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The University of the West Indies

Title: Awareness on nutrition related issues of Breast Cancer in the general public

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**AWARENESS OF NUTRITION RELATED ISSUES OF BREAST CANCER IN THE GENERAL
PUBLIC**

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ABSTRACT

Background: There is strong scientific evidence that healthful dietary patterns, in combination with regular physical activity, can reduce cancer risk. epidemiological studies have shown that populations whose diets are high in vegetables and fruits and low in animal fat, meat, and/or calories have a reduced risk of some of the most common types of cancer.

Purpose: The purpose of this study was to assess the general public knowledge of nutrition-related issues of breast cancer. This study examined nutritional information related to breast cancer compared to the cues to action component of the Health Belief Model and participant demographics.

Design and Methods: A convenience sample was selected from among the respondents. The research instrument was a self administered questionnaire. The questionnaire contains 27 questions, which were divided into four sections. Cross – tabulations, correlations and frequencies have been used in the data analyses. Descriptive analysis such as frequencies and percentages were used to analyse demographic information.

Findings: The major findings of research project. (1) Both male and female participants demonstrated a high level of awareness of breast cancer related to risk factors and other nutrition-related issues. (2) There was no relationship between neither male nor female participants personal risk status and actions that could be taken to reduce breast cancer risk, as it relates to components of the Health Belief Model.

Conclusion: More research should be done to investigate the awareness of nutrition-related issues of breast cancer, Trinidad and Tobago on a wider scale for the entire Caribbean region, using other behavioural theories.

1. INTRODUCTION

Everyday breast cancer affects people of Trinidad and Tobago through one's own diagnosis, the diagnosis of a close family member or a friend. A primary reason for the escalating mortality is late diagnosis of the disease and a lack of early detection programs (Pinotti et al.1995; Parkin, 1994). In the countries of the Caribbean, as in many other developing nations, a diagnosis of cancer is rightly feared since it often comes in the late stages of the disease. Only limited information was available on breast cancer in the Caribbean. Results from a retrospective study (Raju and Naraynsingh, 1989) in Trinidad and Tobago indicated that breast cancer accounted for 17% of all cancers and 26% of those among women (Modeste et al., 1999).

The National Cancer Registry Report indicated that more breast cancer mortality rates have been increasing (17.6 per 100,000 population in 1990 to 19.5 in 1994). In the year 2000, more than one million women were diagnosed and 373,000 women died of breast cancer globally (Parkin et al., 2000). The percentage of cases diagnosed by death certificate only (DCO) was 15% cases and microscopically verified (MV) diagnosis was 82% of cases (National Cancer Registry of Trinidad and Tobago). Microscopically verified included diagnoses made by cytology, histology of the primary or metastasis and autopsy or histology. There were 756 reported cases of breast cancer for the period 2000-2002 among women and 8 cases per 100,000 among men (National Cancer Registry of Trinidad and Tobago). Though the risk of breast cancer for younger women and men is lower, it is an apparent risk throughout every woman's lifetime. Health prevention habits should be encouraged throughout every woman's lifespan, in particular breast self-examinations (BSE), clinical breast examinations (CBE) (Frankenfield, 2009) and consumption of healthy foods and daily physical activity.

A national campaign spear-headed by the Ministry of Health and the Basia Survivor Network (BSN), publicizing statistics, education, and treatment, has increasingly become the focus of media attention in the recent years. As breast cancer becomes part of the public consciousness, there seem to be

a lack of perceived susceptibility, one's belief of the chance of getting breast cancer, especially for young women. This is in part because the risk of getting breast cancer in young women is relatively low compared to postmenopausal women (Murphy, 2003). Young women's perceived susceptibility to breast cancer and the seriousness of breast cancer is low (Frankenfield, 2009).

There is strong scientific evidence that healthful dietary patterns, in combination with regular physical activity, can reduce cancer risk (World Cancer Research, 1997; Freidenreich, 2001). The scientific study of nutrition and cancer is highly complex, and many important questions remain unanswered. It is not presently clear how single nutrients, combinations of nutrients, overnutrition and energy imbalance, or the amount and distribution of body fat at particular stages of life affect one's risk of specific cancers. However, epidemiological studies have shown that populations whose diets are high in vegetables and fruits and low in animal fat, meat, and/or calories have a reduced risk of some of the most common types of cancer. Until more is known about the specific components of diet that influence cancer risk, the best advice is to emphasize whole foods and certain broad dietary patterns (Byers et al., 2000).

1.1 Theoretical Framework

Developed by Hochbaum, Leventhal, Kegeles, and Rosenstock in 1950 (Janz et al., 2002), the Health Belief Model (HBM) was used as the theoretical framework for this study. The theory focuses on the degree of fear of illness related to the potential benefits of taking health action (Janz et al., 2002). The HBM is a method used to evaluate and explain individual differences in preventative health behavior (Janz et al., 2002). Cues to action (external influences promoting the desired behavior, may include information provided or sought, reminders by powerful others, persuasive communications, and personal experiences) and self-efficacy (an individual's self-assessment of ability to successfully adopt the desired behavior) are the concepts of the HBM which are addressed during this study (Janz et al., 2002).

1.2 Purpose of Study

The purpose of this study was to assess the general public knowledge of nutrition-related issues of breast cancer. This study examined nutritional information related to breast cancer compared to the cues to action component of the Health Belief Model and participant demographics.

1.3 Significance of Study

There are many studies which examine direct and indirect relationship between breast cancer and consumption of the different foods. The American Cancer Society recommends vigorous physical activity at least four hours a week, avoid or limit intake of alcoholic beverages to no more than one drink per day, and minimize lifetime weight gain through the combination of caloric restriction and regular physical activity (Freidenreich, 2001; McTiernan, 2000; Curl 2000; Van den Brandt et al. 2000; Cleary and Maihle 1997; Smith-Warner et al., 1998) in order to reduce the risk of breast cancer. Information about general public awareness of nutrition as it relates to breast cancer in Trinidad and even in the Caribbean is even less available.

1.4 Research Questions

- 1) Is there a high level of knowledge of breast cancer related to background factors (i.e., personal and/or family history, education, age) in the general public?
- 2) Is there a significant relationship between breast cancer risk knowledge and cues to action to prevent breast cancer?
- 3) Are females more informed about foods and cooking methods which may prevent breast cancer than males?
- 4) How do risk status correlate with cues to action to prevent breast cancer among males and females?

1.5 Delimitations

- 1) This study was restricted to volunteer subjects identified as adult male and female in the general public.

1.6 Limitations

- 1) The study was limited by the response of instrument and demographic questions.
- 2) The study was limited to the self-evaluation type of assessment of the instrument.
- 3) The study was limited to the voluntary participation of individuals in the North Central region of Trinidad.
- 4) The study was limited to a relatively small amount of information from the Caribbean region with respect to up-date statistics.
- 5) The study was limited to a relatively small amount of information for male gender population.

1.7 Assumptions

- 1) Participants were aware of their own breast cancer risk factors.
- 2) The instrument was an appropriate assessment for adult males and females.
- 3) The sample was representative of the general public.
- 4) The participants provided honest responses to the instrument questions.

1.8 Operational Definitions

- 1) Nutrition-related issues – Nutrition status, dietary and energy intake which decrease or increase the risk of breast cancer, emphasis on healthy weight control and physical activity and cooking method which are associated with breast cancer.
- 2) Awareness- The knowledge and level of consciousness of breast cancer issues, with or without the understanding.

- 3) Health Belief Model (HBM) - A theory focused on the degree of fear of an illness related to the potential benefits of taking health action. Perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self efficacy are the components of the HBM (Frankenfield, 2009).

2. LITERATURE REVIEW

Over the past 25 years, a variety of nutrition guidelines have been developed to promote eating patterns believed to reduce the incidence of chronic diseases such as cancer (Chapman and Beagan 2003). Although the specific wording has varied, for the most part, the guidelines have consistently promoted consumption of vegetables, fruits, whole grains and lower-fat animal products (US Dept of Agriculture and US Dept of Health and Human Services 2000). A feature of people's nutrition beliefs is a high level of skepticism or confusion regarding dietary advice (Hamack, 1997). Even though official nutrition guidelines have presented mostly consistent advice about broad diet-disease relationships, individual studies investigating links between specific dietary components and specific diseases have yielded less consistent results. Research into the relationship between diet and breast cancer risk is an example of this (Hamack, 1997). Although animal model, ecologic, and case-control studies often find associations between breast cancer and dietary factors such as fat, fiber, antioxidants, phytoestrogens, and fruits and vegetables, findings from studies are either lacking or unsupportive of diet-breast cancer relationships (Willett, 2000; Hunter et al., 1996; Snyderwine, 1998). Because these conflicting findings have been well publicized in the popular press, women who want to reduce their breast cancer risk have had to develop their own definition of healthful eating within an environment that provides official advice about general healthful eating as well as competing theories about the specific diet-breast cancer relationship (Hamack, 1997). This environment of contested understandings offers an ideal context for further examination of how people understand relationships among diet, health, and disease risk.

