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FACTORS EFFECTING HEALTH BEHAVIOR, RELATED TO BREAST CANCER SCREENING, AMONG JEWISH ULTRA ORTHODOX WOMEN IN COMPARISON TO JEWISH NON-ULTRA ORTHODOX WOMEN

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**List of Abbreviations**

**AAFP**=American Academy of Family Physicians

**ACOG**=American Obstetricians and Gynecologists

**ACPM**=American College of Preventive Medicine

**ACR**=American College of Radiology

**ACS**=American Cancer Society

**AMA**=American Medical Association

**BI**=Behavioral Intention

**BI1**=Behavioral Intention CBE=The intention to perform a clinical breast examination

**BI2**= Behavioral Intention Mammography=The intention to perform a mammography

**BSE**=Breast Self Examination

**CBE**=Clinical Breast Examination

**CTFPHC**=Canadian Task Force Public Health Care

**Fatalistic Beliefs 1**=The belief that talking about cancer will cause its onset

**Fatalistic Beliefs 2**=The belief that charedy women are more defended against breast cancer than non-charedy women because of multiple pregnancies and breast feeding patterns

**GSN**=Global Social Norm

**HB**=Health Behavior

**HIP**=Health Insurance Plan

**IARC**=International Agency for Research on Cancer

**NCI**=National Cancer Institute

**RCT**=Randomized controlled trial
SN = Social Norm

TRA = Theory of Reasoned Action

USPSTF = United States Preventive Services Task Force
ABSTRACT

**Background:** Advanced or late stage at diagnosis is a major factor contributing to the less favorable mortality and survival rates of breast carcinoma. There is evidence that Jewish ultra orthodox women in Israel are at advanced stage of breast carcinoma at diagnosis. Factors associated with advanced stage at diagnosis include complex behavioral attributes unique to a particular population and a low level of knowledge and awareness of breast cancer. This is the first study attempting to examine the factors associated with advanced stage carcinoma at diagnosis among the sub population of Jewish ultra orthodox women.

**Objective:** The objective of this study was to identify the personal, social and cultural factors that may contribute to late stage diagnosis of breast cancer among Jewish ultra orthodox women by comparing health behavior, related to breast cancer screening, among Jewish ultra orthodox women in comparison to Jewish non ultra orthodox women. More importantly, to discover the factors that most significantly contribute to the explanation of motivation in relation to breast cancer screening behavior among the ultra orthodox women, based on the Ajzen and Fishbein Theory of Reasoned Action.

**Method:** A cross-sectional survey was carried out among 90 women from two outpatient clinics in Bnei Berak and Jerusalem. The sample consisted of 46 ultra orthodox women (51%) and 44 secular to religious (but not charedy) (49%) women. The mean age of the women in the sample was 54.4 (SD 10.3). The women were interviewed based on a questionnaire which included demographic information, attitudes, social influence, beliefs and practices concerning breast cancer screening based on the Theory of
Reasoned Action and questions regarding knowledge, cultural beliefs and general health motivation.

**Results:** Differences between the charedy and non-charedy groups were found for the variables *knowledge* (p=0.00), *practices* (mammography: p=0.02 CBE: p=0.06) *fatalistic beliefs 2* (p=0.01) and *social norm* (p=0.05); however, no differences were found between the groups for the variables *attitudes, barriers, health behavior, perceived control*, and *fatalistic beliefs 1*. Although significant differences were found between the two study groups, religiosity was not a predictor of behavioral intention or breast cancer screening performance.

Knowledge about breast cancer and screening procedures was found to be significantly lower among the ultra orthodox women in comparison to the non orthodox women (p=0.00) and was a predictor of clinical breast examination (CBE) and mammography performance.

The contribution of social factors, in predicting the intention to having a CBE and a mammography, was found to be stronger amongst the non charedy group than the charedy group.

Health behavior was not a predictor of behavioral intention 1-(cbe) for the charedy group of women; however, was found to be a positive predictor for the non charedy group (p=0.04). Behavioral intention 2-(mammography) was found to be predicted by health behavior in both the charedy (p=0.04) and non charedy(p=0.01) groups.

Cultural factors were not predictors of behavioral intentions or performance in either of the study groups.
Conclusions: This study is the first of its kind to explore the predictors of Jewish ultra orthodox women’s breast cancer screening behaviors. The study provides valuable information to healthcare providers as well as researchers and public health educators. The findings may make a significant difference in designing guidelines for culturally sensitive interventions to improve breast cancer screening behaviors.
INTRODUCTION

EPIDEMIOLOGY of BREAST CANCER

Breast cancer is the most common malignancy diagnosed in women throughout the world (Parkin and Fernandez, 2006; Stewart and Kleihues, 2003; U.S. Department of Health and Human Services, 2005; Parkin et al, 2002) and the second principal cause of cancer deaths in women (Yucel et al, 2005). Over 1,050,000 new breast cancer cases occur worldwide annually, with nearly 580,000 cases occurring in developed countries and approximately 470,000 in developing countries. Thus breast cancer ranks first among cancers affecting women throughout the world (Stewart and Kleihues, 2003; McPherson, 2000).

Breast cancer incidence and mortality vary considerably by world region. In general, the incidence is high in developed regions of the world and low, though increasing, in developing regions (Parkin and Fernandez, 2006). Its incidence is very high in North America, Britain, Europe and Russia; whereas, intermediate to low incidence is noticed in Japan, China and the Far East (Altaf, 2004; Stewart and Kleihues, 2003; Parkin et al, 2002). The Netherlands exemplifies the high incidence of breast cancer in developed countries, with an age standardized incidence rate estimated at 91.6 new cases per 100,000 women years. The overall incidence rate in the USA is estimated at 99.4 new cases per 100,000 women years (Parkin and Fernandez, 2006), whereas, the age standardized incidence rate in Japan is 28 new cases per 100,000 women years and 36.2 new cases per 100,000 women years in China (Parkin et al, 2002). Japan is the only rich country that in the year 2000 still showed low incidence rates (Tavassoli and Devilee,
2003); however, the incidence and mortality rates have been increasing quite rapidly (Parkin and Fernandez, 2006).

The risk continues to increase in eastern Europe and Latin America and in some urban populations of Asia. Studies of geographical variation, time trends and populations migrating from low to high risk areas suggest an important role of environmental factors in the etiology.

Low parity, late age at first pregnancy, early menarche and late menopause are all factors that are consistently associated with an increased risk for breast cancer. Trends towards lower reproductive rates in western populations therefore explain part of the observed increase and may predict similar increases in populations where the reproduction rates are declining (IARC, 2002).

The pattern of incidence observed in the United States and Canada is broadly similar to that in Europe, with increases in incidence among both white and black women. Most of this increase occurred in the period between 1980 and 1987 (Parkin and Fernandez, 2006). It is estimated that 180,510 new cases of breast cancer will be diagnosed and 40,900 women will die of breast cancer in the year 2007 (American Cancer Society, 2007). From 1973 to 1980, female breast cancer incidence rates in the US increased slightly from 82.6 per 100,000 in 1973 to 85.5 per 100,000. Then, coincident with the increasingly widespread adoption of screening mammography, incidence rates climbed to 110.4 per 100,000 in 1990 and 118.1 per 100,000 in 1998. By 1996-1997, 70.9% of US women aged 40 or older reported having had a mammogram within the previous two years (NCI, 2005; U.S. Department of Health and Human Services, 2005).
The leveling off in mortality and subsequent decline noted in several northern European countries in the 1980’s was also observed in both the United States and Canada. The most recent data indicate some signs of a slowdown or leveling off of the increase in incidence in several countries since the mid-1990’s. These observations are consistent with what would be expected after the initial breast screening round: a decline after the postscreening increase to a level slightly higher than that before screening (Parkin and Fernandez, 2006). Other factors contributing to these trends include improved treatment and management.

Cumulative incidence represents the probability of developing a particular disease over a life span. It is common practice to present cumulative incidence for the age span 0-74 years of age concerning breast cancer. Cumulative incidence for breast cancer, in the world, varies from 0.76% for women in Korea to 11.9% for non-Hispanic whites in San Francisco, USA (Stewart and Kleihues, 2003; NCI, 2005).

Breast cancer remains the malignancy that causes the most deaths from cancer among women in high income countries. The only exceptions are Canada and the USA, where breast cancer mortality is second only to that of lung cancer (IARC, 2002). The age adjusted breast cancer mortality rate remained fairly constant between 1973 and 1990, increasing only about 1.5% over that year period. Since 1991, there has been a sustained reduction in age adjusted breast cancer mortality of approximately 2% per year which may be due to improved treatment, screening, changes in the demographic composition of the population and other factors (NCI, 2005) such as adjuvant hormonal treatment (Tavassoli and Devilee, 2003).
**EPIDEMIOLOGY of BREAST CANCER in ISRAEL**

The incidence of breast cancer in Israel, as in developed countries in the world, has risen steadily over the past three decades (Ifrah, 1999). In 1997 the age adjusted incidence rate of breast cancer among women in Israel was 97 per 100,000 cases. Jewish women have an incidence rate which is among the highest in the world; whereas, the Arab Women in Israel have an incidence rate of breast cancer which is one of the lowest in the world (Parkin et al, 2002). According to the Israel Cancer Registry, 2421 new cases of breast cancer were diagnosed in 1995 which was approximately 30% of all malignancies diagnosed among Israeli women (Ifrah, 1999 and ICDC, 1998).

In 1995, the age adjusted rates were 82.2 per 100,000 in Jewish women and 22.0 in Arab women (Ifrah, 1999 and ICDC, 1998).

In a comparative analysis of countries, the age adjusted incidence in Jewish Israeli women was found to be lower than in the USA, but higher than in the majority of west European countries. The age adjusted incidence in Arab Israeli women was considerably lower than in all the other countries under comparison.

During the 1980's, the age adjusted incidence rates of Jewish women in Israel increased by over 30% from 62 per 100,000 in 1981 to 81 per 100,000 in 1990. The largest increase was seen between 1986 and 1991. Since 1991 the rising trend has leveled off and rates have stabilized. The increasing incidence trends may be explained partially by improved reporting of cases, heightened awareness and increased utilization of mammography screening which consequently brought on earlier detection of the disease.
Age adjusted incidence rates of breast cancer are consistently and significantly lower among Arab women than among Jewish women. In 1995 incidence rates among Jewish women were 3.7 times higher than among Arab women. The cumulative risk of breast cancer up to the age of 75 was approximately 9% for Jewish women and 3% for Arab women. However, breast cancer incidence is also rising amongst the Arab population. Until the mid 1970's, rates were relatively stable; however, since then they have increased steadily. From 1970 to 1995 incidence rates doubled among the Arab women (Ifrah, 1999).

