on 1927 women with BRCA 1 or 2 mutations (cases) and 2032 women without invasive breast cancer but who carried the BRCA gene (controls). Cases and controls age 18 to 71 were matched with 685 who carried the BRCA 1 mutation and 280 that

carried the BRCA 2 mutations. The control subjects were restricted to the period before the diagnosis of breast cancer. Recall bias with using a questionnaire submitted by mail, telephone and in person was considered a limitation. Limitations were recall bias however they deemed that there was no obvious reason why case subjects should be less likely to recall breastfeeding than the controls.

Results showed significance with shorter durations of breastfeeding for cases than for controls with 6.7 months vs. 8.7 months. Findings also showed a modest but non-significant reduction in breast cancer with breastfeeding and a significant tendency for longer duration of breastfeeding and breast cancer risk reduction with a 2% risk decrease with each additional month. Women who had BRCA 1 mutation and breastfed were significantly less likely to have breast cancer than those who had never breastfed. This was not the case for BRCA2 mutation women. Even though Andrieu et al., (2006) did not find clear evidence of a risk reduction of breast cancer with increased duration of breastfeeding they did report that they could not rule out a 4.3% risk reduction with every 12 months of breastfeeding as other studies had found. However the authors felt that additional research is warranted.

Kim et al., (2005) evaluated the effects of lactation on the risk of breast cancer after adjustment for potential confounders with a comparative risk of breast cancer in women who had breastfed their first child. This was a multi centered hospital based case control study examined both lifestyle and genetic risk of breast cancer.

The sample included women age 25 to 79 with newly and histologically diagnosed invasive breast cancer as well as controls with no history of present cancer from 1997 to 2003. Participants were interviewed by a nurse, with breastfeeding duration calculated in months for each child. Breastfeeding duration was reported in quartiles with categories of 1-11, 12-24, 25-45

and 46 or more months. The average duration was quartiled by dividing the total duration by number of full term pregnancies as 1-4, 5-10, 11-12 and 13 or more. Unconditional logistic regression models were used to estimate the risk with a 95% CI, adjusting for confounders such as hormone use, medication, alcohol and tobacco use. Trend tests were conducted using likelihood ratio statistics to assess the linear trends of odds ratios. With more than 80% of parous women breastfeeding, the analysis on breastfeeding was restricted to ever-lactated women. The longer average duration of breastfeeding showed a lower risk of breast cancer ($p = 0.02$). Duration of 13 months of breastfeeding reduced the risk of breast cancer by 35% compared with a duration of 1-4 months. This study was limited by recall of breastfeeding duration after the first child. Selection bias was addressed by recruiting from the same department in the same hospital during the same period.

They illustrated that there was a reduction in breast cancer with breastfeeding but the effect of environmental factors on female hormone levels warrant further investigations. Environmental and behavioral risk factor effects are still unknown on the risk of breastfeeding duration and breast cancer.

Symmans et al., (2005) investigated the relationship between estrogen receptor (ER) and breast cancer as a major determinant in breast cancer. Part of this receptor, the GABA π , is a subunit that has been found in DNA of these breast cancers. This subunit is expressed in endocrine and reproductive tissues. Symmans et al., (2005) reported that this receptor subunit was might be expressed in breast tissues and might be related the endocrinology of lactation. Symmans et al., (2005) reported that the subunit may not be expressed if a women had a longer duration of breastfeeding.

Symmans et al., (2005) investigated 203 women with newly diagnosed invasive breast cancers. Lactation history was classified as none, less than or equal to 6 months, 6-12 months and 12 or more months. GABA π expression was ranked for a threshold value of higher and lower expression. Univariate and multivariate analyses with a linear regression and ANOVA test were used to determine the significance of the subunit in breastfeeding duration. It was hypothesized that cells that have the ability to change, called progenitor cells, are coexpressed with GABA π expression. Progenitor cells are lost with breastfeeding and if the women does not breastfed then malignant transformation of the retained progenitor cells leads to undifferentiated breast cancer and GABA π expression.

Hispanic women presented with breast cancer of higher stage of disease and at a younger age than non-Hispanic white women. Symmans et al., (2005) demonstrated that GABA π expression is increased in breast cancers of immature cell types and is significantly associated with shorter lifetime history of breastfeeding and high grade breast cancer in Hispanic women..