The objectives of the study is to assess the general public's knowledge of breast cancer, their awareness of nutrition-related risks of developing breast cancer and their knowledge about the relationship between their personal risk status and actions that could be taken to reduce breast cancer risk, as it relates to components of the Health Belief Model. The extent of the problem and the risk factors are also discussed.

2.1 The Extent of the Problem

American Cancer Society 2011 defines breast cancer as a malignant tumour that starts from cells of the breast. A malignant tumour is a group of cancer cells that may grow into (invade) surrounding tissues or spread (metastasize) to distant areas of the body. The disease occurs almost entirely in women, however men are also afflicted (American Cancer Society 2011). There are two main types of breast cancer. Ductal carcinoma in situ (DCIS), or intraductal carcinoma, is breast cancer in the lining of the milk ducts that has not yet invaded nearby tissues. It may progress to invasive cancer if untreated. Lobular carcinoma in situ (LCIS) is a marker for an increased risk of invasive cancer in the same or both breasts. Many breast cancers are sensitive to the hormone estrogen (Yi-Bin 2010). Symptoms may include: Breast lump or lump in the armpit, change in the size, shape, or feel of the breast or nipple and fluid coming from the nipple. The American Cancer Society's dietary guidelines for cancer prevention recommend that people: choose foods and portion sizes that promote a healthy weight; choose whole grains instead of refined grain products; eat 5 or more servings of fruits and vegetables each day; limit processed and red meat in the diet and Limit alcohol consumption to one drink per day (women who are at high risk for breast cancer should consider not drinking alcohol at all) (Yi-Bin 2010).

Breast cancer is by far the most frequent cancer among women with an estimated 1.38 million new cancer cases diagnosed in 2008 (23% of all cancers), and ranks second overall (10.9% of all cancers). The last documented world breast cancer incidence rates: 39 per 100,000 population and world breast cancer incidence : 1,389,675 new cancer cases diagnosed in 2008. Incidence rates 36.0 per 100,000 women in Trinidad and Tobago and incidence cases in 2008 are 285 (International Agency for Research on Cancer 2010). A retrospective review of breast cancer in West Indian women in Trinidad showed that breast cancer constituted 17% of all cancers diagnosed and represented 26% of all cancers in females. The usual presenting symptom was a painless lump (Narinesingh et al. 1989). The right breast and the upper outer quadrant were the common site of cancer. 85% of the patients were multiparous with an average of 4 children and 92% of them breast fed. Most patients presented in stage I disease, but a significant

number of cases were in an advanced stage of the disease (Narinesingh et al. 1989). Infiltrating duct carcinoma was the most frequent histological diagnosis and lobular carcinoma was seen in 1% of the cases (Narinesingh et al. 1989).

Jemal et al. (2007) reported that the lifetime probability of developing cancer for women is 38 percent. Females have a higher probability than males for developing cancer before age 60, because of the relatively early age of breast cancer onset (Jemal et al. 2007). The probability of developing breast cancer between 0-39 years old is 0.48 percent (1 in 210); 40-59 years old is 3.98 percent (1 in 25); 60-69 years old is 3.65 percent (1 in 27); over 70 years old is 6.85 percent (1 in 15); and a women's lifetime risk is 12.67 percent (1 in 8; Jemal et al. 2007; Frankenfield 2009).

2.2 Risk Factors of Breast Cancer

In the 2002 American Cancer Society *Breast Cancer Facts and Figures 2007-2008* report, risk factors of breast cancer included age, family history, age at first full-term pregnancy, early menarche, late menopause, and breast density. Modifiable risk factors were defined as risk factors that can be controlled with action taken by the risk population (American Cancer Society, 2007a). Modifiable risk factors consisted of postmenopausal obesity, postmenopausal hormones, alcohol consumption, high intake of meat, dairy products, fat and physical inactivity. High relative risk factors for breast cancer included female, over 65 years old, BRCA1/2, two or more first-degree relatives with breast cancer diagnosed at an early age, personal history (Frankenfield 2009).

Various potential mechanisms have been proposed, which can be considered in two categories: nutritional effects that may be mediated by changes in endogenous hormone levels; and nutritional effects that may have a direct impact on breast cancer risk (Key et al. 2003). For example, phyto-oestrogens have been proposed to reduce breast cancer risk by reducing oestradiol levels or by blocking the action of oestradiol, whereas antioxidants have been proposed to reduce breast cancer risk by reducing oxidative damage to the DNA in breast epithelial cells (Key et al. 2003).

The strongest relationship observed for a nutrition related factor and breast cancer is for relative body weight, generally indicated by body mass index (BMI) (Pathak and Whittemore 1992). A high BMI is associated with an even greater increase in concentration of free oestradiol (Key et al. 2001). Breast cancer risk appears to increase with alcohol intake in an approximately linear fashion, so that an intake of around 30 g of alcohol (c. 3 units) per day is associated with about a 20% increase in breast cancer risk.¹⁶ The mechanism for the association of alcohol with breast cancer risk, is that alcohol increases endogenous oestrogen levels (Reichman et al. 1993; Dorgan et al. 2001). A high intake of fat may be associated with an increased breast cancer risk (Howe et al. 1990). The mechanism through which dietary fat may increase breast cancer risk has not been established, although an increase in levels of endogenous oestradiol has been proposed (Holmes et al. 2000). Insulin-like growth factor-I (IGF-I) is a peptide hormone that acts as a mitogen to stimulate breast epithelial cell growth in both normal and diseased tissue and thus may play a role in breast cancer development (Yu 2000). There is some evidence from prospective studies that a relatively high circulating IGF-I concentration, either on its own or relative to its main binding protein, IGFBP-3, is predictive of breast cancer risk, at least among premenopausal women (Hankinson et al.; Toniolo et al. 2000)

Dietary fibre has been shown to alter the metabolism of endogenous oestrogens, interrupting the entero-hepatic circulation and increasing the excretion of oestrogens in the faeces (Rose 1990). Phyto-oestrogens, for example; isoflavones found in soy products; lignans found in many cereals; seeds, berries, tea and some vegetables. When digested, the metabolites of these compounds can mimic or modulate the actions of endogenous oestrogens, usually by binding to oestrogen receptors and thus potentially reducing the effect of more potent endogenous oestrogens (Setchell 1984). A high intake of fruits and vegetables is associated with a reduction in several types of cancer (World Cancer Research Fund/American Institute for Cancer Research 1997; Department of Health 1998). However, for breast cancer the possible association of fruits and vegetables with risk has generally been much weaker and less consistent (World Cancer Research Fund/American Institute for Cancer 1997 Research; Department of Health 1998). Physical activity is associated with energy intake and partly determines BMI. Although physical activity

is a determinant of energy expenditure and therefore body size, the protective association appears to be independent of body mass index (Key, 2003).

Adequate cooking is required to kill harmful germs in meat. But some research suggests that frying, broiling, or grilling meats at very high temperatures forms organic compounds which have been identified as polycyclic aromatic hydrocarbons and aromatic amines, which might increase cancer risk. Studies have shown that although these compounds can damage deoxyribonucleic acid DNA and cause cancer in animals, it is not clear how much they (as opposed to other substances in meat) may contribute to the increased cancer risk seen in people who eat large amounts of meat. Techniques such as braising, steaming, poaching, stewing, and microwaving meats produce fewer of these chemicals (Breastcancer.org 2011).

2.3 Awareness of risk factors

A study done by the Cancer Research UK (2009), most individuals knew that a positive family history was associated with breast cancer. However, knowledge of other risk factors was poor, including the protective effect of early pregnancy. Most participants were aware that screening tests were available, could name at least one symptom and knew that surgery was a useful treatment for breast cancer. Knowledge of symptoms, available treatments and screening was better amongst women than men. A high proportion of female were aware of breast cancer and appeared to have a fair grasp of facts relating to symptoms, diagnosis and treatment. They knew that a positive family history was an important risk factor, most also thought that smoking and stress was important (Redeker, 2009). Both men and women did not know that risk of breast cancer increases with age (Perneger, 2002). As men are generally less directly concerned by breast cancer than women, their responses may have been more systematically affected by acquiescence bias than those of women (Streiner and Norman 1989).