Age adjusted breast cancer incidence is higher among Israeli born women and those of European and American origin, and lower among women of North African and Asian origin. There has been a marked increase in age adjusted breast cancer incidence among women of all ethnic groups in Israel during the past 25 years. The greatest percentage increase was among women of Asian origin; incidence rates increased by 92% between 1970-1995. Studies have indicated that among certain origin groups, there is a significant increase in risk with increasing duration of residence in Israel, especially among the North African immigrants, whose risk increased by 75% after 30 years (Ifrah, 1999). These studies emphasize the importance of investigating the role of environmental factors in the etiology of breast cancer (Ifrah, 1999; McPherson, 2000).

More women in Israel die of breast cancer than from any other malignancy. Age adjusted mortality rates have been consistently higher among Jews than Arabs. In 1995, the rate for Jewish women was double the rate for Arab women. However, this mortality gap has been narrowing over the past 25 years (Ifrah, 1999), together with the breast cancer incidence gap between different ethnic groups in Israel.
PRINCIPLES OF BREAST CANCER SCREENING

The overall goal of screening is to reduce morbidity and mortality from cancer. The immediate goal is to detect cancers before they become clinically evident (IARC, 2002). The core concept being that detection of early disease offers the opportunity to change its prognosis. Earlier diagnosis may improve prospects for survival because early intervention permits treatment at a more tractable stage (IARC, 2002; Meissner et al, 2004). The idea is to use a relatively simple, inexpensive test in a large number of individuals to determine whether they are likely or unlikely to have the cancer for which they are being screened (Wilson and Jungner, 1968). Screening tests are not diagnostic tests; rather, they should distinguish those individuals who may have the disease from the much larger group of people who most likely do not have it. The emphasis is on classifying people on the basis of their likelihood of having cancer (Meissner et al, 2004).

Several fundamental criteria must be met for any cancer screening to be appropriate and effective. Criteria promoted by the WHO to assure a net benefit to those who are screened include:

1. The disease in question should be an important health problem; its significance may be defined by several criteria related to disease burden including: morbidity, mortality and premature mortality.

2. There should be a detectable pre-clinical phase (a period in the natural history of the disease when it is detectable in asymptomatic individuals, thus gaining lead time before symptoms develop).
3. Treatment of occult disease (i.e., disease diagnosed before the appearance of symptoms) should offer advantages compared with the treatment of symptomatic disease.

4. A screening test should be affordable and provide benefits justifying its cost.

5. The test must be acceptable to the target population and to health care professionals.

6. Screening tests must achieve an acceptable level of accuracy in the population undergoing screening. Screening tests are never 100% accurate (false-positive, false negative outcomes). Accuracy varies by test, cancer site and individual patient characteristics.

(Meissner et al, 2004; Pritchard, 2002; Anderson et al, 2003; Smith, 1997).

At the most fundamental level, the goal of screening is to improve outcomes. If treatment before the onset of symptoms is beneficial, then improvements in survival should be associated with the gain in lead time and mortality should be lower in those patients diagnosed by screening compared with those diagnosed after symptoms are apparent. On the other hand, if the gain in lead time advances the time of diagnosis, but the patient's life is not extended beyond when death would occur without early detection, there is only the appearance of greater survival. Moreover, those patients who are diagnosed are living with an awareness of cancer; a fact that may itself carry negative sequelae (Meissner et al, 2004).
The three screening tests usually considered for early detection of breast cancer are: Breast Self Examination (BSE), Clinical Breast Examination (CBE) and Mammography. Although mammography is the most sensitive available means by which the early detection of breast cancer can be accomplished both CBE and BSE have the potential to advance the diagnosis of breast cancer and do not entail the expense of a mammography facility to accomplish this (Weiss, 2003).

**BREAST SELF EXAMINATION (BSE)**

Breast self examination (BSE) is a systematic method of self-inspection and palpation of breast and axilla (Baxter, 2001) for detecting breast cancer. Programs to encourage BSE were first established in Europe, Australia and North America in the 1950s and major sustained public information programs were implemented up to the late 1990s to encourage women to practice monthly BSE.

Systematic BSE has been recommended for almost 70 years in the absence of compelling evidence of its efficacy (IARC, 2002). Initially, it was justified because a substantial proportion of breast cancers were discovered by women themselves (Hackshaw and Paul, 2003; IARC, 2002). There is a belief that among women who practice BSE, those who develop breast cancer, are more likely to find it at an earlier stage and this is expected to lead to earlier treatment and hence decrease their risk of dying from the disease. BSE is appealing as a routine screening method because it has minimal financial cost; however, it has an estimated low sensitivity of 20%-30% (Elmore et al., 2005).
Most studies on the effectiveness of BSE have been observational. They suggest that women who practice BSE are more likely to find their breast tumors themselves, that the tumor tends to be smaller and that these women have an increased survival rate (Hackshaw and Paul, 2003 and Weiss, 2003). Only observational studies of women with breast cancer, who were asked about their history of regular BSE practice, consistently found a difference in breast cancer mortality associated with BSE. These studies are likely to be affected by several biases: publication bias, selection bias, recall bias, lead time bias and length biased sampling (there may be a larger proportion of slow growing cancers diagnosed in women who practice BSE; slow growing cancers tend to have better prognosis). Women who practiced BSE tended to be younger, pre-menopausal and of a higher socioeconomic status (Smith et al, 1980; Feldman et al, 1981; Tamburini et al, 1981; Huguley et al, 1988; Le Geyte et al, 1992; Auvinen et al, 1996). Much of the reduction in mortality observed in these studies might be explained by a combination of these and other confounding factors and the biases mentioned above rather than a real effect of BSE performance (Hackshaw and Paul, 2003).

Two randomized controlled trials (RCTs) of breast self-examination, with mortality from breast cancer as the primary end point, have been conducted. The first initiated in Moscow and St. Petersburg, Russian Federation and the second trial was conducted in Shanghai, China. The trial in China involved 267,040 women aged 31-64 recruited from 520 factories in Shanghai, China. The 133,375 women in the intervention group received extensive BSE training using silicone breast models and personalized instruction, followed by two reinforcement sessions and multiple reminders to practice the technique. Women were followed up for the development of breast cancer and death, confirmed by registry data. No significant difference was found between the groups for the breast cancer
mortality rate. The RCT conducted in Russia involved women aged 40-64 randomly assigned to BSE educational programs or to a control group. Five year and 9 year follow up data were published for 122,471 women. Women in the BSE arm attended small group sessions, run by trained nurses or physicians, that involved a demonstration of the BSE technique. After 9 years of follow up, there was no difference in tumour stage and breast cancer mortality between the BSE and control groups (Baxter, 2001; IARC, 2002; Hackshaw and Paul, 2003; Anderson et al, 2003; Thomas et al, 2002; US Department of Health and Human Services, 2005).

The two trials showed no effect of BSE on breast cancer mortality. In the Russian trial, there was an increase in breast cancer diagnoses in women taught BSE after 9 and 13 years, but this was not reflected in a decrease in mortality at either time. Both trials also showed that women in the BSE group were much more likely to be referred for a biopsy. For every diagnosed case of breast cancer, there was one extra biopsy in women without cancer; in other words, there were two times as many biopsies in the BSE group. The evidence shows that it is likely to result in a considerable increase in women without breast cancer who have breast biopsy with its associated anxiety and counseling, but with no benefit (Hackshaw and Paul, 2003; IARC, 2002; Green and Taplin, 2003; Mayo Clinic Staff, 2005; Elmore et al, 2005; McCready et al, 2005).

A quasi-randomized trial in the United Kingdom, in a large population of women aged 45-64 years at 8 centers, found no reduction in breast cancer mortality, after 16 years of follow up, between the BSE and control centers. However, the significant differences between the centers in methods of recruitment for BSE teaching, breast cancer care and
pretrial mortality may have confounded the results (Baxter, 2001; IARC, 2002).

A meta-analysis of the effect of regular BSE on breast cancer mortality or rates of advanced breast cancer was performed on twenty observational studies and three clinical trials. No difference in death rate was noted in studies of women who detected their cancers during self-examination and no mortality differences were noted in trials of training (Elmore et al, 2005).

At first glance it seems that the evidence does not support routinely teaching BSE since it is ineffective in saving lives; being taught BSE and practicing it regularly is no more effective at reducing breast cancer mortality than finding the tumor by chance. However, examination of the results shows a relatively high rate of self-detection of localized breast cancer in the control group, suggesting that a significant proportion of the women in the Shanghai textile industry were highly responsive to new breast symptoms without formal instruction in BSE. Further, the authors were careful to distinguish that they were measuring the effect of BSE instruction and not BSE per se.

Thus, while the prognostic advantage of smaller breast tumor sizes is consistently evident, there may be a limit to the potential of BSE to measurably improve on what is achieved through incidental self-detection in a highly aware population. It may very well be that the contribution of BSE is lessened as a population gains increasing awareness about breast cancer and symptoms of breast cancer and has increasing access to mammography (Smith, Cokkinides and Eyre, 2003; Anderson et al, 2003).
Since the use of BSE as a screening tool has not been shown to reduce mortality in two randomized controlled trials, many professional panels have decided that BSE cannot be recommended as a substitute for mammography in breast cancer screening (Baxter, 2001; IARC, 2002; Hackshaw and Paul, 2003; Elmore et al, 2005). However, there is no evidence about the impact of BSE in countries in which the population has more limited breast cancer awareness and in which women typically present with late stage breast cancer. BSE may have a general benefit in terms of awareness and motivating women to see a health care provider if they find a lump, and earlier response to symptoms may help reduce the cancer stage at diagnosis. In addition, BSE may be an effective primary tool in breast health education and may increase general awareness when initiating a new program for early breast cancer detection (Anderson et al, 2003).

At present, it is uncertain whether BSE has any effectiveness at all in reducing breast cancer mortality. Under the new guidelines, BSE is being recognized as a way for women to know how their breasts normally feel and to notice any changes (American Cancer Society, 2005). For women who choose to do BSE, they should be assisted in learning to do it proficiently. If they choose not to do it, they do not need to feel guilty; however, it is essential that women be aware of changes in their breasts and seek advice to promptly report any breast changes or concerns. Any woman who wishes to practice BSE and who requests instruction should be counseled regarding the risks and benefits of the exam. (Hackshaw and Paul, 2003; IARC, 2002; Baxter, 2001; Green and Taplin, 2003). The American Cancer Society recommends that women be told at age 20 about the benefits and limitations of BSE (Mayo Clinic Staff, 2005). More research needs to be conducted on the benefits of BSE amongst countries with limited resources or amongst populations where women commonly present with locally advanced or metastatic disease.
Clinical breast examination (CBE) is a standardized procedure whereby a health care provider examines a woman's breasts, chest wall and axilla. The examination typically consists of visual inspection of the breasts while the woman is in the upright position with her arms relaxed and then raised above her head, palpation of the axilla and supraclavicular fossa while the woman is in the upright position and palpation of the breasts while the woman is in both the upright and supine positions. A detailed CBE can take several minutes to complete (Anderson et al, 2003).

CBE long pre-dates imaging for evaluating mammary health and disease. Although it depends on the eyes and fingers and subjective assessment of any abnormality found, it may still have a place in modern breast cancer screening programs. The examination is inexpensive and no special equipment is required. It is easy to perform and can be offered ubiquitously. Professionals can be readily trained in this technique (Albert and Schulz, 2003).