Symmans et al., (2005) reported there needs to be more studies on the GABA π expression for therapeutic or preventive strategies for breast cancer. Symmans et al., (2005) reported that breastfeeding facilitates reduction of progenitor cells through terminal differentiation of epithelial cells in the lobules. Shorter duration of lifetime breastfeeding may predispose to future development of undifferentiated and estrogen independent breast cancer due to retention of progenitor cells. The authors concluded that a shorter duration of lifetime breastfeeding may predispose to future development of undifferentiated and estrogen independent breast cancer due to retention of progenitor cells

Meeske et al., (2003) reported due to the lack of information on the relationship of reproductive factors such as lactation to breast Carcinoma in situ (CIS) they wanted to further

investigate this. The study interviewed 726 cases that were newly diagnosed with CIS. The cases were between the ages of 35-64 and it was conducted between March 1, 1995 and May 31, 1998. There were 1,026 controls that were selected through random digit dialing. Women were considered to have a positive breastfeeding history if they breastfed one of their infants for 2 weeks or longer. Two lifetime duration of breastfeeding variables were created, the number of months a woman breastfed overall and the number of months a woman breastfed without the addition of supplemental feedings. Multivariate models examined the effect of breastfeeding on risk and were restricted to women with at least one live birth. Linear trend for continuous variables looked at number of pregnancies, number of term pregnancies, months of breastfeeding and number of children breastfed. The results of this study indicated that the risk of breast CIS increased slightly with increasing number of children breastfed and increasing duration of breastfeeding. This was the first study to illustrate positive breast cancer risk with breastfeeding duration. One interesting finding was that although the study was done with a large the number of women who had breastfed for prolonged periods it was a relatively small study with 726 cases and 1,026 controls, which could increase the risk is due to a small sample size.

They did not have any explanation of the observed increase risk of breast cancer with longer breastfeeding duration other than the reflection that breastfeeding impacts tumor proliferation but not tumor initiation. Meeske et al., (2004) conjectured that this could be attributed to tumor proliferation but not tumor initiation and that further studies finding were needed. Meeske et al., (2004) reported that long duration of breastfeeding of greater than 24 months was associated with increased risk of breast cancer.

Huo et al., (2008) inferred that the relation between reproductive factors and breast cancer had not been studied in indigenous women of sub Saharan Africa. Huo et al., (2008)

demonstrated that Nigerian women almost always breastfed their babies and more than half of them breastfed for twelve months or longer. This contributed to the low incidence of breast cancer in Nigerian women. However Huo et al (2007) also reported that protective effects of breastfeeding may be decreased as Nigeria as well as many other countries that adopt a more westernized lifestyle.

This was a case control study of women age 18 and older during the years of 1998 to 2006 in Nigeria. This study included 819 women with breast cancer identified through the University College Hospital and 569 women identified in an adjoining community as controls.

This study was done via a structured questionnaire, and the interviewer was blinded to the health status of the women. Breastfeeding duration was categorized into less than 24 months, 25-48, 49-72, 73-96 and 96 and greater and then further dichotomized with parity as less than 12 months and greater than or equal to 12 months. Confounding factors such as hormonal contraceptive, alcohol, and BMI were analyzed.

The authors reported that they attempted to reduce selection bias by selecting women from the same medical center, and interviewer bias by using one interviewer that was blinded and participant being blinded to the hypothesis. Recall bias was an issue but the authors aimed to reduce it by conducting a second retrospective interview with 50 of the women in the study.

This study showed a risk reduction of breast cancer when comparing women who breastfed to those who did not. This study showed significant risk reduction with duration of breastfeeding, breast cancer risk is decreased by 7% for every 12 months of breastfeeding (Huo et al., 2008). It also illustrated that the association between breast cancer and lifetime duration of breastfeeding persisted after adjustment for parity, age at first live birth and other potential confounders.

Summary

The prevalence of breast cancer is quite significant with 1 in 8 women being affected in their life time. While breast cancer is the second leading cause of death in many women, it is the first in Hispanic women. We know that breastfeeding rates do not meet the 2010 Healthy People Objectives. The AAP, ADA, AFP all report that breastfeeding has breast protective properties, however the AAP and ADA clinical guidelines state that it lowers a women risk of developing breast cancer.