The Eurocadet project reported that there were high levels of awareness of the role of smoking, sunburn and family history in the development of cancer, but only modest levels of awareness of overweight, fruit and vegetable intake and older age. In particular, awareness of overweight, alcohol,

exercise and infections in the development of cancer needs to be increased, particularly among the younger people and those from more socio-economically deprived backgrounds (Hawkins et al. 2007; Wardle et al. 2001; Renehan et al. 2008; Keighley et al. 2004; Marlow LAV, Waller et al. 2007). Encouragingly, over three quarters of respondents thought that cancer risk could be modified by lifestyle changes, but this was graded by socio-economic status. Of particular interest is whether people are aware of the changes they personally need to make to reduce their risk, given their own risk factor profile.

People with a tendency to burn in the sun and smokers were more likely to identify appropriate strategies to reduce their cancer risk. The Health Information National Trends Survey (HINTS) 2003 reported that although smokers were more likely to say that quitting smoking was something they could do to reduce their personal cancer risk, they showed lower levels of awareness of other lifestyle changes they could make, such as eating healthily, going for screening and reducing alcohol intake. For a number of the other risk factors, people most in need of behaviour change showed lower levels of awareness of what they could do to reduce their risk. Those with low levels of fruit and vegetable intake were less likely to mention healthy eating, and those who reported doing fewer than the recommended five sessions of exercise a week were less likely to mention regular exercise (Hawkins et al. 2007). People who self-reported BMI in the overweight or obese range were no more likely to be aware that losing weight was something they could do to reduce their personal cancer risk than people of a normal weight (Renehan et al. 2008).

2.4 The Health Belief Model

The HBM, a social-cognitive model, has been used widely in the health literature to explain and predict behavior (Chew, Palmer, and Kim, 1998; Volk and Koopman, 2001; see Yep 1993, for a review). According to the theory, motivation to engage in a particular behavior is based on three cognitive components: perceived susceptibility, perceived severity, and perceived efficacy, which combine to motivate an individual to change or maintain a behavior (Rosenstock, 1974). Perceived susceptibility and perceived severity must be high, but not higher than perceived efficacy in order for a new behavior to be adopted. Internal and external cues to action also influence an individual's motivation. HBM constructs

will be considered as they relate to breast cancer and environmental factors in this formative research (Silka 2006).

Perceived efficacy is defined as the belief that a health condition can be avoided or controlled, and may be related to perceived benefits and barriers. If perceived benefits outweigh the perceived barriers, efficacy will be high for engaging in a recommended behaviour (Rosenstock, 1974). In the case of breast cancer, women report high efficacy concerning the effectiveness of mammograms as a detection tool (Petro-Nustas, 2001), believing that mammography reduces the risk of breast cancer more than BSEs, low-fat diet or annual physical exams (Covello & Peters, 2002). While scientists have found that the interaction of genetics, onset of puberty, eating, exercising, and lifestyle habits (e.g. tobacco use) impact the risk of breast cancer, there are still unknowns about the link between environmental agents and breast cancer (Brody & Rudel, 2003; Mitra, Faruque, & Avis, 2004).

Women's perceptions of risk factors for breast cancer span a wide range of controllable and uncontrollable influences. Women tend to be uncertain about the true causes of breast cancer, risks, preventive actions, and credible sources of information (Duncan et al., 2001; Lipkus et al., 2001). This uncertainty about breast cancer risks heightens women's perceived susceptibility and weakens their perceived self-efficacy to act (Covello & Peters, 2002).

Cues to Action

Cues to action are the strategies taken to activate one's readiness to take health action (Janz, Champion, & Strecher, 2002). Cues to action, formerly known as motivation, refers to internal incentive for living a healthy lifestyle (Janz et al., 2002). Cues to action for changing lifestyle behaviours relate to awareness of breast cancer risks.

3. METHODOLOGY

This research project assessed the awareness of nutrition-related issues of breast cancer among the general public. The independent variables were the cue to action component of the HBM and the demographics of the respondents. The dependent variables were the nutrition awareness related to breast cancer information, foods and cooking methods.

3.1 Subjects/ Participants

The population of interest for this research study consisted of 50 men and 50 women, 18 years and over living in the twin-island State Trinidad and Tobago who volunteered to complete the questionnaire. This island is situated at the southern end of the Caribbean chain of islands. The revised census population of 2000 was 1,300,000 (C.S.O. Central Statistical Office). The male-to-female ratio was 101:100. These trends are also reflected in a more constrictive shaped population pyramid: 33.5% of the population is under 15 years of age and 6% are over 65. Nearly 72% of the population was considered urban. The ethnic composition of Trinidad and Tobago consists of almost equal proportions of persons of African and East Indian descent—approximately 40% each. The remaining 20% was made up mainly of persons of mixed ethnicity (18.5%) and less than 2% of all other groups (Caucasian, Chinese, and “other” or not stated). There are significant differences by county—persons of African descent were most predominant in Tobago (92%) and in Saint George (50%); persons of Indian descent were predominant in Caroni (67%) and Victoria (62%) (Organización Panamericana de la Salud 2011). Participant eligibility criteria included being male or female, at least 18 years old, and reside in Trinidad and Tobago, being able to read and write English, and being physically and mentally willing and able to complete the questionnaire.

3.2 Design

A convenience sample was selected from among the respondents attending community health centers, businesses, work sites, and churches (Parsa 1999). The participants were briefed on the confidentiality and purpose of the study before each questionnaire was completed. The research instrument was a self administered questionnaire.

3.3 Questionnaire/ Conduct of Study

The questionnaire was used to address the research questions guiding this research project. The questionnaire contains 27 questions, which were divided into four sections. Section I. Examined breast cancer knowledge of the participants and contains 9 questions. One of the questions, Q5., in this section was a 10-item scale used to assess which factors contribute to breast cancer risk. *Least affected* was scored as one and *most affected* as ten. Section II. assessed nutrition-related knowledge of risk of developing breast cancer and contains 2 questions. One of the questions, Q 11., in this section was a five-item Likert scale to assess the knowledge of cooking method may contribute to cancer. *Strongly agree* was scored as five and *strongly disagree* as one. Section III. examined risk status and actions that could be taken to reduce breast cancer risk by respondents and contains 3 questions. Question 14 was a five-item Likert scale to assess cues to action to prevent breast cancer. *Strongly agree* was scored as five and *strongly disagree* as one. *Cues to action or health motivation*, a component of the HBM, was defined as one's state of concern about general health matters, resulting in positive health activities and behaviors to decrease disease (Champion, 1984). Section IV. included demographics questions: sex, age, ethnicity, marital status, Religion, weight, height which was used to calculate self-reported BMI and employment status. Breast cancer and health history were determined the following yes/no type questions: *Were you ever diagnosed with breast cancer? Has a family member or friend experienced breast cancer? Do you smoke? What is your fruit and vegetable intake? How much time is spent doing physical activity or exercise?* (See Appendix II.).

3.4 Statistical Analyses

This research project sought to answer four questions: (1) Is there a high level of knowledge of breast cancer related to background factors (i.e., personal and/or family history, education, age) in the general public? (2) Is there a significant relationship between breast cancer knowledge and cues to action to prevent breast cancer? (3) How do risk status correlate with cues to action to prevent breast cancer among males and females? (4) What factors are identified by the general public which personally reduce breast cancer risk? The four research questions were answered using cross – tabulations, correlations and frequencies have been used in the data analyses.

The data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) (Version 17, SPSS, Chicago, IL). Descriptive analysis such as frequencies and percentages were used to analyse demographic information. “How did you learn about Breast Cancer?” “Do you know the Symptoms of Breast Cancer?” “Which group foods do you believe are associated with preventing breast cancer?” “What could you do to personally reduce your breast cancer risk?”

4. RESULTS

This research project uses a self-reporting questionnaire, to assess the awareness of nutrition-related issues of breast cancer among the general public. The Results presents a description of the sample, which includes background demographic characteristics and Health Belief Model constructs including self-efficacy and cues to action. In addition, the results present from statistical analyses used to answer the six research questions.