In most population based screening programs, mammography is the only method used for detection, although clinical breast examination is added in some countries or regions. Various approaches have been taken to investigating CBE, with differences among studies in the population and the age of the women, the frequency of clinical breast examination and measures of practice. There is little information for countries outside Europe, North America and Australia about the practice of CBE (IARC, 2002).

CBE is capable of identifying some tumors that are missed by mammography. Between 3%-45% of cancers detected by CBE were missed by mammography. (Weiss, 2003; Albert, and Schulz, 2003). However, little is known about its effectiveness in detecting breast cancer in asymptomatic women, its risks and benefits and its influence on outcomes such as mortality, stage at diagnosis and quality of life in women.
with breast cancer. The effectiveness and efficacy of CBE alone have not been directly tested in randomized trials. Screening trials have either combined CBE with mammography or used mammography alone. Much of what we know about the benefit of the CBE is derived from indirect evidence based on its performance. This indirect evidence comes partially from the results of the Canadian National Breast Screening Study-2 (CNBSS-2). A total of 39,405 women agreed to take part in one of two programs of annual screening for a period of 4 to 5 years. They were assigned at random in nearly equal numbers to receive either mammography accompanied by CBE or CBE alone. The results of the study demonstrated that the addition of mammography to CBE led to a screening intervention that had relatively greater sensitivity; however, breast cancer mortality was no different between the two groups (Miller et al, 2000 and Weiss, 2003). The Munich study revealed evidence that CBE favorably influences the stage distribution at diagnosis and that women using either one of the methods or a combination of at least two of the methods (BSE, CBE or mammography) had smaller tumors at the time of breast cancer detection than women doing nothing. Other researchers believe that CBE as a screening tool has an additional valuable effect— the increased awareness and empowerment of women, physicians and other health care providers (Albert and Schulz, 2003).

The sensitivity of CBE ranges from 69% in picking up breast cancers in women who have not had much screening to about 31% in those that had regular screening. The sensitivity of the CBE is higher in women younger than 50 years (in contrast to screening mammography, which is less sensitive in younger women) (Green and Taplin , 2003). A meta-analysis of clinical trials revealed a pooled data sensitivity of 54% and specificity of 94% (Barton, Harris and Fletcher, 1999). CBE increases case finding of breast cancer,
but it is unknown whether this increased case finding improves outcomes (Green and Taplin, 2003).

There have been no randomized trials comparing mortality from breast cancer in women offered and not offered a program of CBE. However, the staggered introduction of CBE in Japan during the late 1980s allowed investigators to examine possible differences in mortality in relation to completeness of screening by geographic area. There was little change in mortality from breast cancer between 1986-1990 in the municipalities that had not implemented screening. In contrast, there was a decline in mortality in those parts of the country in which screening had been introduced. The decline in mortality was of increasing magnitude with increasing screening coverage of the population. The hypothesis that at least some of the change was attributable to screening is supported by the investigators' choice of screened and unscreened municipalities which were comparable with respect to breast cancer mortality rates during the baseline period (Weiss, 2003; Albert and Schulz, 2003).

Because of the absence of randomized studies of CBE in women not receiving other types of screening, the evidence for this modality remains controversial. However, there is considerable indirect evidence that CBE can be recommended as a systematic method for detecting breast cancer, thereby providing a public health benefit. There is a consensus of many professionals that CBE should be part of routine health examinations or part of any program for early detection of breast cancer, provided that women have access to follow-up medical and oncology care (Albert and Schulz, 2003 and Anderson, 2003). The guidelines of the American Cancer Society recommend that asymptomatic women aged 40 and over should continue to receive a CBE as part of a periodic health examination, preferably annually (American Cancer Society, 2005). The American College of Obstetricians and Gynecologists also recommend that all women have a CBE annually.
as part of the physical examination (ACOG, 2003). This practice should increase breast health awareness on the part of both the woman and the health care provider, it may encourage a woman to see her provider more often and it could reduce the cancer stage at diagnosis. The value of these benefits would be most striking in countries where women typically present with locally advanced breast cancer (Anderson, 2003). CBE might be useful while a country is getting a mammography screening program up and running, it might be useful in women at higher risk and it might have the benefit of reassuring women (Anderson, 2003).

**MAMMOGRAPHY**

CBE and BSE play important, unique and supplemental roles in overall breast health care and early cancer detection; however, mammography is the only screening modality that has evidence from randomized trials showing a reduced mortality in women who were offered screening (Anderson et al, 2003).

Mammography utilizes ionizing radiation to image breast tissue. The examination is performed by compressing the breast firmly between a plastic plate and an x-ray cassette that contains special x-ray film. For routine screening, examination films are taken in two views which include breast tissue from the nipple to the pectoral muscle. Studies have shown that two-view examinations decrease the recall rate for suspicious findings found at screening mammography when compared with single-view examinations (National Cancer Institute, 2005).

In general, breast cancers detected by mammography screening are smaller and have more favorable histological and biological features than tumors detected between mammography screening rounds or tumors found outside of screening. Since the favorable prognoses of women with breast cancer detected by mammography screening
may be attributable to selection bias, length bias, lead-time bias and over-diagnosis, randomized controlled trials with breast cancer mortality as the outcome have been particularly important in excluding such biases (Elmore et al, 2005).

Eight randomized controlled trials of mammography screening have been conducted in the past 40 years to assess the efficacy of screening programs, particularly by mammography, for reducing mortality from breast cancer.

**The Health Insurance Plan Trial in New York**

The first study which investigated the effect of mammography screening on breast cancer mortality was initiated in 1963, known as the HIP trial-the Health Insurance Plan Trial in New York (Pritchard, 2002; Smith et al, 2004). It was the first study in which women were randomly selected to receive mammographic screening. Sixty two thousand women aged 40-64 were recruited from a pool of subscribers to the HIP of Greater New York and then randomly allocated to receive an invitation to screening in addition to performing CBE or to receive no invitation to screening in addition to the performance of CBE. Mammography was performed using general purpose x-ray machines, rather than the screen film units that evolved in the 1970's. Cause of death was reviewed independently (Smith et al, 2004). Long term follow-up showed a reduction in breast cancer related mortality of about 30% (Pritchard ,2002; Feig, 2005). This study was judged to be flawed, because people with previous breast cancer were allegedly not excluded from the control group in some cases. It was also concluded that there was probable bias in the assignment of the cause of death because the screened group was more closely observed (Green and Taplin, 2003).

Several trials have been conducted in Sweden and these are summarized below:
Malmo and the Two-County study

In the late 1970's two Swedish trials (Malmo and the Two-County study) were initiated to investigate the effect of invitation to screening that involved the use of mammography without the use of CBE. The Malmo study recruited two cohorts of women: the first cohort were aged 45-70 and the second aged 43-49. Computer randomization was used to allocate individual women by date of birth. Ultimately, approximately 31,000 women were randomized to a study group which received an invitation to two-view mammography at 18-24 month intervals for five rounds or usual care (Smith et al, 2004). In late 1977, the counties of Kopparberg and Ostergotland provided the setting for a second Swedish trial known as the Two-County Trial which is the largest of the eight randomized trials. The trial consisted of approximately 133,000 women aged 40-74 years, with approximately 77,000 women invited to the screening. The screening intervals differed by age. Women aged 40-49 were invited every 24 months and women aged 50 and older were invited every 33 months. The screening examination included only single view mammography.

The Stockholm trial

The Stockholm trial of breast cancer screening was initiated in 1981 and cluster randomized 60,000 women aged 40-64 on the basis of birth date. The study group consisted of approximately 40,000 women who would receive invitations to screening and a control group of 20,000 women. The study had only two rounds of screening with single view mammography at a 28 month interval (Smith et al, 2004 and IARC, 2002).

The Gothenburg trial

In 1982, 51,611 women between the ages 39-59 and living in the city of Gothenburg, Sweden were randomized to mammographic screening or a control group. 25,941 were
aged 39-49. The screening interval was 18 months and usually women were screened with 2-view mammography.

Pooled data analysis of the Swedish trials showed a significant 20% reduction in breast cancer mortality (RR= 0.80; 95% CI: 0.71-0.90) (IARC, 2002 and Pritchard, 2002). However, women 45-54 years of age had less benefit than women aged 55-64 years. This is probably due to the fact that younger women have denser breasts, less amenable to mammographic detection, and are therefore, less likely to obtain benefit from screening. At the meeting of the European Group for Breast Cancer Screening Program, Dr. Tabar, the principal investigator of the Swedish Two-County Study, reviewed the evidence available on the efficacy of breast cancer screening. He concluded that carefully performed mammographic screening with good quality control, done at appropriate intervals, will reduce the risk of death from breast cancer related causes by 30%-40% (Pritchard, 2002).

**The Edinburgh Trial**

The Edinburgh Trial in Scotland was initiated in 1979 and continued until 1981. The study cluster randomized 87 general practices rather than individual women. The original study population was 44,288 women aged 45-64, later augmented by a further 10,366 women aged 45-49. Practices were stratified by size and randomized to either a policy of invitation to mammography every second year plus annual CBE or to usual care. Initially, two views were performed and depending on the findings, a single view mammography was often performed in subsequent screening rounds (Smith et al, 2004 and IARC, 2002).
The Canadian National Breast Screening Trials (NBSS)

In 1980, two trials were conducted in Canada, one with women aged 40-49 (NBSS-1) and the other with women aged 50-59 (NBSS-2). Women randomized to screening in both age groups were offered annual CBE and mammography and were taught how to practice BSE. Control women aged 40-49 were given a single clinical examination, taught how to practice BSE and received a questionnaire every year. Control women aged 50-59 were offered only annual CBE and were taught how to practice BSE, as the objective was to evaluate the contribution of mammography over and above that of CBE and BSE. Before randomization, all participants received a screening CBE and instruction in BSE and the findings were recorded. A total of 50,430 women aged 40-49 participated in the NBSS-1, with nearly equal numbers randomized to study and control groups. 39,405 women aged 50-59 were enrolled to NBSS-2 with roughly equal numbers randomized to study and control groups. This trial’s objective was to evaluate the efficacy of breast cancer screening in this age group with mammography and CBE versus CBE alone (Smith et al, 2004; IARC, 2002 and Pritchard, 2002). The Canadian studies have been the only randomized trials to show no benefit from screening mammography (Green and Taplin, 2003 ; Feig, 2005). This may be due to the design of the Canadian studies which differ from the other trials in a few ways: (1) The population was recruited volunteers, which probably accounts for the higher attendance rates observed in this trial. (2) Both the intervention and control arms received CBE and training in BSE. (3) The fact that CBE was performed before randomization also may have introduced bias. (4) After randomization at the initiation of the intervention, many more cases than controls had breast cancers with a poorer prognosis. (5) Fewer than expected breast cancer deaths occurred in both groups, as a result, the study was not sufficiently powered to show an
effect size less than 40% difference in mortality (Smith et al, 2004; Green and Taplin, 2003).