Seven out of nine current studies (Yang & Jacobsen 2009; Hietala et al., 2008, Huo et al., 2008, Shema et al., 2007, Kim et al., 2005, & Symmans et al., 2005 & Jernström et al., 2004) demonstrated statistical significance with reduction of breast cancer and increased duration of lactation. However most studies necessitate for further studies due to confounding factors in women such as oral birth control, medications, smoking, alcohol, nutrition and exercise to name a few.

Studies were synthesized to provide the evidence base for health care provider's education related to breastfeeding and breast cancer risk. Appendix B shows a summary of each study in relation to; (1) Author and year, (2) Setting, Subjects and Sample, (3), Study type and Variables, (4) Instruments used and Analysis and (5) Conclusions. This summary also shows the year that the study was conducted, as well as statistical significance of each study

CHAPTER III

Methods

This project was accomplished through a comprehensive review of literature in order to identify the evidence related to duration of breastfeeding and reduced breast cancer risk. Clinical guidelines and studies were identified, evaluated and subsequently conclusions were made regarding the findings. The final result was a pamphlet to present to providers to assist them in providing evidence based recommendations to decrease breast cancer reduction by breastfeeding. Findings show that seven out of nine current studies shows significance that breast cancer can be reduced by increased duration of breastfeeding.

Comprehensive Review of Literature

Databases were searched to identify studies for review which included: PubMed, Cochrane, Scopus and CINAHL. PubMed provided 308 hits with a query of "Breastfeeding and Breast cancer", produced 724 hits with a query of "Lactation and risk of Breast cancer", provided 27 hits with a query of "Breastfeeding duration and risk of Breast cancer" and with an advanced search for a Clinical Control Trial provided 3 articles were not used because they were not related to breastfeeding duration. Cochrane produced 52 hits with breastfeeding, none of which pertained to the reduction on breast cancer and no hits for "Lactation and risk of Breast cancer. Scopus was queried and produced 290 hits with "Breastfeeding and Breast cancer. CINAHL was queried for "Breastfeeding and Breast cancer with 124 hits mainly the same ones found in a PubMed search and an advanced search for clinical trials produced 2 hits with no pertinent results.

Of these studies 10 were pertinent to the information on breastfeeding duration reducing the risk of breast cancer. They were refined down to 9 solid studies from the years 2009 to 2004 which included a systematic review.

Project Description

This project includes stakeholders such as: (a) women of child bearing age, (b) pregnant women, (c) family's of women at risk for breast cancer (d) physicians, (e) nurse practitioners, (f) physician assistants, and (g) insurance companies. The target population for this independent study includes all women of child bearing age and pregnant women who will be making a decision to breastfeed or not at sometime in their lives. The information obtained from this independent study will be utilized by primary care providers when working with women of child bearing age and pregnant women. Primary care providers include physicians, nurse practitioners and physician assistants.

The pamphlet (Appendix A) contains information from the AAP, ADA and AFP on the recommendation of breastfeeding. Statistics from the CDC on the percentage of women who breastfeed and the Health People 2010 goal of women they would like to have breastfeed.

CHAPTER IV

Discussion

The evidence from the studies demonstrated that there was a correlation with breastfeeding and breast cancer risk and many studies show significance with increased duration of breastfeeding and reduced breast cancer risk (Yang & Jacobson 2009, Hietala et al 2008, Huo et al 2008, Shema et al 2007, Kim et al 2005, and Jernstrom et al 2004).

There are many co-founding variants that influence the risk of breast cancer such as smoking (Yang & Jacobson 2009, Hietala et al 2007, Shema 2007, Andrieu et al 2006, & Jernstrom et al 2004), alcohol (Yang & Jacobson 2009, Huo 2007, & Andrieu et al 2006), age (Yang & Jacobson 2009, Huo 2007, Jernstrom 2004, & Meeske 2004), weight (Yang & Jacobson 2009, Hietala et al 2007, Huo 2007, & Meeske 2004), medication (Hietala et al 2007, Huo 2007, Shema 2007, Andrieu et al 2006, & Jernstrom et al 2004) and age at first pregnancy (Yang & Jacobson 2009, Hietala et al 2008, Huo et al 2008, Shema et al 2007, Andrieu et al 2006, Kim et al 2005, & Jernstrom et al 2004). Many of these studies conclude that it remain unclear how these factors play a role in breast cancer risk with duration of lactation.