Description of the Sample

The questionnaire is completed by 100 individuals, 50 females and 50 males. In general, the participants are single, young, full-time employment, who attained tertiary education (see Table 1). The average self-reported BMI for females is 24.5 and for males is 26.3. The majority of the respondents (48.0%) are between 28-41 years of age. Most (35.0 %) identified themselves as mixed race. Full-time employed participants accounted for 86.0 percent of responses. Academically, the sample represents as 66 percent tertiary educated. A majority of participants (63.0%) report no family history of breast cancer, yet 37 percent have a family member or friend experience breast cancer, where 20 percent are female and 17 percent male respondents. Two total participants' responses reported a personal diagnosis of breast cancer, both respondents are female. Four percent are females who smoke and ten percent are males. 88 percent of the respondents' daily fruit and vegetable intake are less than 5 a day. 82 percent of the respondents' physical activity and exercise are less than five times a week.

Table 1

Demographic Characteristics of Study Respondents (n=100)

Characteristics	Male (n=50)	Female (n=50)
Age		
18-27 years	17 (34%)	21 (42%)
28-41 years	26 (52%)	22 (44%)
42-51 years	5 (10%)	5 (10%)
52-60 years	2 (4%)	1 (2%)
61 + years	0 (0%)	1 (2%)
Did not state	0 (0%)	0 (0%)
Ethnicity		
East Indian	15 (30%)	16 (32%)
African	19 (38%)	13 (26%)
Mixed	14 (28%)	21 (42%)
Other	2 (4%)	0 (0%)
Employment Status		
Full-time	45 (90%)	41 (82%)
Part-time	2 (4%)	3 (6%)
Unemployed	0 (0%)	1 (2%)
Student	0 (0%)	2 (4%)
Housewife	0 (0%)	1 (2%)
Retired	0 (0%)	0 (0%)
Did not state	3 (6%)	2 (4%)
Marital Status		
Single	24 (48%)	35 (70%)
Married	14 (28%)	11 (22%)
Divorced	2 (4%)	1 (2%)
Common-law	3 (6%)	2 (4%)
Did not state	7 (14%)	1 (2%)
Education Level		
Primary	0 (0%)	0 (0%)
Secondary	15 (30%)	11 (22%)
Tertiary/university	27 (54%)	39 (78%)
Other	4 (8%)	0 (0%)
Did not state	4 (8%)	0 (0%)
Religion		
Hindu	10 (20%)	7 (14%)
Muslim	1 (2%)	5 (10%)
Christian	26 (52%)	31 (62%)
Other	13 (26%)	7 (14%)

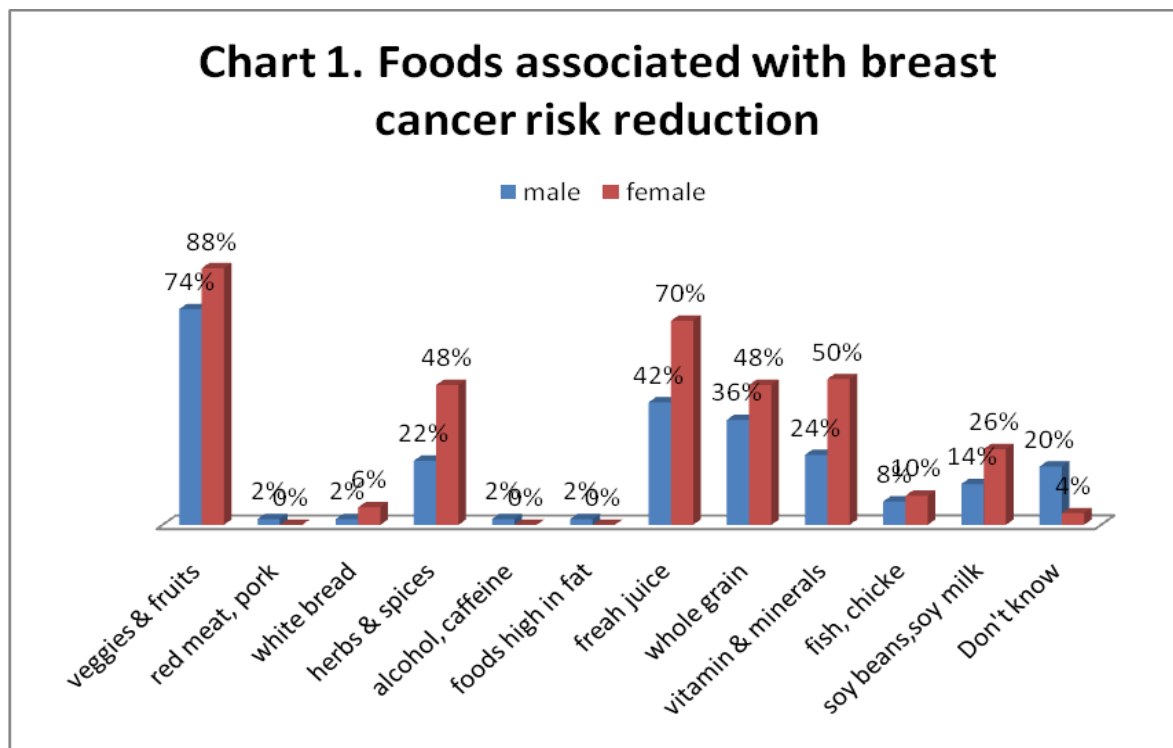
How much time is spent doing physical activity or exercise? 5 times a week or more of moderate Less than 5 times a week	41 (82%) 9 (18%)	47 (94%) 3 (6%)
What is your fruit and vegetable intake? 5 a day or more Less than 5 a day	38 (76%) 12 (24%)	44 (88%) 6 (12%)
Were you ever diagnosed with breast cancer? Yes No	0 (0%) 50(100%)	1 (2%) 49 (98%)
Has a family member or friend experienced breast cancer? Yes No	17 (34%) 33 (66%)	20 (40%) 30 (60%)
Do you smoke? Yes No	5 (10%) 45 (90%)	2 (4%) 48 (96%)

4.2 Knowledge of breast cancer

98 percent of the sample are familiar with the term breast cancer and learnt about this type of cancer from information on the internet (31%). The results show that more females (78%) know that the symptoms of breast cancer than males (60%). A breast lump (56%) is identified as a symptom of breast cancer. Mammogram (58%) and breast exam (27%) are selected as the methods of diagnosis of breast cancer.

4.3 Nutrition-related knowledge of risk of developing breast cancer

Both male (74%) and females (88%) respondents choose vegetables and fruits. 42 percent male respondents and 70 percent female chose the fresh carrot juice, tomato juice, cranberry juice, grape juice, water and green tea as being associated with preventing the development of breast cancer. A minority of the respondents, (2%) males chose alcohol, caffeine, soft drinks (carbonated beverages) and foods high in fat, particularly in saturated fats, for example, butter as being associated with preventing the development of breast cancer. Chart 1 provides a profile of the respondents knowledge of foods associated with preventing breast cancer.



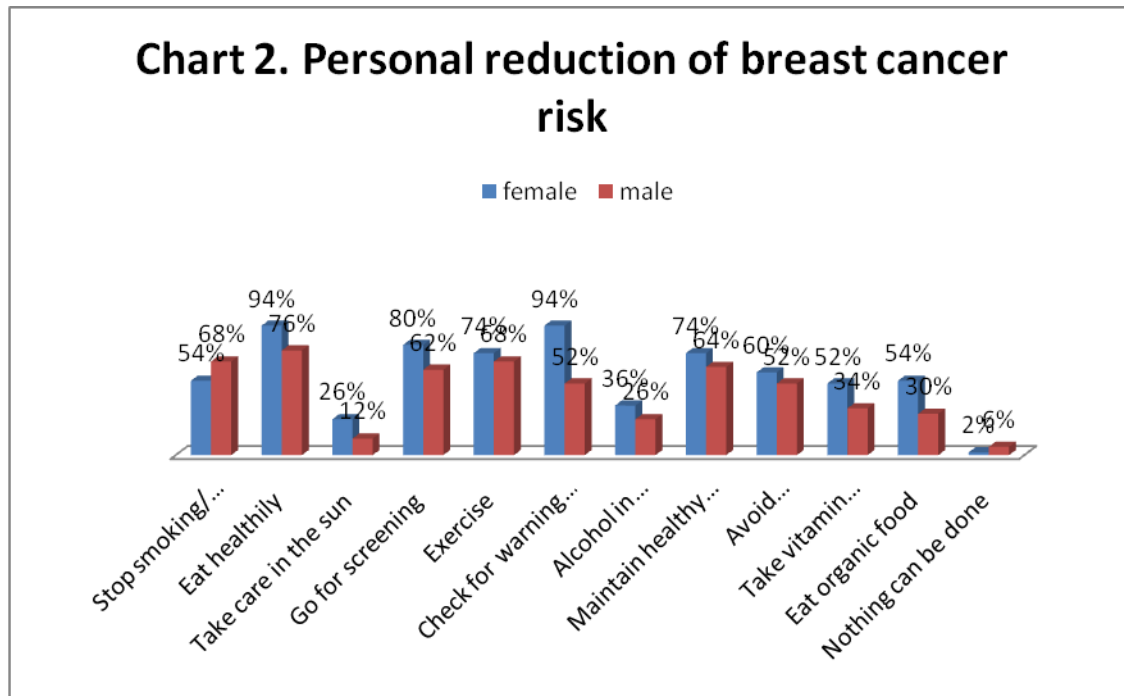
4.4 Knowledge of risk status

Respondents were asked to state yes or no to the following question: *Do you believe that you are at risk of developing breast cancer?* The majority of the male participants (74.0%) did not believe that they were at risk of developing breast cancer. The female participants (52.0%) believed that they were at risk of developing breast cancer and (48%) believed that they were not risk of developing breast cancer.