No study is perfect, and because breast cancer screening has had its detractors, each of the breast cancer screening trials has been criticized for one reason or another. Ultimately, these criticisms must be judged on the basis of whether identified shortcomings are indeed factual, and if so, are they a basis for doubting the findings from an individual study. Many of the criticisms were either incorrect, trivial or if true, validly controlled for in the design and analysis of the study. It is generally agreed that the trials, although by no means perfect, give valid evidence on the efficacy of mammographic screening especially in women aged 50-69 years (Smith et al, 2004; Elmore et al, 2005; Pritchard, 2002 and Feig, 2005). Trials comparing mammography with or without CBE to usual care, demonstrated remarkably consistent results for women older than 50 years. Meta-analyses that included all trials demonstrated statistically significant reductions of 20% to 35% in mortality from breast cancer for women aged 50-69 years.

At early follow up, no trial showed much benefit for the subset of women who entered screening between the ages 40-49 years. Benefit for these younger women took longer to appear because their breast cancer growth rates were slower and their screening intervals excessively long. As a consequence of the relatively small number of younger women enrolled and their lower incidence of breast cancer, initial proof of benefit required pooling results from multiple trials in order to attain statistical significance. By 1997, a meta-analysis of women age 40-49 years at entry into all of the Swedish trials found a significant 30% reduction in breast cancer deaths. Subsequent long term follow up of the younger women in three individual trials (HIP, Gothenburg and Malmo) each found statistically significant breast cancer mortality reductions of 24%,
45% and 36% respectively. Thus benefit for screening women ages 40-49 and 50-70 years became well established. Trials underestimated the benefit for women of all ages because screening parameters were not optimized. Deficiencies included excessively long screening intervals, incomplete study group participation, control group contamination, one versus two views per breast and sub-optimal technique and interpretation. In summary, the weight of scientific evidence strongly supports annual screening mammography of all women 40 years of age and older (Feig, 2005 and Elmore et al, 2005).

Limitations of Controlled Trials and Meta-Analyses

Randomized controlled trials are not true efficacy studies in the classic sense of testing a technology under ideal conditions. In the breast cancer screening studies, compliance with screening was not complete and often decreased further after several rounds of screening. All the trials reported crossover contamination with control groups receiving screening. This crossover was as high as 25% in the Malmo and Canadian studies, partially because the benefits of screening were being advertised. Additionally, randomized controlled trials are analyzed as intent to treat studies. The study analyzed women by the group to which they were assigned, regardless of whether they complied with the intervention as intended. This design controls for any selection biases that might be related to characteristics of those that participate but underestimates the efficacy of the intervention. Tabar et al (2001) reanalyzed the Swedish Two-County trial and found a 63% reduction in breast cancer death among women who actually underwent screening.

Meta-analyses also have limitations. The interventions combined differed; some included CBEs whereas others did not. Some used one view mammography and others used two views. Number of screening rounds and intervals between screenings also were
not the same. The degree of compliance and crossover contamination varied (U.S. Department of Health and Human Services, 2005). A meta-analysis combines results from many studies, but as studies are excluded, the analytic power decreases. The Gotzsche and Olsen met-analysis, which caused a great controversy around mammography screening, was based on only two studies. Additionally, unlike the investigators in a clinical trial, the authors in meta-analyses know the outcomes of the individual studies before they begin their analysis, which might introduce subtle forms of bias. Because of all these potential concerns, the results of meta-analyses are generally thought to be of a weaker grade of evidence than a well conducted controlled trial (Green and Taplin, 2003).
RISKS OF BREAST CANCER SCREENING

The underlying rationale for breast cancer screening is to promote health by identifying women with breast cancer at an early enough stage so that treatment will cure the disease. Although there is substantial evidence that mammography is effective in reducing breast cancer mortality, as with any medical intervention, it has limitations which can pose potential harm to women who participate. These limitations are described as false negatives (related to the sensitivity of the test), false positives (related to the specificity), overdiagnosis (true positives that will not become clinically significant) and radiation risk (National Cancer Institute, 2005; IARC, 2002; Green and Taplin, 2003; U.S. Department of Health and Human Services, 2005). The harm of false positive mammograms relates to the additional testing, invasive procedures and anxiety that would never have happened in the absence of screening. The harm of overdiagnosis relates to unnecessary anxiety associated with a diagnosis of potentially fatal disease and unnecessary treatment. Both harms are inevitable if a screening program is to be effective. The challenge is to minimize both while still detecting those cancers for which early diagnosis and treatment can alter the clinical course of disease.

Several epidemiological studies have addressed the risk for breast cancer induced by radiation and provided quantitative estimates of the level of risk after different doses of radiation. These studies use different assumptions for the screening programs, such as different age groups, screening intervals, doses of radiation at each mammography and models to estimate the numbers of radiation induced breast cancer cases. The results are consistent in showing that few breast cancer cases are induced by radiation during mammography. If screening was begun at the age of 50, the number of radiation...
induced deaths from breast cancer during the remaining lifespan was estimated to be 10-50 per million regularly screened women. These numbers can be compared with the tens of thousands of breast cancer deaths in unscreened populations. The low risk is due to the fact that exposure to radiation after the menopause is associated with a low risk as observed in many epidemiological studies (IARC, 2002).
Breast Cancer Screening Recommendations

The American Cancer Society (ACS) publishes a summary of its recommendations for early cancer detection each January. ACS guidelines for the early detection of breast cancer, in average risk women, emphasize a process that begins after a woman is 20 years of age and consists of a combination of clinical breast examination, counseling to raise awareness of breast symptoms and regular mammography beginning at age 40. The ACS guidelines for 2006, recommends that women between the ages 20-39 years undergo clinical breast examination every three years and annually after the age of 40 years. This examination should take place during periodic health examinations and provides an opportunity for health care professionals to play a key role in raising awareness about the importance of recognizing symptoms of breast cancer and developing a heightened awareness about breast changes. The ACS no longer recommends that all women conduct regular BSE; however, they should be informed about the potential benefits, limitations and harms associated with BSE. Women may then choose to do BSE regularly, occasionally or not at all. If a woman chooses to perform periodic BSE, she can receive instructions in the technique and/or have her performance reviewed (Smith, Cokkinides and Eyre, 2006).

The ACS recommends that average risk women should begin annual mammography at the age of 40 years. Women should also be informed about the scientific evidence demonstrating the value of detecting breast cancer before symptoms develop and the importance of adhering to a schedule of regular mammograms. Benefits include a reduction in the risk of dying from breast cancer, less aggressive therapy and a greater range of treatment options. Women should also be told about the limitations of mammography. Specifically, that mammography will not detect all breast cancers and
some breast cancers detected with mammography may still have poor prognosis. Further, women should be informed about the potential harms associated with mammographic screening. The ACS guidelines of 2003 state that women at significantly increased risk for breast cancer may benefit from earlier initiation of screening, screening at shorter intervals and screening with additional modalities such as ultrasound or magnetic resonance imaging (Smith, Cokkinides and Eyre, 2006).

All guidelines released by major North American organizations recommend screening mammography for women >50 years. The majority of controversy lies whether to screen women between the years 40-49 (Madison Clinic, 2005). The US Preventative Services Task Force (USPSTF), American Medical Association (AMA), the American Obstetricians and Gynecologists (ACOG), the American College of Radiology (ACR), the National Cancer Institute (NCI), the American Cancer Society (ACS) and the Huntsman Cancer Institute (2005) all support screening mammography beginning at age 40 (Madison Clinic, 2005; Lumetra, 2006). The ACR, ACS, AMA and the AMWA recommend mammography screening annually beginning at the age 40; whereas, the ACOG, the NCI (National Cancer Institute) and the Mayo Clinic recommend it every 1-2 years (Madison Clinic, 2005; Lumetra, 2006 and Mayo Clinic, 2006). The USPSTF recommend that women should decide for themselves after receiving counsel about potential risks and benefits (Lumetra, 2006). The Canadian Task Force Public Health Care (CTFPHC), the American Academy of Family Physicians (AAFP) and the American College of Preventive Medicine (ACPM) recommend initiating mammography for average risk women at age 50 (Madison Clinic, 2005).

The majority of US organizations recommend initiating screening for breast cancer by CBE annually at the age of 40 years. The 2006 American Cancer Society (ACS) guidelines for the early detection of cancer (Smith, Cokkinides and Eyre, 2006) and the Anderson
Cancer Center (2006) recommend that women have a CBE, beginning at age 20, every one to three years and then annually at age 40.

Beginning in their early 20s, women should be told the benefits and limitations of BSE. The importance of prompt reporting of any new breast symptoms to a health professional should be emphasized. Women who choose to do BSE should receive instruction and have their technique reviewed on the occasion of a periodic health examination. It is acceptable for women to choose not to do BSE or to do BSE irregularly (Smith, Cokkinides and Eyre, 2006).
ETHNICITY AND SCREENING PRACTICES

Numerous studies have reported a more advanced stage of breast carcinoma at diagnosis in ethnic subgroups (Miller, 2006; Polite and Olopade, 2005; Hunter, 2000; Foxall et al, 2001; Shokar et al, 2005) and a poorer 5-year survival and higher mortality rates (Sun et al, 2002; Odusany, 2001; Foster et al, 1992; ACS, 2005; Watts et al, 2004). Treatment delay of even three months is a significant factor in breast cancer mortality (Gullatte, Phillips and Gibson, 2006). There is evidence that ultra orthodox women in Israel are at advanced stage of breast carcinoma at diagnosis and have a lower survival rate in comparison to other women with breast cancer (2001). Many studies that were performed identified barriers that impede optimal breast cancer diagnosis and treatment in the minority population (Simon, 2006; Hardy, et al, 2000; Meissner et al, 2004). Studying the barriers experienced by women from different ethnic groups and from traditional cultures, in breast screening practices, is essential in understanding the reasons for late stage diagnosis and in designing successful interventions and programs. To help detect and treat breast cancer early, health care providers and policymakers should try to understand their predicaments and the factors influencing their decisions (Remennick, 2006). The patient related barriers that are experienced by ethnic subgroups include lower socioeconomic status, lower level of education, cultural or belief systems that inhibit involvement in contemporary breast cancer treatment (Hurd et al, 2005; Remennick, 2006; Watts et al, 2004), and poor or incorrect knowledge and practices relating to early detection of breast cancer as compared with white women (Watts et al, 2004).
Many studies showed that lower socioeconomic status resulted in higher breast cancer mortality. Lower socioeconomic status is independently prognostic for lack of optimal care and increased mortality (Hunter et al, 1993; Lanin et al, 1998). A large percentage of the ultra orthodox population also live at the poverty level; however, their well being is not damaged by their poverty level because of their outlook on life (1998, דון). Therefore, trends that are observed among minority groups are not always relevant for the ultra orthodox population. The ultra orthodox population is considered a minority group; however, it has different characteristics than most other minority groups. For example, there is no question about the fact that in the minority groups mentioned above, there is a higher fraction of women who have a lower level of education (Hurd et al, 2005); whereas, the ultra orthodox population (men and women) is characterised by a higher level of education than the non charedy population (1998, דון).