Yang & Jacobsen 2008, reported that 13 of 24 or 54% of the studies revealed statistical significance in reducing breast cancer with duration of breastfeeding. Shema et al (2007) reported that breast cancer protection that was gained mainly during the first year of breast feeding, Jernstrom et al., (2004) revealed that BRAC 1 mutation carriers with a cumulative total of more than one year of breastfeeding demonstrated reduced breast cancer risk. Huo et al (2007) reported a 7% and Kim et al., (2005) a 54% decreased breast cancer risk with increased duration

of breastfeeding. While Andrieu et al., (2006) showed no association with increased duration of breastfeeding decreasing the risk of breast cancer. Meeske et al., (2004) reported an increased risk of carcinoma in-situ with increased duration of 24 months or more of breastfeeding. Breasts fully mature during breastfeeding and Symmans et al., (2005) found that immature/undifferentiated breast cells show an increased risk of breast cancer which was significantly associated with shorter lifetime history of breastfeeding.

The significance of this literature review was that of the nine studies reviewed, six of them or 67% showed a reduction in breast cancer risk with increased duration of breastfeeding. This is over half of the studies reporting that breastfeeding can reduce the risk of breast cancer.

When all nine studies were reviewed, only one study showed that lactation had little or no protective effects against breast cancer. This is very significant for all women and it shows that it is very important to increase the rates of breastfeeding in the future so that we can begin to see the rates of breast cancer go down.

The purpose of this project was to evaluate the current studies and report on the evidence that breastfeeding duration has on breast cancer risk reduction. Findings synthesized from this project are summarized in a pamphlet, which can be viewed in Appendix A. The pamphlet is to be used by health care providers to educate women of child bearing age and pregnant women on what is the current evidence that breastfeeding duration has on breast cancer risk.

Nursing Implications

The implications for nursing will be that more women will choose to breastfeed, which will potentially reduce the risk of breast cancer for many women. This could potentially increase breastfeeding rates which would align with the "Healthy People 2010 Objectives". Nurses will benefit by being informed on the benefits of breastfeeding as well as the importance of

increasing breastfeeding rates. They will have the latest evidenced based information to present to women when they are making the choice of whether to breast or bottle feed. Nurses will be able to help women make an informed choice on whether to breastfed or bottle feed.

Practice

This independent project could increase not only the rates of women of childbearing age and pregnant mothers who will potentially breastfeed but would also provide area health care providers the opportunity to know what is the current evidence based research on breastfeeding and breast cancer risk reduction. The goal would be that updated research showing that breastfeeding duration reduces the risk of breast cancer would increase the breastfeeding rates.

Many providers remain satisfied when they ask pregnant women whether they are going to breast or bottle feed and the decision is left at that. This is not adequate as studies demonstrate (Chezem, Frieson & Boettcher 2002) that with education many women will choose breastfeeding over bottle feeding. It is also reported that Health care professionals can be a negative source of support if they lack knowledge or give inaccurate or inconsistent advice (Dennis 2002).

Breastfeeding education for health care practitioners can increase breastfeeding initiation rates (Grossman et al 2009). Health care workers must provide direct education and support for breastfeeding duration not only to women but also to women's family and significant others (Thulier & Mercer 2009). Chezem, Frieson & Boettcher (2002) illustrated that breastfeeding knowledge was strongly correlated with breastfeeding confidence and increased breastfeeding duration. Health care providers need to know what the current evidence presents and that breastfeeding can reduce the risk of breast cancer. This could potentially increase their standards of care and their protocols or policies for providing information on the benefits of increased duration of breastfeeding to all pregnant women at all prenatal visits. The information in the

pamphlet would offer health care providers up to date evidenced based studies on the evidence of breastfeeding duration and the risk reduction of breast cancer.

Research

When considering if there is more research needed on the effects that breastfeeding has on the risk reduction of breast cancer, seven (Yang & Jacobson 2009, Hietala et al 2008, Shema et al 2007, Andrieu et al 2006, Kim et al 2005, Jernstrom et al 2004, Meeske et al 2004) of the nine studies felt that more research was needed. Many reports conclude that breastfeeding is a modifiable factor on breast cancer and it is shown that longer duration does reduce the risk of breast cancer in women. More research is needed to understand the risks of other modifiable environmental and behavioral factors and how they defeat the benefits of breastfeeding.