4.5 Personal reduction of breast cancer risk

Female and male responses to the question of what they could do to personally reduce their breast cancer risk were collected. Both females (94%) and males (76%) were most likely to say consuming a healthy diet. Female participants were also most likely to say check for warning signs (94%), whereas a

little more than half males selected check for warning signs (52%).Alcohol in moderation were mentioned less by males (26%) and females (36%) participants (see Chart 2.). A very small proportion considered that nothing could be done to reduce their cancer risk.



4.6 Cues to Action

Participants were asked to indicate the degree to which they agreed or disagreed with statements related to cues to action for breast cancer prevention. A majority of both the female and male participants agreed with the statements: *I eat a well-balanced diet; I always follow medical orders because I believe they will benefit my state of health; I frequently do things to improve my health; I search for new information related to my health; I have the recommended yearly physical exams in addition to visits related to illness; I take vitamins when I don't eat good meals and I exercise regularly- at least three times a week (36 %).* Table 2 provides a profile of cues to action for females. Table 3 provides a profile of cues to action for males.

Table 2
Profile of cues for action (n=50, female)

Items	Responses	(n)	%
<i>I eat a well-balanced diet</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=47) 1 4 6 14 22	2.1 8.5 12.8 29.8 46.8
<i>I always follow medical orders because I believe they will benefit my state of health</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=48) 1 5 6 17 19	2.1 10.4 12.5 35.4 39.6
<i>I frequently do things to improve my health</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=47) 1 4 7 21 14	2.1 8.5 14.9 44.7 29.8
<i>I search for new information related to my health</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=46) 5 8 13 15 5	10.9 17.4 28.3 32.6 10.9
<i>I have the recommended yearly physical exams in addition to visits related to illness</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=48) 2 4 11 17 14	4.2 8.3 22.9 35.4 29.2
<i>I take vitamins when I don't eat good meals</i>	Strongly Agree Agree Neither Agree nor	(n=47) 3 9 7	6.4 19.1 14.9

	Disagree Disagree Strongly Disagree	11 17	23.4 36.2
<i>I exercise regularly- at least three times a week</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=49) 9 16 2 6 16	18.4 32.7 4.1 12.2 32.7

Table 3
Profile of cues for action (n=50, male)

Items	Responses	(n)	%
<i>I eat a well-balanced diet</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=47) 0 2 9 12 44	0.0 4.3 19.1 25.5 51.1
<i>I always follow medical orders because I believe they will benefit my state of health</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=48) 0 0 13 18 17	0.0 0.0 27.1 37.5 35.4
<i>I frequently do things to improve my health</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=47) 0 5 8 15 18	0.0 10.6 17.0 31.9 38.3
<i>I search for new information related to my health</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=42) 1 2 10 11 18	2.4 4.8 23.8 26.2 42.9

<i>I have the recommended yearly physical exams in addition to visits related to illness</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=47) 5 3 15 13 11	10.6 6.4 31.9 27.7 23.4
<i>I take vitamins when I don't eat good meals</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=47) 2 0 10 16 19	4.3 0.0 21.3 34.0 40.4
<i>I exercise regularly- at least three times a week</i>	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=45) 1 4 9 11 20	2.2 8.9 20.0 24.4 44.4

4.7 Results of the questions

Research question #1: Is there a high level of knowledge of breast cancer related to background factors (i.e., personal and/or family history, education, age) in the general public?

A frequency analysis of the questions which asked the participants which risk factors contributed to breast cancer. The responses were recoded. If the participants answered *Least affected*, from a scale of one to four or did not answer, the response was recoded as *no*. If participants answered *Most affected*, from a scale of five to ten, the response was recoded as *yes*. Over 80 percent of both male and female participants reported that family history increases the risk of breast cancer and 58 percent of the male and female (80%) participants reported that diet increases the risk of breast cancer. More female (56%) stated that weight affects the risk of breast cancer, whereas 56 percent male disagreed. Female (50%) and male (70%) respondents felt confident that alcohol does not increase the risk of breast cancer. Table 4 provides a profile for the recoded factors affecting the risk of breast cancer.

Table 4
Profile for the recoded risk of breast cancer.

Items	Responses	Male (n=50)	Female (n=50)
Family history	No Yes	9 (18%) 41 (82%)	6 (12%) 44 (88%)
Diet	No Yes	21 (42%) 29 (58%)	10 (20%) 40 (80%)
Early menstruation	No Yes	31 (62%) 19 (38%)	35 (70%) 15 (30%)
Late menopause	No Yes	30 (60%) 20 (40%)	34 (68%) 16 (32%)
Weight	No Yes	28 (56%) 22 (44%)	22 (44%) 28 (56%)
Multiple pregnancies	No Yes	36 (72%) 14 (28%)	25 (50%) 25 (50%)
Breast implants	No Yes	23 (46%) 27 (54%)	14 (28%) 36 (72%)
Race	No Yes	32 (64%) 18 (36%)	28 (56%) 22 (44%)
alcohol	No Yes	35 (70%) 15 (30%)	25 (50%) 25 (50%)
Smoking	No Yes	19 (38%) 31 (62%)	18 (36%) 32 (64%)
Age	No Yes	17 (34%) 33 (66%)	22 (44%) 28 (56%)

Research question #2: Is there a significant relationship between breast cancer risk knowledge and cues to action to prevent breast cancer among females and males?

A frequency analysis of the questions which asked the participants which cues to action they use to prevent breast cancer. The responses were recoded. If the participants answered, *Strongly disagree*, *Disagree*, the response was recoded as *no*. If participants answered, *Strongly Agree* or *Agree*, the response was recoded as *yes*. If participants answered *Neither Disagree or Agree*, the responses were dropped. Over 70 percent of the male participants responded negatively to all the cues to action. 76.6 percent female participants answered ‘no’ to the cue, *I eat a well-balanced diet*. 51.1 percent answered ‘yes’ to the cue, *I exercise regularly- at least three times a week*. Table 5 profile of recoded cues for action among male. Table 6 profile of recoded cues for action among female.

Correlations were used to identify a significant relationship between risk factors knowledge and cues to action among females. Individual responses under the cues for action were averaged for correlations. Significant correlations were noted between family history and following medical orders and taking vitamins when your diet is insufficient ($p < .05$). Significant correlations were noted between diet and seeking information into health ($p < .05$). Significant correlations breast implants risk factor and eating well and significant correlations between race risk factor and regular exercise ($p < .05$). Table 7 correlation between risk factors knowledge and cues to action among females.

Correlations were used to identify a significant relationship between risk factors knowledge and cues to action among males. Individual responses under the cues for action were averaged for correlations. Significant correlations were noted between family history and following information into health and medical physical exams ($p < .05$). Significant correlations were noted between weight risk knowledge and taking vitamins when your diet is insufficient ($p < .05$). Significant correlations alcohol risk factor and eating well ($p < .05$). Table 8 correlation between risk factors knowledge and cues to action among males.