The level of education has a significant impact on screening practices. Women who did not complete high school are less likely to participate in screening and are more likely to present with late-stage disease (Hiatt and Pasick, 1996). With a lower level of education and a lower socio economic status, breast cancer awareness becomes a deferrable issue; personal health needs becomes a secondary issue to maintaining a steady job. However, the ultra orthodox population have a higher level of education; therefore, we must seek the reasons for their presenting with late stage diagnosis.

The minority populations have unique cultural behaviors and belief systems that can impede breast cancer diagnosis and treatment. This perhaps may be true for the ultra orthodox population. However, how their beliefs and cultural behaviors may affect preventive health behaviors has not been studied. In the African American community,
there is a strong belief that ignoring the symptoms will alleviate the disease (Lanin et al, 2002; Lanin et al, 1998). Deep spiritual relationships support the belief that G-d may heal the cancer without medical intervention. The Hispanic and African American communities share the belief that the family comes before the matriarch’s health issue. Therefore, women will delay their health issues to address children’s or spouse’s health, finance or household well being (Hurd et al, 2005). Among traditional societies, especially Muslims, men control women's decisions and actions, and men may be unaware of or disapprove of breast screening (Remennick, 2006). A common belief among devout women of certain religions is the belief that one's destiny is determined by some high power and one has no control over disease, life and death. Specifically, a women may believe that if she is destined to breast cancer, she will get it, and then her survival or death is all a matter of luck (Remennick, 2006). Although the ultra orthodox also believe in a higher power (G-d); however, they also believe that although G-d may bring on a disease to a person, the maximum must be done to become healthy. A person must take both physical action (medicines, seeing the best doctors in the specific field...) and spiritual action (praying, doing good deeds...).

The ultra orthodox population is considered to be a minority group; however, it has different characteristics than most other minority groups. Therefore, it is important to examine the traits that can impede breast cancer diagnosis and treatment among this specific minority group.
THEORETICAL FRAMEWORK

The goal of many health behavior researchers is to understand both the determinants of health behaviors and the process of health behavior change. The implication of research in this area is that it may give a basis upon which interventions to improve the public health of individuals and communities can be developed and evaluated. Despite a large empirical literature, there is still no consensus that certain models of health behavior are more accurate than others, that certain variables are more influential than others, that certain behaviors or situations are understood better than others and how the variables combine in an equation to predict behavior (Noar and Zimmerman, 2005). How are researchers supposed to choose the most precise and fruitful theory or theories to apply in their studies? In fifteen health intervention research projects, each researcher was asked to describe how and why a certain theory was chosen to guide one's particular health intervention. Various reasons were offered; however, empirical studies showing the superiority of the chosen theory over other theories was rarely among the reasons. Theories are sometimes used because they are easy to understand or because it is the theory one learned during one's academic training (Noar and Zimmerman, 2005).

This study used the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980) as a theoretical framework for a few reasons: the relationships of the model components are clearly specified by mathematical formulations and the model enables to explore the contribution of social factors in addition to personal factors in predicting behavior. When studying the ultra orthodox population, studying the social influence is extremely
important since it has a key role on behavior in this specific population. In addition, social normative factors were found to be important in screening behavior (Lierman et al, 1990). The TRA is based on the assumption that behaviors are under volitional control. An intention to perform a behavior is the immediate determinant of action. Intention is a function of two basic components: a personal factor (attitude) and a social factor (social normative influence). Attitudes can be defined as the extent to which individuals have a favourable or unfavourable evaluation of the behavior and social norms refer to the social pressure individuals perceive themselves to be under to perform a behavior (Jenner et al, 2002).

The TRA model has been utilized in previous research to examine a wide variety of health behaviors such as: explaining hand hygiene practice among health care workers (Jenner et al, 2002), health care workers' glove use (Levine, 1999), predicting breast self examination (Lierman et al, 1990), predicting attendance at breast screening (Steadman and Rutter, 2004) and predicting smoking cessation (Bledsoe, 2005).
**THE OBJECTIVES AND HYPOTHESES OF THIS STUDY**

The aim of this study was to explore and characterize the personal, social and cultural factors that may contribute to late stage diagnosis of breast cancer among Jewish ultra orthodox women by comparing health behavior, related to breast cancer, among Jewish ultra orthodox women in comparison to health behavior, related to breast cancer, among Jewish non orthodox women.

**The Hypotheses:**

1. The knowledge, attitudes and practices of Jewish charedy women concerning CBE and mammography are different in comparison to Jewish non charedy women.

2. The contribution of social and cultural factors, in predicting the intention to having a CBE and a mammography, is stronger amongst the Jewish charedy group in comparison to the Jewish non charedy group.

3. The contribution of health behavior to the intention of having a CBE and mammography performed among the Jewish charedy women and Jewish non charedy women will be similar.
Method

Design and Sample

A cross-sectional survey was carried out at two different areas in Israel. A total of ninety six women were interviewed based on a questionnaire developed by the author. Forty seven women were interviewed in Bnei Beraq and forty nine women were interviewed in Jerusalem at two outpatient clinics. Women waiting for a doctor's visit were approached by the interviewer and asked for their consent to be interviewed. If the women agreed and fitted the criteria (a minimal age of 40 years old, without a history of breast disease, without malignancy of any kind and without any disease of the chest area) she was included in the study. Six women were omitted from this study: four women were omitted since they had a history of breast disease and two women refused to be interviewed. The sample consists of a total of 90 women; 51% (N=46) Jewish ultra orthodox women (charedy) and 49% (N=44) Jewish secular to religious (but not charedy) women. The mean age of the women in the sample is 54.4 (SD 10.3).

Procedure

In order to eliminate inter observer bias and ensure cultural acceptability, interviews were conducted by one interviewer who is an ultra orthodox woman. The personal interviews were based on a questionnaire which was evaluated for internal consistency by Standarized Cronbach's alpha coefficients. Anonymity and confidentiality were insured in order to enhance cooperation of the participants and to overcome possible apprehensions which might affect the honesty of responses. The ethics committee of the Loewenstein Hospital, in the city of Raanana, gave its consent to the study.
Measurements

Main outcome variable:

Behavior

CBE Performance: CBE Performance was measured by a single item, rating whether or not the woman has a clinical breast examination not performed regularly by a professional.

Mammography Performance: Mammography Performance was measured by a single item, rating whether or not the woman has a mammography performed regularly.

Behavioral Intention (BI): Behavioral intention is the person’s perception of whether a specific behavior will be performed (Levin, 1999). The variable was measured by two items: “How likely is it you will perform a CBE regularly?” (BI1) and “How likely is it you will have a Mammography performed regularly?” (BI2) Rating was made on a 7-point agree-to-disagree Likert scale.

Main predictor variables:

Attitude: Attitude, the person’s evaluation of performing the behavior.

Attitude was measured by the sum of seven semantic differential evaluation scales (bad to good, foolish to wise, useless to useful, unimportant to important, unpleasant to pleasant, frightening to reassuring and worthless to valuable) (Levin, 1999; Lierman et al, 1990; Drossaert et al, 2005). The item stem read: “In general, do you think that performing screening tests for breast cancer is (response option)?” Rating was made on a 7-point scale for each of the items. The seven items had an overall internal consistency value of 0.71 (Cronbach’s alpha).
**Social Norm (SN) (Indirect):** Nine social referents have been identified by Lierman, (1990) as important social influences, these include: friends and family; regular doctor; husband; friends and family with cancer; daughter; sister; health insurance program; magazines and newspapers; advertisements and programs. The item “Health insurance program” was omitted as a social influence and “Rabbi’s opinion” was added in order to suit the ultra orthodox population. As items, each social referent group was rated according to the respondent’s perception (expectancy) of whether that person or group wants her to perform breast cancer screening tests using a 7-point agree (7) to disagree (1) Likert scale. The item stem read: “I believe that the social referent (my husband) thinks that I should perform breast cancer screening tests.”

A value component, motivation to comply, was determined for each social referent, (“generally speaking, I try to do what my husband thinks I should do”) using a 7-point agree (7) to disagree (1) Likert scale. Social norm was computed by multiplying each expectancy score with the corresponding motivation to comply score and summing the products. Norm influence was derived by multiplying the normative belief score by its corresponding motivation to comply score. Ratings for both items were made on a 7-point agree-to-disagree Likert scale. The overall internal consistency value of the items was 0.79 (Cronbach’s alpha).

**Global Social Norm (GSN):** A direct measure of social norm. A single global item was used. The item stem read: “Most people who are important to me think I should perform screening tests for breast cancer.” The rating was made on a 7-point agree-to-disagree Likert scale.
**Perceived control:** Perceived control is the person’s perception of how easy or difficult it would be to perform the behavior. This variable was measured by two items of how easy and how much control. For example: “Performing screening tests for breast cancer is in my control” (7) or is not in my control (1) on a 7 point Likert scale. The overall internal consistency value of the items was (Cronbach’s alpha, 0.58; Pearson’s Correlation, 0.56).

**Perceived risk** is the evaluation of personal degree of risk as compared to others. The variable comparative risk assessed the women’s perception of the chances of acquiring breast cancer. The stem item read: “How likely is it that you will get breast cancer as compared to other women”. Approximately 75% of the ultra orthodox women refused to answer this question. All of the refusers explained that they can’t answer such a question on a 1 (below average)- 7 (above average) scale, since morbidity of any kind depends on G-d’s will and can not be compared to other women. Therefore, this variable was not included in the statistical analysis.

**Barriers to CBE:** The variable was measured by the mean of ten items: “The reasons for not performing CBE by you... “ The items included: embarrassment, fear, it’s a bother, no recommendation by doctor, I don’t have enough time, the examination is uncomfortable, problem with modesty, I have no symptoms, performance of exam by a man, my doctor is not professional enough. Rating was made on a 7-point Likert scale. The overall internal consistency value of the items was 0.63 (Cronbach’s alpha).
**Barriers to Mammography:** The variable was measured by the mean of ten items: “The reasons for not performing Mammography by you include...” The items included: embarrassment, fear, it’s a bother, no recommendation by doctor, I don’t have enough time, the examination is uncomfortable, problem with modesty, I have no symptoms, performance of the exam by a man, my doctor is not professional enough. Rating was made on a 7-point Likert scale. The overall internal consistency value of the items was 0.64 (Cronbach’s alpha).

**Knowledge:** The women were asked questions on symptoms of breast cancer, risk factors relating to breast cancer and the performance of CBE and mammography. The score was derived by the mean of the scores of each question. The overall internal consistency value of the items was 0.63 (Cronbach’s alpha).

**Religiosity:** The variable was measured by the women’s self definition of religiosity on a 7 point scale from secular to ultra-orthodox. Women who chose 1-6 on the scale were allocated to the non charedy group and women who chose 7 were allocated to the charedy group.