It is very important to improve the rates and duration of breastfeeding for the health benefits to women. Further understanding of the social, cultural, economic and psychological factors that influence and inhibit breastfeeding would be a step forward in breastfeeding health research. Also important would be improving the understanding of what the health benefits are of longer duration of breastfeeding and risk reduction of breast cancer.

Education

It is important to educate health care providers on what current evidence is available on the benefits of breastfeeding and breast cancer risk reduction. Women deserve to know what the current research shows on the risk reduction of breast cancer and that there is significant evidence that breast cancer is reduced by increasing the duration of breastfeeding (Lea et al 2002). McDowell, Wang and Kennedy-Stephenson (2008) show that breastfeeding rates among low income families are 57% compared with infants whose families had a higher income at 74%. Infants whose mothers are 20 years old and younger were less likely to be breastfed than infants

whose mothers are 20 - 29 years and older (McDowell et al 2008). The U.S. Preventive Services Task Force recommends that health care setting use strategies that work with women and families both before and after delivery to encourage and support breastfeeding (Chung, Raman, Trikalinos, Lau & Ip 2008). Several interventions for promoting breastfeeding include, baby friendly hospital initiatives, training of health professionals, formal & breastfeeding education, professional support for lactation consultants, midwives, nurses, physicians and other health professionals, peer support and family support (Chung et al 2008).

This pamphlet will be available to women of childbearing years and health care providers. This pamphlet will help women make an informed decision on whether breastfeeding is the best choice for them. This pamphlet can be viewed in Appendix A.

Health Policy

For the past 15 years the Office of the Surgeon General has promoted breastfeeding with recommendations to improve professional education in lactation and breastfeeding, developing education and promotional efforts to breastfed, strengthen the support for breastfeeding in the health care system and to expand research on human lactation and breastfeeding (U.S. Department of Health and Human Services 2000). The HHS (2000) reports on a strategic plan in the United States that assures appropriate lactation care and service, ensuring that breastfeeding is recognized as normal and the preferred method of feeding and that all Federal, State and Local laws recognize the importance of breastfeeding along with protection, promotion and support for breastfeeding mothers in the work force. It is important to women that all health care providers promote and support breastfeeding, and providers that work with women of child bearing age need to be educated about lactation and the benefits of increasing the duration of breastfeeding and reducing the risk of breast cancer.

Summary

Preventing disease and saving lives is very important to health care providers. Providing health care providers with current evidence based information about risk reduction of breast cancer could facilitate with raising the rates of breastfeeding and decreasing the risk of breast cancer.

While studies reviewed different data and aspects of increased duration of lactation and the effects on reducing breast cancer risk there is not enough strong evidence to promote longer duration of breastfeeding to reduce the risk of breast cancer. Women need evidenced based information on breast cancer risk reduction so that they can make an informed decision on whether they want to breastfed and for how long. Women with a family history of breast cancer could decrease their risk by 59% with breastfeeding for six or more months. This information alone should increase breastfeeding rates which would ultimately decrease breast cancer risk.

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APPENDIX A



DO YOU KNOW THAT 192,000 WOMEN ARE DIAGNOSED WITH BREAST CANCER?
BREAST CANCER WILL AFFECT 1-8 WOMEN IN THEIR LIFE TIME.
ARE YOU AWARE OF THE BENEFITS TO WOMEN WHEN THEY BREASTFEED?

- The American Academy of Pediatrics (AAP) reports that breast feeding decreases a women's risk of breast cancer
- The American Dietetic Association (ADA) recommends breastfeeding to lower risk of pre-menopausal breast cancer as well as ovarian cancer and osteoporosis
- The Academy of Family Physicians (AFP) supports breastfeeding
- Seven out of nine current studies demonstrated that there is a reduction of breast cancer with longer duration of breastfeeding
 - These studies looked at many different countries as well as the United States,
 - Thousands of women were studied
- The Centers for Disease Control and Prevention report:
 - Only 44.4 of Women breastfeed their infants to age 6 months
 - Only 22.7% of Women breastfeed their infants to age 12 months
 - Montana 56.8% of Women breastfeed their infants to 6 months
 - Montana 30.6% of Women breastfeed their infants to 3 months
 - North Dakota 37.6% of Women breastfeed their infants to 6 months
 - North Dakota 20.6 % of Women breastfeed their infants to 3 months
- The Healthy People 2010 Goal is