Table 5
Profile of recoded cues for action (n=50, male)

Items	Responses	(n)	%
<i>I eat a well-balanced diet</i>	Yes	(n=47) 2	4.3
	No	36	76.6
<i>I always follow medical orders because I believe they will benefit my state of health</i>	Yes	(n=48) 0	0.0
	No	35	72.9
<i>I frequently do things to improve my health</i>	Yes	(n=47) 5	10.6
	No	33	70.2
<i>I search for new information related to my health</i>	Yes	(n=42) 3	7.2
	No	29	69.1
<i>I have the recommended yearly physical exams in addition to visits related to illness</i>	Yes	(n=47) 8	17.0
	No	24	51.1
<i>I take vitamins when I don't eat good meals</i>	Yes	(n=47) 2	4.3
	No	35	74.4
<i>I exercise regularly- at least three times a week</i>	Yes	(n=45) 5	11.1
	No	31	68.8

Table 6
Profile of cues for action (n=50, female)

Items	Responses	(n)	%
<i>I eat a well-balanced diet</i>	Yes	(n=47) 5	10.6
	No	36	76.6
<i>I always follow medical orders because I believe they will benefit my state of health</i>	Yes	(n=48) 6	12.5
	No	36	75.0
<i>I frequently do things to improve my health</i>	Yes	(n=47) 5	10.6
	No	35	74.5

<i>I search for new information related to my health</i>	Yes No	(n=46) 13 20	28.3 43.5
<i>I have the recommended yearly physical exams in addition to visits related to illness</i>	Yes No	(n=48) 6 31	12.5 64.6
<i>I take vitamins when I don't eat good meals</i>	Yes No	(n=47) 12 28	25.5 59.6
<i>I exercise regularly- at least three times a week</i>	Yes No	(n=49) 25 22	51.1 44.9

Table 7
Correlation between risk factors knowledge and cues to action among females

	<i>I eat a well-balanced diet</i>	<i>I always follow medical orders because</i>	<i>I frequently do things to improve my health</i>	<i>I search for new information related to my health</i>	<i>I have the recommended yearly physical exams in addition to visits related to illness</i>	<i>I take vitamins when I don't eat good meals</i>	<i>I exercise regularly- at least three times a week</i>
Family History		Correlation				Correlation	
Pearson Correlation	.182	.331*	.086	.231	.319	.412**	.103
Significance (2-tailed)	.256	.032	.599	.195	.054	.008	.490
N	41	42	40	33	37	40	47
Diet				Correlation			
Pearson Correlation	.193	.251	.000	.373*	.319	.247	.023
Significance (2-tailed)	.227	.109	1.000	.033	.054	.124	.828
N	41	42	40	33	37	40	47
Early menstruation							
Pearson Correlation	.227	-.021	-.061	.166	-.035	.071	.090
Significance (2-tailed)	.154	.895	.711	.357	.839	.661	.550
N	41	42	40	33	37	40	47
Late menopause							
Pearson Correlation	.252	-.168	-.222	-.043	.017	.037	.046
Significance (2-tailed)	.112	.287	.169	.811	.922	.822	.759
N	41	42	40	33	37	40	47

Weight							
Pearson Correlation	-.065	-.234	-.172	.061	.110	-.011	-.009
Significance (2-tailed)	.684	.135	.288	.737	.516	.946	.951
N	41	42	40	33	37	40	47
Multiple pregnancies							
Pearson Correlation	.052	.061	.086	.155	.069	.101	.224
Significance (2-tailed)	.747	.701	.599	.389	.684	.536	.131
N	41	42	40	33	37	40	47
Breast implants	Correlation						
Pearson Correlation	-.329*	-.008	-.106	.327	-.110	-.216	-.079
Significance (2-tailed)	.030	.960	.513	.063	.516	.180	.600
N	41	42	40	33	37	40	47
Race							Correlation
Pearson Correlation	.011	-.039	-.114	.026	-.012	-.114	-.367*
Significance (2-tailed)	.945	.806	.484	.886	.944	.382	.011
N	41	42	40	33	37	40	47
Alcohol							
Pearson Correlation	.179	-.039	.095	.219	.060	.033	-.060
Significance (2-tailed)	.261	.806	.561	.220	.724	.841	.689
N	41	42	40	33	37	40	47
Smoking							
Pearson Correlation	-.011	.079	-.247	.312	.110	.048	.002
Significance (2-tailed)	.945	.618	.124	.077	.516	.770	.990
N	41	42	40	33	37	40	47
Age							
Pearson Correlation	-.197	.039	-.095	.061	-.065	.099	-.141
Significance (2-tailed)	.217	.806	.561	.737	.704	.542	.343
N	41	42	40	33	37	40	47

*Correlation is significant at the 0.05 value (2-tailed)

** Correlation is significant at the 0.01 value (2-tailed)

Table 8
Correlation between risk factors knowledge and cues to action among males

	<i>I eat a well-balanced diet</i>	<i>I always follow medical orders because</i>	<i>I frequently do things to improve my health</i>	<i>I search for new information related to my health</i>	<i>I have the recommended yearly physical exams in addition to visits related to illness</i>	<i>I take vitamins when I don't eat good meals</i>	<i>I exercise regularly- at least three times a week</i>
Family History				Correlation	Correlation		
Pearson Correlation	-.007	. ^a	-.164	-.373*	-.660*	-.097	-.013
Significance (2-tailed)	.967	.	.320	.036	.000	.572	.937
N	38	35	39	32	37	36	41
Diet							
Pearson Correlation	-.190	. ^a	-.287	-.149	.046	-.156	-.097
Significance (2-tailed)	.252	.	.077	.415	.787	.365	.545
N	38	35	39	32	37	36	41
Weight							
Pearson Correlation	-.236	. ^a	-.067	-.073	-.019	.219	-.076
Significance (2-tailed)	.154	.	.686	.692	.909	.199	.637
N	38	35	39	32	37	36	41
Race						Correlation	
Pearson Correlation	.170	. ^a	-.182	-.298	.187	.359*	.190
Significance (2-tailed)	.308	.	.266	.097	.269	.031	.234
N	38	35	39	32	37	36	41
Alcohol	Correlation						
Pearson Correlation	-.347*	. ^a	-.007	-.348	-.106	.032	-.164
Significance (2-tailed)	.033	.	.967	.051	.532	.852	.305
N	38	35	39	32	37	36	41
Smoking							
Pearson Correlation	-.180	. ^a	-.108	-.331	.060	-.070	-.053
Significance (2-tailed)	.279	.	.511	.065	.725	.686	.740
N	38	35	39	32	37	36	41
Age							
Pearson Correlation	-.190	. ^a	-.225	.078	.106	-.215	-.007
Significance (2-tailed)	.252	.	.168	.672	.532	.209	.966
N	38	35	39	32	37	36	41

*Correlation is significant at the 0.05 value (2-tailed)

** Correlation is significant at the 0.01 value (2-tailed)

a. Cannot be computed because at least one of the variables is constant

Research question #3: Are females more informed about foods and cooking methods which may prevent breast cancer than males?

Participants were asked to indicate the degree to which they agreed or disagreed with items related to cooking methods which contribute to cancer. 90.2 percent female participants and 75.6 percent male participants disagreed that *boiling* contributed to cancer development. 62.8 percent female participants and 79.5 percent male participants agreed that *frying* contributed to cancer development. 80.5 percent female participants and 69.1 percent male participants agreed that *smoking* contributed to cancer development. 76.1 percent female participants and 71.0 percent male participants disagreed that *microwaving* contributed to cancer development. Table 9 provides a profile of the female responses with respect to the cooking method which contribute to cancer development. Table 10 provides a profile of the male responses with respect to the cooking method which contribute to cancer development.

Table 9
Cooking methods that contribute breast cancer risk (n=50, female)

Items	Responses	(n)	%
Boiling		(n=41)	
	Strongly Agree	19	46.3
	Agree	18	43.9
	Neither Agree nor Disagree	2	4.9
	Disagree	1	2.4
	Strongly Disagree	1	2.4
Frying		(n=43)	
	Strongly Agree	1	2.3
	Agree	5	11.6
	Neither Agree nor Disagree	10	23.3
	Disagree	10	23.3
	Strongly Disagree	17	39.5
Charboiling		(n=37)	
	Strongly Agree	3	8.1
	Agree	6	16.2
	Neither Agree nor Disagree	18	48.6
	Disagree	3	8.1
	Strongly Disagree	7	18.9

Smoking and Nitrite curing meals	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=41) 3 1 4 9 24	7.3 2.4 9.8 22.0 58.5
Steaming	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=37) 21 13 2 1 0	56.8 35.1 5.4 2.7 0.0
Braising	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=38) 6 9 21 2 0	15.8 23.7 55.3 5.3 0.0
Poaching	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=36) 9 10 14 2 1	25.0 27.8 38.9 5.6 2.8
Stewing	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=40) 5 15 16 3 1	12.5 37.5 40.0 7.5 2.5
Microwaving	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=46) 2 2 7 11 24	4.3 4.3 15.2 23.9 52.2

Table 10
Cooking methods that contribute breast cancer risk (n=50, male)