**Fatalistic Beliefs:** Was measured by a “yes” or “no” answer to the items: “Do you believe that talking about cancer will cause its onset?” (fatalistic beliefs 1) (Petro-Nustus and Mikhail, 2003) and “Do you believe that charedy women are more defended against breast cancer than non-charedy women because of multiple pregnancies and breast feeding patterns?” (fatalistic beliefs 2).
**Health Behaviors**: Was measured by the mean of the scores to the questions: “I exercise at least 3 times a week”, “I eat a balanced diet”, and “I have my teeth checked by a dentist once a year even if I don’t have any special problems”. The rating was made on a 7-point agree-to-disagree Likert scale.

The overall internal consistency value of the items was 0.63 (Cronbach’s alpha) after omitting two items: “I look for new information concerning health” and “I take vitamin supplements when I don’t eat properly”.

**Confounder variables**

**Age**: Was measured by the women’s year of birth.

**Ethnic group**: Was measured by the father’s ethnic origin.

**Socioeconomic status**: The measure was obtained by the mean of two items: Household income and household crowding index (number of people living in a household divided by the number of rooms) (Melki et al, 2004).

**Family History of Breast Cancer**: Was considered positive if the woman has/had a mother, sister or daughter with breast cancer.
STATISTICAL ANALYSIS

The distributions of the variables were examined by the Kolmogorov-Smirnov Tests. Numerical variables which did not have a normal distribution (BI1, BI2, global social norm, religiosity, knowledge and attitudes) were diverted to categorical variables according to their frequencies. Variables with sparse frequencies were categorized. The variable origin was categorized into two groups: Europe, America or other. Marital status was categorized to: married or other. BI1, BI2, knowledge, attitudes, global social norm, and perceived control were each categorized into low or high, religiosity was categorized into two groups: charedy and non-charedy (the cut point was 7 on a 1-7 likert scale). All tests applied were two-tailed and a P-value of 5% or less was considered statistically significant. The data was analyzed with SPSS.

Kruskall Wallis Tests were used to examine the differences between the study groups for the categorical variables occupation and mean monthly income which have more than two options (table 1).

Chi-square tests were used:

1. To compare the two subgroups, charedy and non-charedy, for the categorical variables: family history, origin, marital status (table 1), BI1, BI2, knowledge, attitudes, GSN, CBE performance, mammo performance, fatalistic beliefs 1, fatalistic beliefs 2 and perceived control (table 2).
2. To examine the contribution of GSN in predicting the intention to having a CBE and a mammography amongst the two study groups (tables 3 and 4).

3. To assess the associations between BI1 and the categorical variables: religiosity, family history, origin, marital status, global social norm (GSN), attitudes, knowledge, fatalistic beliefs 1, fatalistic beliefs 2 and perceived control (table 6) in order to decide which variables to include into the final model.

4. To assess the associations between BI2 and the categorical variables: religiosity, family history, origin, marital status, global social norm (GSN), attitudes, knowledge, fatalistic beliefs 1, fatalistic beliefs 2 and perceived control (table 6) in order to decide which variables to include into the final model.

5. To assess the associations between CBE performance and the categorical variables: religiosity, family history, origin, marital status, GSN, attitudes, knowledge, fatalistic beliefs 1, fatalistic beliefs 2 and perceived control (table 8).

6. To assess the associations between mammography performance and the categorical variables: religiosity, family history, origin, marital status, GSN, attitudes, knowledge, fatalistic beliefs 1, fatalistic beliefs 2 and perceived control (table 8).
**Independent T-Tests** were used to:

1. Analyze the differences between the two study groups, charedy and non charedy, for the continuous variables: age, number of children, women’s education, husband’s education, crowding index, socio-economic status (table 1), CBE barriers, mammo barriers, health behavior and social norm (SN) (table 2).

2. To analyze the associations of each one of the variables BI1 and BI2 with the numerical variables: age, socio-economic status, health behavior, SN, mammo barriers and CBE barriers (table 7).

3. To analyze the associations of each one of the variables CBE performance and mammography performance with the numerical variables: age, socio-economic status, health behavior, SN, mammo barriers and CBE barriers (table 8).

4. To examine the contribution of health behavior to the intention of having a CBE and mammography performed among the charedy and non charedy women (table 5).

**Logistic Regressions** were used to:

1. Analyze the contribution of the study variables in predicting BI1 (tables 9 and 10), BI2 (tables 13 and 14), CBE performance (tables 11 and 12) and mammography performance (tables 15 and 16).
# RESULTS

## Table 1: Characteristics of the Study Population Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Non-charedy</th>
<th>Charedy</th>
<th>Total</th>
<th>( P_V )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (Std. Dev)</td>
<td>mean (Std. Dev)</td>
<td>mean (Std. Dev)</td>
<td></td>
</tr>
<tr>
<td><strong>age</strong></td>
<td>56.4 (10.7)</td>
<td>52.5 (9.6)</td>
<td>54.4 (10.3)</td>
<td>n.s.</td>
</tr>
<tr>
<td><strong>Number of children</strong></td>
<td>3 (1.5)</td>
<td>7 (2.8)</td>
<td>5 (2.9)</td>
<td>( p&lt;0.01 )</td>
</tr>
<tr>
<td><strong>Women's education</strong></td>
<td>12.6 (3.2)</td>
<td>13.8 (3.2)</td>
<td>13.24 (3.26)</td>
<td>( p&lt;0.05 )</td>
</tr>
<tr>
<td><strong>Husband's education</strong></td>
<td>13.6 (3.3)</td>
<td>23.3 (10.2)</td>
<td>18.4 (9.0)</td>
<td>( p&lt;0.01 )</td>
</tr>
<tr>
<td><strong>Crowding index</strong></td>
<td>0.9 (0.4)</td>
<td>1.6 (1.0)</td>
<td>1.26 (0.8)</td>
<td>( p&lt;0.01 )</td>
</tr>
<tr>
<td><strong>Socio-economic status</strong></td>
<td>1.86 (0.61)</td>
<td>2.0 (0.53)</td>
<td>1.93 (0.57)</td>
<td>n.s.</td>
</tr>
<tr>
<td></td>
<td>N(%)</td>
<td>N(%)</td>
<td>N(%)</td>
<td></td>
</tr>
<tr>
<td><strong>Family history</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>34 (77.3)</td>
<td>34 (73.9)</td>
<td>68 (75.6)</td>
<td>n.s.</td>
</tr>
<tr>
<td>yes</td>
<td>10 (22.7)</td>
<td>12 (26.1)</td>
<td>22 (24.4)</td>
<td></td>
</tr>
<tr>
<td><strong>Origin</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe/America</td>
<td>11 (25)</td>
<td>27 (58.7)</td>
<td>38 (42.2)</td>
<td>( p&lt;0.01 )</td>
</tr>
<tr>
<td>other</td>
<td>33 (75)</td>
<td>19 (41.3)</td>
<td>52 (57.8)</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>33 (75.0)</td>
<td>39 (84.8)</td>
<td>72 (80.0)</td>
<td>n.s.</td>
</tr>
<tr>
<td>other</td>
<td>11 (25.0)</td>
<td>7 (15.2)</td>
<td>18 (20.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secretary</td>
<td>3 (6.8)</td>
<td>3 (6.5)</td>
<td>6 (6.7)</td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>3 (6.8)</td>
<td>13 (28.3)</td>
<td>16 (17.8)</td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>3 (6.8)</td>
<td>1 (2.2)</td>
<td>4 (4.4)</td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>11 (25.0)</td>
<td>17 (37.0)</td>
<td>28 (31.1)</td>
<td></td>
</tr>
<tr>
<td>other</td>
<td>24 (54.6)</td>
<td>12 (26.1)</td>
<td>36 (40.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Husband’s Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lawyer/Doctor/Engineer</td>
<td>4 (9.5)</td>
<td>0(0)</td>
<td>4 (4.6)</td>
<td></td>
</tr>
<tr>
<td>Businessman</td>
<td>5 (11.9)</td>
<td>3 (6.7)</td>
<td>8 (9.2)</td>
<td></td>
</tr>
<tr>
<td>Layman</td>
<td>2 (4.8)</td>
<td>1 (2.2)</td>
<td>3 (3.5)</td>
<td></td>
</tr>
<tr>
<td>Student/Avrech</td>
<td>2 (4.8)</td>
<td>19 (42.2)</td>
<td>21 (24.1)</td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>0(0)</td>
<td>3 (6.7)</td>
<td>3 (3.4)</td>
<td></td>
</tr>
<tr>
<td>other</td>
<td>29 (69.0)</td>
<td>19 (42.2)</td>
<td>48 (55.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Mean monthly income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High above average</td>
<td>10 (22.7)</td>
<td>13 (28.9)</td>
<td>23 (25.8)</td>
<td></td>
</tr>
<tr>
<td>Above average</td>
<td>7 (15.9)</td>
<td>10 (22.2)</td>
<td>17 (19.1)</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>12 (27.3)</td>
<td>14 (31.1)</td>
<td>26 (29.2)</td>
<td></td>
</tr>
<tr>
<td>Below average</td>
<td>11 (25.0)</td>
<td>8 (17.8)</td>
<td>19 (21.4)</td>
<td></td>
</tr>
<tr>
<td>Very much below average</td>
<td>4 (9.1)</td>
<td>0(0)</td>
<td>4 (4.5)</td>
<td></td>
</tr>
</tbody>
</table>
THE DIFFERENCES BETWEEN THE CHAREDY AND NON-CHAREDY STUDY GROUPS FOR THE DEMOGRAPHIC VARIABLES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Charedy</th>
<th>Non-charedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>56</td>
<td>53</td>
</tr>
<tr>
<td>Education Female</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Education Male</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td>No. of children</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Crowding Index</td>
<td>1.6</td>
<td>0.9</td>
</tr>
<tr>
<td>Socio Economic Status</td>
<td>2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Significance levels: n.s. = P<0.05, P<0.01
Expected significant differences were found between the charedy and non charedy groups for the demographic variables: number of children, education, crowding index, origin and occupation. The charedy women had a significantly higher number of children (p<0.01) with a mean of 7 children in comparison to the non charedy group who had a mean of 3 children. The number of years the women (p<0.05) and husbands (p<0.01) studied was also higher among the charedy group, especially amongst the husbands, with a mean of 23.3 years (std. Dev 10.2). There was a significant difference in the crowding index which was higher among the charedy group (p<0.01). A larger percent of women from the charedy group were from a European/American origin. There is a significant difference between the charedy group and non charedy group in both the women's and husband's occupation (p<0.01). Most charedy women are housewives or teachers and most of the charedy men are avrechs (study Torah). No differences were found between the sub-groups for marital status, family history of breast cancer and mean monthly income (Table 1).
Results concerning hypothesis 1: The knowledge, attitudes and practices of charedy women concerning CBE and mammography are different in comparison to non-charedy women (Table 2).