- For 75% of Women to initiate breastfeeding
- 50% of Women to breastfeed to 6 months
- 25% of Women to breastfeed to 12 months
- Please be one of these Women who want to decrease their risk of breast cancer.
- Choosing Breastfeeding is not only important for your infant but it has many health benefits to you with the most important one being a possible reduction in risk of Breast Cancer

APPENDIX B

Author and Year	Setting, Subjects and Sample	Study Type, Variables	Instrument, Analysis	Conclusion
Yang & Jacobsen (2008)	Multiple Countries 23 on duration of BF Studies 1999-2007	Systematic Review: Age at menarche, # of Children, age, BMI, OBC, Smoking & Exercise	Odds Ratio	13 studies showed statistical significance with increased duration of BF and reduction of BCa. The other studies did not show a risk reduction with breastfeeding
Hietala et al (2008)	Lund Oncogenetic Clinic Sweden High risk BCa families 1996-2006 269 age <= 40	Cohort: milk production, BF duration, OBC, smoking, Medications	Mann Whitney, U test (p<0.05) Spearman rank correlation	Decreased post lactational Prolactin levels modifies BCa risk
Huo et al (2008)	African (Nigerian) 819 cases/569 controls 1998-2006 age >= 18	Case Control: age, menarche, parity, age at first live birth, duration of breastfeeding, ethnicity, education, family hx BCa, Benign breast disease, OBC, alcohol, Ht, BMI & menopausal status	T-test, Wilcoxon rank (P-trend 0.005) Logistical regression	BCa risk decreased 7% for each 12 months of BF
Shema et al (2007)	Jewish Women 256 cases 536 controls 1999-2005 age 30 to 75	Case Control: menstrual & reproductive factors, disease status, family hx of BCa/Ovary Ca, tobacco use	OR t-test Logistical regression (p<0.001)	Most protective effects of reduction of BCa in 1 st year of BF
Andrieu et al (2006)	European/Canadian 1187 cases/414 controls 1997-2002 age >= 18	Carrier Cohort: Known carrier of BRCA 1 or BRCA 2 mutation Pregnancy hx, duration of BF Hospital based	Hazard regression, Cox modified	No association between ever BF & BCa risk
Kim et al (2005)	Korean 753 cases/753 controls 1997-2003	Case Control: family hx of BCa,	Unconditional Log regression, linear trends	BCa decreased with total months of BF 11-12

Ages 25-79		menarche, menopausal status, parity, age at first full term preg, # of full term pregnancies, BF hx, duration of months in each child, smoking alcohol, exercise		months decreased risk 54% compared to 1-4 months
Symmans et al (2005)	University of Texas MD Anderson Cancer Center 203 Newly dx pretreatment invasive BCa	Cohort: newly dx invasive BCa RNA extracted for transcriptional profiling	Multivariate 2-way interactions	GABA π increase in BCa immature (undifferentiated) cells are significantly associated with shorter lifetime hx of BF
Meeske et al (2004)	LA County 567 cases/614 controls 1995-1998 Ages 35-64	Case Control: preg hx, BF history duration (+ hx = BF an infant 2 wks or longer), BMI, demographics, family hx BCa, hormone use, hx of mammography,	OR multivariate, linear trend p values 2 sided	Long duration of ≥ 24 months increased BCa risk with carcinoma in situ
Jernstrom et al (2004)	Israel, North America & Europe 965 w/BCa and 965 w/Mutation Age 18-71	Case Control: Women with BRCA 1 or BRCA 2 mutation Controls had to be cancer free and no prophylactic mastectomy. Matched year of birth, country of residence, gene mutation. Other data pregnancies, OBC, excluded nulliparous, duration of BF, total months with midpoint used, smoking	OR, t-test, logistical regression, 2 tailed p values ($p < 0.001$)	BRCA 1 BF for an accumulation total of more than one year showed a decrease in BCa with a decreased risk for each additional month (2%). BRCA 45% less likely to have BCa with 1 year of BF for women on in US