Items	Responses	(n)	%
Boiling	Strongly Agree	(n=41) 15	36.6
	Agree	16	39.0
	Neither Agree nor Disagree	7	17.1
	Disagree	1	2.4
	Strongly Disagree	2	4.9
Frying	Strongly Agree	(n=39) 5	12.8
	Agree	1	2.6
	Neither Agree nor Disagree	2	5.1
	Disagree	20	51.3
	Strongly Disagree	11	28.2
Charboiling	Strongly Agree	(n=37) 8	21.6
	Agree	2	5.4
	Neither Agree nor Disagree	15	40.5
	Disagree	7	18.9
	Strongly Disagree	5	13.5
Smoking and Nitrite curing meals	Strongly Agree	(n=42) 1	2.4
	Agree	2	4.8
	Neither Agree nor Disagree	10	23.8
	Disagree	11	26.2
	Strongly Disagree	18	42.9
Steaming	Strongly Agree	(n=36) 19	51.4
	Agree	10	27.0
	Neither Agree nor Disagree	4	10.8
	Disagree	1	2.7
	Strongly Disagree	2	5.4
Braising	Strongly Agree	(n=35) 9	25.7
	Agree	8	22.9
	Neither Agree nor Disagree	16	45.7
	Disagree	1	2.9

	Strongly Disagree	1	2.9
Poaching	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=36) 9 10 14 2 1	 25.0 27.8 38.9 5.6 2.8
Stewing	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=36) 8 9 15 3 0	 22.2 25.0 41.7 8.3 0.0
Microwaving	Strongly Agree Agree Neither Agree nor Disagree Disagree Strongly Disagree	(n=38) 4 2 5 13 14	 10.5 5.3 13.2 34.2 36.8

Research question #4: How do risk status correlate with cues to action to prevent breast cancer among males and females?

A frequency analysis was performed using the risk status profile. Of the male participants, only (26.0%), believe that they can develop breast cancer. The female participants, only (52.0%), believe that they can develop breast cancer.

Correlations were used to identify a significant relationship between risk status and cues to action. Individual responses under the HBM category of cues to action or motivation were averaged for correlations. No significant correlations were noted between risk status and cues to action ($p < .05$). Therefore, the belief that an individual may develop breast cancer did not negatively or positively influence the cues to action to prevent the development of breast cancer, among neither men nor women.

See Table 11 *Correlation between risk status and cues to action among females*. Table 12 *Correlation between risk status and cues to action among males*.

Table 11
Correlation between risk status and cues to action among females

Items	Risk status
<i>I eat a well-balanced diet</i>	
Pearson Correlation	-.215
Significance (2-tailed)	.178
N	41
<i>I always follow medical orders because I believe they will benefit my state of health</i>	
Pearson Correlation	-.157
Significance (2-tailed)	.321
N	42
<i>I frequently do things to improve my health</i>	
Pearson Correlation	-.179
Significance (2-tailed)	.268
N	40
<i>I search for new information related to my health</i>	
Pearson Correlation	.046
Significance (2-tailed)	.800
N	33
<i>I have the recommended yearly physical exams in addition to visits related to illness</i>	
Pearson Correlation	.085
Significance (2-tailed)	.617
N	37
<i>I take vitamins when I don't eat good meals</i>	
Pearson Correlation	.232
Significance (2-tailed)	.150
N	40
<i>I exercise regularly- at least three times a week</i>	
Pearson Correlation	-.045
Significance (2-tailed)	.766

N	47
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*Correlation is significant at the 0.05 value (2-tailed)

** Correlation is significant at the 0.01 value (2-tailed)

a. Cannot be computed because at least one of the variables is constant

Table 12

Correlation between risk status and cues to action among males

Items	Risk status
<i>I eat a well-balanced diet</i>	
Pearson Correlation	.141
Significance (2-tailed)	.399
N	38
<i>I always follow medical orders because I believe they will benefit my state of health</i>	
Pearson Correlation	. ^a
Significance (2-tailed)	.
N	35
<i>I frequently do things to improve my health</i>	
Pearson Correlation	-.054
Significance (2-tailed)	.743
N	39
<i>I search for new information related to my health</i>	
Pearson Correlation	-.149
Significance (2-tailed)	.415
N	32
<i>I have the recommended yearly physical exams in addition to visits related to illness</i>	
Pearson Correlation	.126
Significance (2-tailed)	.459
N	37
<i>I take vitamins when I don't eat good meals</i>	
Pearson Correlation	-.289
Significance (2-tailed)	.087
N	36
<i>I exercise regularly- at least three times a week</i>	

Pearson Correlation	-.136
Significance (2-tailed)	.398
N	41

**Correlation is significant at the 0.05 value (2-tailed)*

*** Correlation is significant at the 0.01 value (2-tailed)*

a. Cannot be computed because at least one of the variables is constant

5. DISCUSSION

The research questions in this research project were to determine the awareness of nutrition - related issues of breast cancer among the general public. The following discussion analyses the findings for each of the research project questions. It is important to note that the results of this project were responses from men and women that were conveniently sampled. Therefore, the findings reflecting relationships among this demographic sample are not comparable to studies that investigate the general public.

Both male and female participants reported that the consumption of vegetables and fruits decreases the risk of breast cancer. Overwhelmingly, more females than males reported that the use of vitamins and minerals also decreases breast cancer risk. Consistent with this research study, a single small postal study performed in Switzerland has previously assessed knowledge of breast cancer in males as well as females found that breast cancer knowledge was no better in women than men (Chamot and Perneger 2002). Silka et al. 2006 also reported that female students' awareness of breast cancer risk factors was not significantly different from their male counterparts. Women were more likely to know about the link between heredity and breast cancer, but also more likely to believe in an unsupported link between smoking and stress and breast cancer. As breast cancer is a predominantly female disease, it is surprising that women do not know more than men about its causes.

Men and women both reported that in order to personally reduce their risk of breast cancer, they would eat healthily and exercise regularly. More females than males stated that they would check for warning signs and consume organic foods. Consistent with findings in this study, Chapman and Beagan illustrate how women's beliefs about nutrition, health, and breast cancer reflect differing perspectives on healthful eating. Some women had a traditional perspective that emphasizes unprocessed meat, potatoes, and vegetables and makes no claims about the relationship between diet and breast cancer. Other women had a more mainstream perspective that reflects current official nutrition guidelines and speculates that this kind of eating pattern may reduce breast cancer risk. Three quarter of survey respondents have agreed

that diet has a moderate to strong effect on cancer risk. Increasing intakes of vegetables, fruit, and fiber and decreasing intakes of fat and/or fatty meats are the most commonly named protective behaviors. Their findings are consistent with this but suggest that specific diet-cancer beliefs and the degree of conviction about those beliefs vary depending on, among other things, the individual's overall nutrition perspective.

This study found that among the female and male participants, the knowledge of breast cancer risks family history, diet, weight, race and the component of the HBM, cues to action were related. Consistent with findings of Chapman and Beagan 2003 suggest that people's understandings of why these behaviors are protective may differ. People with a mainstream perspective tend to see a low-fat, high vegetable and fruit diet as part of a healthful lifestyle that protects against disease in general, whereas those with an alternative perspective see this eating pattern as reducing toxins (especially if the vegetables and fruits are grown organically) and increasing protective factors.

This study found that the component of HBM, cues to action was not related with the belief that one may develop breast cancer (risk status). Participants' perceived susceptibility of breast cancer (Frankenfield 2009) did not positively nor negatively influence their cues to action to prevent breast cancer. As well, studies of women's perceptions of their personal risk for breast cancer and of factors that contribute to that risk indicate that in comparison with "expert" views on these topics, North American women tend to overestimate their risk and attribute greater importance to the role of dietary factors in contributing to that risk (Black et al. 1995 and Silverman et al. 2001).

5.1 Limitations

The issue of generalizability must be identified as a limitation to this study (Frankenfield 2009). Criteria for participation required that they were at least 18 years old, able to understand and write English, and physically and mentally willing and able to complete a self-administered questionnaire. Self-reporting studies are limited by the self-evaluation type of assessment. Participants may present themselves intentionally or unintentionally in a more desirable fashion. The demographic questions may

have been limiting in their translation between socially acceptable terminology and scientific research (Frankenfield 2009).

6. CONCLUSION

The following are the major findings of this research project:

1. Both male and female participants demonstrated a high level of awareness of breast cancer related to risk factors and other nutrition-related issues.
2. There was no relationship between neither male nor female participants personal risk status and actions that could be taken to reduce breast cancer risk, as it relates to components of the Health Belief Model.
3. There was a significant relationship between breast cancer risk knowledge among male and female participants and cues to action to prevent breast cancer.
4. The findings of this research project showed no relationship between the individual respondent's self-reported consumption of vegetables and fruits with age, sex or knowledge of risk factors of breast cancer.