### Table 2: THE DIFFERENCES BETWEEN THE CHAREDY AND NON CHAREDY GROUPS FOR THE STUDY VARIABLES

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>CHAREDY N(%)</th>
<th>NON CHAREDY N(%)</th>
<th>P&lt;sub&gt;v&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI1-CBE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>28 (60.9%)</td>
<td>25 (56.8%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>No</td>
<td>18 (39.1%)</td>
<td>19 (43.2%)</td>
<td></td>
</tr>
<tr>
<td>BI2-Mammo:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>22 (47.8%)</td>
<td>20 (45.5%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>No</td>
<td>24 (52.2%)</td>
<td>24 (54.5%)</td>
<td></td>
</tr>
<tr>
<td>KNOWLEDGE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>34 (73.9%)</td>
<td>17 (38.6%)</td>
<td>0.00</td>
</tr>
<tr>
<td>High</td>
<td>12 (26.1%)</td>
<td>27 (61.4%)</td>
<td></td>
</tr>
<tr>
<td>ATTITUDES:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>26 (56.5%)</td>
<td>20 (45.5%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>High</td>
<td>20 (43.5%)</td>
<td>24 (54.5%)</td>
<td></td>
</tr>
<tr>
<td>GSN:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>25 (54.3%)</td>
<td>17 (38.6%)</td>
<td>n.s.</td>
</tr>
<tr>
<td>High</td>
<td>21 (43.7%)</td>
<td>27 (61.4%)</td>
<td></td>
</tr>
<tr>
<td>CBE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18(39.1%)</td>
<td>26(59.1%)</td>
<td>p=0.06</td>
</tr>
<tr>
<td>No</td>
<td>28(60.9%)</td>
<td>18(40.9%)</td>
<td></td>
</tr>
<tr>
<td>VARIABLE</td>
<td>CHAREDY N(%)</td>
<td>NON CHAREDY N(%)</td>
<td>P&lt;sub&gt;v&lt;/sub&gt;</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------</td>
<td>------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Mammo:</td>
<td></td>
<td></td>
<td>p=0.02</td>
</tr>
<tr>
<td>Yes</td>
<td>16(36.4%)</td>
<td>27(61.4%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>28(63.6%)</td>
<td>17(38.6%)</td>
<td></td>
</tr>
<tr>
<td>Fatalistic Beliefs 1</td>
<td></td>
<td></td>
<td>p=ns</td>
</tr>
<tr>
<td>Yes</td>
<td>10(23.3%)</td>
<td>6(14%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>33(76.7%)</td>
<td>37(86%)</td>
<td></td>
</tr>
<tr>
<td>Fatalistic Beliefs 2</td>
<td></td>
<td></td>
<td>p=0.01</td>
</tr>
<tr>
<td>Yes</td>
<td>17(58.6%)</td>
<td>5(20.8%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>12(41.4%)</td>
<td>19(79.2%)</td>
<td></td>
</tr>
<tr>
<td>Perceived Control</td>
<td></td>
<td></td>
<td>n.s.</td>
</tr>
<tr>
<td>Low</td>
<td>28 (60.9%)</td>
<td>19 (44.2%)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>18 (39.1%)</td>
<td>24 (55.8%)</td>
<td></td>
</tr>
<tr>
<td>M (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BARRIERS -CBE</td>
<td>3.5</td>
<td>3.2</td>
<td>n.s.</td>
</tr>
<tr>
<td></td>
<td>(1.1)</td>
<td>(1.0)</td>
<td></td>
</tr>
<tr>
<td>BARRIERS- Mammo</td>
<td>3.6</td>
<td>3.4</td>
<td>n.s.</td>
</tr>
<tr>
<td></td>
<td>(1.2)</td>
<td>(1.1)</td>
<td></td>
</tr>
<tr>
<td>Health behavior</td>
<td>4.0</td>
<td>4.4</td>
<td>n.s.</td>
</tr>
<tr>
<td></td>
<td>(1.8)</td>
<td>(1.7)</td>
<td></td>
</tr>
<tr>
<td>SN</td>
<td>190.0</td>
<td>219.5</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>(84.0)</td>
<td>(57.4)</td>
<td></td>
</tr>
</tbody>
</table>

Significant differences were found between the charedy and non charedy study groups for the variables: knowledge (p=0.00), mammography performance (p=0.02), SN (p=0.05) and fatalistic beliefs 2 (p=0.01). A borderline difference was found for the variable: CBE performance (p=0.06).
In table 2, we see that the charedy group of women have less knowledge about breast cancer than the non charedy group. A significantly larger percentage of charedy women have a low level of knowledge (73.9%); whereas, 61.4% of non charedy women have a high level of knowledge. A significantly larger percentage of the non charedy group (61.4%) perform mammography (p=0.02) in comparison to the charedy group (36.4%). A borderline difference was found for the variable CBE performance (p=0.06); 39.1% of women in the charedy group perform CBE in comparison to 59.1% of the women in the non charedy group. No difference was found between the groups for the variable attitudes.

This hypothesis was partially rejected. Differences were found between the two study groups for knowledge and practices but not for attitudes.
Results concerning hypothesis 2: *The contribution of social and cultural factors, in predicting the intention to having a CBE and a mammography, is stronger amongst the charedy group in comparison to the non charedy group (Table 3 and Table 4).*

**Table 3:**
Social Influence (GSN) as a predictor of BI1 -cbe amongst both study groups (Fisher exact test).

<table>
<thead>
<tr>
<th></th>
<th>Global Social Norm low</th>
<th>Global Social Norm high</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BI1 LOW N(%)</td>
<td>BI1 HIGH N(%)</td>
<td>BI1 LOW N(%)</td>
<td>BI1 HIGH N(%)</td>
</tr>
<tr>
<td>CHAREDY</td>
<td>18 (72.0%)</td>
<td>7 (28.0%)</td>
<td>10 (47.6%)</td>
<td>11 (52.4%)</td>
</tr>
<tr>
<td>NON CHAREDY</td>
<td>14 (82.4%)</td>
<td>3 (17.6%)</td>
<td>11 (40.7%)</td>
<td>16 (59.3%)</td>
</tr>
</tbody>
</table>

A significant relationship was found between GSN and BI1 only for the non charedy group (p=0.01).

**Table 4: Social Influence (GSN) as a predictor of BI2 -Mammo amongst both study groups**

<table>
<thead>
<tr>
<th></th>
<th>Global Social Norm low</th>
<th>Global Social Norm high</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BI2 LOW N(%)</td>
<td>BI2 HIGH N(%)</td>
<td>BI2 LOW N(%)</td>
<td>BI2 HIGH N(%)</td>
</tr>
<tr>
<td>CHAREDY</td>
<td>14 (56.0%)</td>
<td>11 (44.0%)</td>
<td>8 (38.1%)</td>
<td>13 (61.9%)</td>
</tr>
<tr>
<td>NON CHAREDY</td>
<td>12 (70.6%)</td>
<td>5 (29.4%)</td>
<td>8 (29.6%)</td>
<td>19 (70.4%)</td>
</tr>
</tbody>
</table>

A significant relationship was found between GSN and BI2 only for the non charedy group (p=0.01).
In Tables 3 and 4, we see that Global Social Norm (GSN) was not a predictor of behavioral intention 1 (cbe) nor of behavioral intention 2 (mammography) amongst the charedy group of women, whereas, amongst the non charedy group of women, GSN was found to be a positive predictor for both behavioral intention 1 (cbe) \( (p=0.01) \) (table 3) and behavioral intention 2 (mammography) \( (p=0.01) \) (table 4).

In tables 6 and 7, we see that the cultural factors: perceived control, cbe barriers, mammo barriers and fatalistic beliefs 1 had no influence on behavioral intentions and no differences were found between the two subgroups for these variables (table 2); therefore, they were not included in the final model. However, a significant difference was found between the two study groups for fatalistic beliefs 2 (table 2). In other words, charedy women believe that they are more protected against breast cancer than the general population because of multiple pregnancies and breastfeeding. However, this belief did not predict either of the behavioral intentions. Another cultural factor \textit{perceived risk} was excluded from the statistical analysis since 75\% of the charedy women refused to answer the question. They all said that it depends on G-d’s will.

This hypothesis was rejected for both the social and cultural variables. The contribution of social factors, in predicting the intention to having a CBE and a mammography, was found to be stronger amongst the non charedy group than the charedy group and the cultural factors were not predictors of behavioral intentions.
Results concerning hypothesis 3: *The contribution of health behavior to the intention of having a CBE and mammography performed among the charedy women and non charedy women will be similar (Table 5).*

**TABLE 5: Health Behavior as a predictor of BI₁ and BI₂ amongst both study groups**

<table>
<thead>
<tr>
<th>HEALTH BEHAVIOR</th>
<th>BI₁ LOW</th>
<th>BI₁ HIGH</th>
<th><strong>P</strong></th>
<th>BI₂ LOW</th>
<th>BI₂ HIGH</th>
<th><strong>P</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>M (SD)</td>
<td>M (SD)</td>
<td>Pv</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>Pv</td>
<td></td>
</tr>
<tr>
<td>CHAREDY</td>
<td>3.65 (1.70)</td>
<td>4.43 (1.78)</td>
<td>0.15</td>
<td>3.41 (1.52)</td>
<td>4.46 (1.83)</td>
<td>0.04</td>
</tr>
<tr>
<td>NON CHAREDY</td>
<td>3.91 (1.63)</td>
<td>4.98 (1.74)</td>
<td>0.04</td>
<td>3.67 (1.58)</td>
<td>4.96 (1.68)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

A significant relationship was found between health behavior and BI₁ for the non charedy group (p=0.04). The association between health behavior and BI₂ was significant for both the charedy (p=0.04) and non charedy group (p=0.01).

Health behavior was not a predictor of behavioral intention 1-(cbe) for the charedy group of women; however, was found to be a positive predictor for the non charedy group (p=0.04). Behavioral intention 2-(mammography) was found to be predicted by health behavior in both the charedy (p=0.04) and non charedy (p=0.01) groups.

This hypothesis was partially rejected since the contribution of health behavior to the intention of having a CBE was not similar amongst both study groups and the intention to having a mammography performed was better predicted by health behavior amongst the non charedy group of women.
PREDICTING BEHAVIORAL INTENTIONS

The associations between the categorical independent variables and the dependent variables, behavioral intention 1 (cbe) and behavioral intention 2 (mammography), were examined in order to decide which variables to include in the regression model.