6.1 Recommendations

Further research should be done into the awareness of nutrition-related issues of breast cancer, in Trinidad and Tobago and on a wider scale for the entire Caribbean region. Studies should be done to investigate attitudes towards changing diet behaviours which increase the risk of breast cancer. Perhaps, another behavioural theory, for example, the Theory of Reasoned Action Model, can be used as the theoretical framework to understand the eating behaviours which increase an individual's risk for breast cancer. This theory provides a construct that links individual beliefs, attitudes, intentions, and behaviour (Fishbein et al., 1994). In addition, the Ministry of Health, Education, Caribbean Food and Nutrition Institute and the Cancer Society can form a committee to develop nutrition and physical activity guidelines for cancer prevention in the Caribbean. These guidelines could be used in community nutrition health education strategies, interventions and programs.

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APPENDICES

I. Letter to participants of information about study

Department of Agricultural Economics and Extension,
University of the West Indies UWI,
St. Augustine Campus,
Trinidad and Tobago.

Dear Sir/Madam,

I am a student at the University of the West Indies, St. Augustine campus, pursuing a BSc. Degree in Human Nutrition and Dietetics. As part of the requirements for the course, I am conducting a study on **“Awareness Of Nutrition-Related Issues As It Relates To Breast Cancer”**.

Description of the Study:

The primary purpose of this research is to determine the awareness of nutrition-related issues of breast cancer in the general public.

Benefits :

As a subject in this study, you may gain insight into nutrition factors related to the development of breast cancer.

Voluntary Participation:

Your participation is strictly voluntary. Your personal information will not be connected in any way to your actual questionnaire.

Right to Withdraw:

You have the right to refuse participation and withdraw from participation in the study at any time. You may refuse to answer any item on the testing instrument. No penalties or negative consequences will result from your withdrawal or refusal.

Confidentiality and Anonymity:

All information collected will be held in the strictest of confidence. No names will be placed on the testing instruments (questionnaire) at any time.

Results of the Study:

The results of this research study will be shared with the members of the principal investigator's thesis committee members. In addition, the results may be presented in a professional health education forum.

You may print or write down this information for your reference.

Yours Respectfully,

Naila McLeod-Goodridge

UNIVERSITY STUDENT

II. Questionnaire



THE UNIVERSITY OF THE WEST INDIES
AT ST. AUGUSTINE, TRINIDAD AND TOBAGO

QUESTIONNAIRE

AWARENESS OF NUTRITION-RELATED ISSUES AS IT RELATES TO BREAST CANCER

SECTION I. Knowledge of breast cancer

Q1. Are you familiar with the term ‘Breast Cancer’?

☐ Yes

☐ No

Q2. How did you learn about Breast Cancer?

☐ Internet

☐ Family doctor

☐ Books and Magazines

☐ Media; TV, Radio programmes

☐ **At church**

☐ Family members and/or friends

☐ Not applicable

Q3. Do you know the Symptoms of Breast Cancer?

☐ Yes

☐ No

Q4. If yes to Q3., Name one symptom._____

Q5. What factors contribute breast cancer risk? (PUT a tick in the appropriate box)

1 = least affected , 10 most affected

	Least Most									
	1	2	3	4	5	6	7	8	9	10
Family history										
Diet										
Early menstruation										
Late menopause										
Weight										
Multiple pregnancies										
<u>Breast implants</u>										
	Least Most									

	1	2	3	4	5	6	7	8	9	10
Race										
alcohol										
Smoking										
Age										

Q6. Who do you think gets Breast Cancer?

- ☐ Older women
- ☐ Younger women
- ☐ Men
- ☐ Don't know

Q7. Are there different types of Breast Cancer?

- ☐ Yes
- ☐ No
- ☐ Don't know

Q8. How Is Breast Cancer Diagnosed?

- ☐ Breast exam
- ☐ Mammogram
- ☐ Ultrasonography
- ☐ Blood tests
- ☐ Don't know

Q9. How Is Breast Cancer Treated?

- ☐ Surgery
- ☐ Radiation treatment
- ☐ Chemotherapy
- ☐ Don't know

SECTION II. Nutrition-related knowledge of risk of developing breast cancer

Q10. Which groups foods do you believe are associated with preventing breast cancer?

a. Vegetables and fruits; broccoli, carrots, cauliflower, bhagi, sweet potatoes, dark green leafy vegetables, cabbage, mangoes, cantaloupe and black or red grapes.	
b. pork, ham, whole milk and red meats.	
c. white bread and processed cereal.	
d. fresh garlic and ginger, cumin powder or seeds, turmeric powder and coriander powder or seeds	
e. alcohol, caffeine, soft drinks (carbonated beverages)	
f. Foods high in fat, particularly in saturated fats; butter	
g. Fresh carrot juice, tomato juice, cranberry juice, grape juice, water and green tea	
h. Whole grains, Flax seeds, long grain rice, whole bran	
i. Vitamin and mineral supplements	
j. fish, chicken and turkey	
k. soy beans, soy milk and tofu	
l. Do not know	

Q11.
cooking

Which
method

do you think contributes to cancer? (PUT a tick in the appropriate box)

	Strongly Agree (5)	Agree (4)	Neither agree nor disagree (3)	Disagree (2)	Strongly Disagree (1)
Boiling					
Frying					
Charboiling					
Smoking and Nitrite curing meals					
Steaming					
Braising					
Poaching					
Stewing					
Microwaving					

Section III. RISK STATUS AND ACTIONS THAT COULD BE TAKEN TO REDUCE BREAST CANCER RISK

Q12. Do you believe that you are at risk of developing breast cancer?

☐ Yes

☐ No

Q13. What could you do to personally reduce your breast cancer risk? (please tick all that apply)

☐ Stop smoking/ don't smoke

☐ Eat healthily

☐ Take care in the sun

☐ Go for screening

☐ Exercise

☐ Check for warning signs

☐ Alcohol in moderation

☐ Maintain healthy weight

☐ Avoid chemicals/pollution

☐ Take vitamin supplements

☐ Eat organic food

☐ Nothing can be done

☐ Don't know

Q14. CUES TO ACTION TO PREVENT BREAST CANCER. (PUT a tick in the appropriate box)

	Strongly Agree (5)	Agree (4)	Neither agree nor disagree (3)	Disagree (2)	Strongly Disagree (1)
I eat a well-balanced diet.					
I always follow medical orders because I believe they will benefit my state of health.					
I frequently do things to improve my health.					

	Strongly Agree (5)	Agree (4)	Neither agree nor disagree (3)	Disagree (2)	Strongly Disagree (1)
I take vitamins when I don't eat good meals.					
I search for new information related to my health.					
I have the recommended yearly physical exams in addition to visits related to illness.					
I exercise regularly- at least three times a week.					

Section IV. DEMOGRAPHICS

Q15. Sex

- ☐ Male
☐ Female

Q16. Weight_____lbs

Height_____ft_____ins

Q17. What is your fruit and vegetable intake?

- ☐ 5 a day or more
☐ Less than 5 a day

Q18. How much time is spent doing physical activity or exercise?

- ☐ 5 times a week or more of moderate
☐ Less than 5 times a week

Q19. What is your age?

- ☐ 18-27 years

- ☐ 28-41 years
- ☐ 42-51 years
- ☐ 52-60 years
- ☐ 61 + years
- ☐ Did not state

Q20. Ethnicity

- ☐ East Indian
- ☐ African
- ☐ Mixed
- ☐ Other

Q21. Employment Status

- ☐ Full-time
- ☐ Part-time
- ☐ Unemployed
- ☐ Student
- ☐ Housewife
- ☐ Retired
- ☐ Did not state

Q22. Marital Status

- ☐ Single
- ☐ Married
- ☐ Divorced
- ☐ Common-law
- ☐ Did not state

Q23. Education Level

- ☐ Primary
- ☐ Secondary

- ☐Tertiary/university
- ☐Other
- ☐Did not state

Q24. Religion

- ☐Hindu
- ☐Muslim
- ☐Christian
- ☐Other

Q25. Were you ever diagnosed with breast cancer?

- ☐Yes
- ☐No

Q26. Has a family member or friend experienced breast cancer?

- ☐Yes
- ☐No

Q27. Do you smoke?

- ☐Yes
- ☐No

Thank you for responding.