Table 6: THE ASSOCIATION BETWEEN BEHAVIORAL INTENTIONS AND THE CATEGORICAL VARIABLES

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>BI1-CBE</th>
<th></th>
<th>BI2-Mammography</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOW N(%)</td>
<td>HIGH N(%)</td>
<td></td>
<td>LOW N(%)</td>
</tr>
<tr>
<td>RELIGIOSITY:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charedy</td>
<td>28 (52.8%)</td>
<td>18 (48.6%)</td>
<td>n.s.</td>
<td>22 (52.4%)</td>
</tr>
<tr>
<td>Non-Charedy</td>
<td>25 (47.2%)</td>
<td>19 (51.4%)</td>
<td></td>
<td>50 (47.6%)</td>
</tr>
<tr>
<td>Family History:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11 (20.8%)</td>
<td>11 (29.7%)</td>
<td>n.s.</td>
<td>7 (16.7%)</td>
</tr>
<tr>
<td>No</td>
<td>42 (79.2%)</td>
<td>26 (70.3%)</td>
<td></td>
<td>35 (83.3%)</td>
</tr>
<tr>
<td>Origin:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe/America</td>
<td>17 (32.1%)</td>
<td>21 (56.8%)</td>
<td>0.02</td>
<td>13 (31.0%)</td>
</tr>
<tr>
<td>Other</td>
<td>36 (67.9%)</td>
<td>16 (43.2%)</td>
<td></td>
<td>29 (69.0%)</td>
</tr>
<tr>
<td>Marital status:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>44 (83.0%)</td>
<td>28 (75.7%)</td>
<td>n.s.</td>
<td>35 (83.3%)</td>
</tr>
<tr>
<td>Other</td>
<td>9 (17.0%)</td>
<td>9 (24.3%)</td>
<td></td>
<td>7 (16.7%)</td>
</tr>
<tr>
<td>GSN:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>32 (60.4%)</td>
<td>10 (27%)</td>
<td>0.00</td>
<td>26 (61.9%)</td>
</tr>
<tr>
<td>High</td>
<td>21 (39.6%)</td>
<td>27 (73%)</td>
<td></td>
<td>16 (38.1%)</td>
</tr>
<tr>
<td>ATTITUDES:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>30 (56.6%)</td>
<td>16 (43.2%)</td>
<td>n.s.</td>
<td>27 (64.3%)</td>
</tr>
<tr>
<td>High</td>
<td>23 (43.4%)</td>
<td>21 (56.8%)</td>
<td></td>
<td>15 (35.7%)</td>
</tr>
<tr>
<td>KNOWLEDGE:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>30 (56.6%)</td>
<td>21 (56.8%)</td>
<td>n.s.</td>
<td>28 (66.7%)</td>
</tr>
<tr>
<td>High</td>
<td>23 (43.4%)</td>
<td>16 (43.2%)</td>
<td></td>
<td>14 (33.3%)</td>
</tr>
<tr>
<td>Fatalistic Beliefs 1:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>13 (43.3%)</td>
<td>9 (39.1%)</td>
<td>n.s.</td>
<td>10 (40.0%)</td>
</tr>
<tr>
<td>No</td>
<td>17 (56.7%)</td>
<td>14 (60.9%)</td>
<td></td>
<td>15 (60.0%)</td>
</tr>
<tr>
<td>Fatalistic Beliefs 2:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9 (18.0%)</td>
<td>7 (19.4%)</td>
<td>n.s.</td>
<td>7 (17.9%)</td>
</tr>
<tr>
<td>No</td>
<td>41 (82.0%)</td>
<td>29 (80.6%)</td>
<td></td>
<td>32 (82.1%)</td>
</tr>
<tr>
<td>Perceived Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>31 (58.5%)</td>
<td>16 (44.4%)</td>
<td>n.s.</td>
<td>25 (59.5%)</td>
</tr>
<tr>
<td>High</td>
<td>22 (41.5%)</td>
<td>20 (55.6%)</td>
<td></td>
<td>22 (46.8%)</td>
</tr>
</tbody>
</table>
The associations between the numerical independent variables and the dependent variables, behavioral intention 1 (cbe) and behavioral intention 2 (mammography), were examined in order to decide which variables to include in the regression model.

Table 7: THE ASSOCIATION BETWEEN BEHAVIORAL INTENTIONS AND THE NUMERICAL VARIABLES

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>BI-CBE low</th>
<th>BI-CBE high</th>
<th>BI-mammo-low</th>
<th>BI-mammo-high</th>
<th>Pv</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>54.0 (10.9)</td>
<td>55.0 (9.6)</td>
<td>52.2 (10.5)</td>
<td>56.3 (9.9)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Socio economic status</td>
<td>1.9 (0.6)</td>
<td>2.1 (0.6)</td>
<td>1.9 (0.5)</td>
<td>2.0 (0.6)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Health Behavior</td>
<td>3.8 (1.7)</td>
<td>4.7 (1.8)</td>
<td>3.5 (1.5)</td>
<td>4.7 (1.8)</td>
<td>0.01</td>
</tr>
<tr>
<td>Social Norm (SN)</td>
<td>192.1 (72.3)</td>
<td>222.2 (72.1)</td>
<td>174.6 (70.2)</td>
<td>230.6 (66.2)</td>
<td>0.05</td>
</tr>
<tr>
<td>Barriers Mammo</td>
<td>3.4 (1.1)</td>
<td>3.6 (1.2)</td>
<td>3.5 (1.2)</td>
<td>3.5 (1.1)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Barriers CBE</td>
<td>3.34 (1.0)</td>
<td>3.41 (1.14)</td>
<td>3.4 (1.1)</td>
<td>3.4 (1.0)</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

Significant associations were found between behavioral intention 1(cbe) with the variables: origin (p=0.02), GSN (p=0.00), health behavior(p=0.01) and SN (p=0.05). As for the associations between behavioral intention 2 (mammography) with the variables, associations were found between the groups for: origin (p=0.04), GSN (p=0.01), attitudes (p=0.02), health behavior (p=0.00), SN (p=0.00) and a borderline difference for knowledge (p=0.07).
In tables 6 and 7, we see that in the total group, women who intended to perform mammography screening were from a European/American origin, women who have high scores in GSN and SN (in other words, women who are socially influenced), women with positive health practice behaviors, women with more positive attitudes and women with more knowledge. Women who intended to perform CBE were women from a European/American origin, women who are socially influenced and women with positive health practice behaviors. No differences were found, for both of the screening intentions, between the charedy and non charedy groups.
PREDICTING CBE AND MAMMOGRAPHY PERFORMANCE

The associations between the independent variables and the dependent variables, CBE performance and mammography performance, were examined in order to decide which variables to include in the regression model.

Table 8: THE DIFFERENCES BETWEEN PERFORMERS AND NON PERFORMERS OF CBE AND MAMMOGRAPHY

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>CBE</th>
<th></th>
<th>MAMMO</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO N(%)</td>
<td>YES N(%)</td>
<td>Pv</td>
<td>NO N(%)</td>
</tr>
<tr>
<td><strong>RELIGIOSITY:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charedy</td>
<td>28 (60.9%)</td>
<td>18 (40.9%)</td>
<td>0.06</td>
<td>28 (62.2%)</td>
</tr>
<tr>
<td>Non-Charedy</td>
<td>18 (39.1%)</td>
<td>26 (59.1%)</td>
<td></td>
<td>17 (37.8%)</td>
</tr>
<tr>
<td><strong>Family History:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7 (15.2%)</td>
<td>15 (34.1%)</td>
<td>0.04</td>
<td>7 (15.6%)</td>
</tr>
<tr>
<td>No</td>
<td>39 (84.8%)</td>
<td>29 (65.9%)</td>
<td></td>
<td>38 (84.4%)</td>
</tr>
<tr>
<td><strong>Origin:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe and America</td>
<td>17 (37.0%)</td>
<td>21 (47.7%)</td>
<td>n.s.</td>
<td>19 (42.2%)</td>
</tr>
<tr>
<td>Other</td>
<td>29 (63.0%)</td>
<td>23 (52.3%)</td>
<td></td>
<td>26 (57.8%)</td>
</tr>
<tr>
<td><strong>Marital status:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>34 (73.9%)</td>
<td>38 (86.4%)</td>
<td>n.s.</td>
<td>38 (84.4%)</td>
</tr>
<tr>
<td>Other</td>
<td>12 (26.1%)</td>
<td>6 (13.6%)</td>
<td></td>
<td>7 (15.6%)</td>
</tr>
<tr>
<td><strong>GSN:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>27 (58.7%)</td>
<td>15 (34.1%)</td>
<td>0.02</td>
<td>28 (62.2%)</td>
</tr>
<tr>
<td>High</td>
<td>19 (41.3%)</td>
<td>29 (65.9%)</td>
<td></td>
<td>17 (37.8%)</td>
</tr>
<tr>
<td><strong>ATTITUDES:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>30 (65.2%)</td>
<td>16 (36.4%)</td>
<td>0.01</td>
<td>31 (68.9%)</td>
</tr>
<tr>
<td>High</td>
<td>16 (34.8%)</td>
<td>28 (63.6%)</td>
<td></td>
<td>14 (31.1%)</td>
</tr>
<tr>
<td><strong>KNOWLEDGE:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>33 (71.7%)</td>
<td>18 (40.9%)</td>
<td>0.00</td>
<td>32 (71.1%)</td>
</tr>
<tr>
<td>High</td>
<td>13 (28.3%)</td>
<td>26 (59.1%)</td>
<td></td>
<td>13 (28.9%)</td>
</tr>
<tr>
<td><strong>Fatalistic Beliefs 1:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11 (35.5%)</td>
<td>11 (50%)</td>
<td>n.s.</td>
<td>11 (42.3%)</td>
</tr>
<tr>
<td>No</td>
<td>20 (64.5%)</td>
<td>11 (50%)</td>
<td></td>
<td>15 (57.7%)</td>
</tr>
<tr>
<td><strong>Fatalistic Beliefs 2:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8 (18.6%)</td>
<td>8 (18.6%)</td>
<td>n.s.</td>
<td>9 (21.4%)</td>
</tr>
<tr>
<td>No</td>
<td>35 (81.4%)</td>
<td>35 (81.4%)</td>
<td></td>
<td>33 (78.6%)</td>
</tr>
<tr>
<td><strong>Perceived Control:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>26 (57.8%)</td>
<td>21 (47.7%)</td>
<td>n.s.</td>
<td>27 (61.4%)</td>
</tr>
<tr>
<td>High</td>
<td>19 (42.2%)</td>
<td>23 (52.3%)</td>
<td></td>
<td>17 (38.6%)</td>
</tr>
</tbody>
</table>
Significant differences were found between the CBE performers and non performers for the variables: family history (p=0.04), GSN (p=0.02), attitudes (p=0.01), knowledge (p=0.00), health behavior (p=0.00) and SN (p=0.00). A borderline difference was found for the variable religiosity (p=0.06). For mammography performers and non performers significant differences were found for age (p=0.00) and all the above variables including religiosity (p=0.04).

Both of the screening methods have the same set of predictors except for older age which predicts only mammography. In the total group, mammography and cbe performers, were women without a family history of breast cancer, women with a high level of knowledge, women who are socially influenced, women with positive attitudes, women with positive health behavior practices and non charedy women.

<table>
<thead>
<tr>
<th>variable</th>
<th>YES</th>
<th>NO</th>
<th>Pw</th>
<th>YES</th>
<th>NO</th>
<th>Pw</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>55.8 (9.78)</td>
<td>53.1 (10.8)</td>
<td>n.s.</td>
<td>58.5 (9.2)</td>
<td>50.8 (10.2)</td>
<td>0.00</td>
</tr>
<tr>
<td>Health behavior</td>
<td>4.8 (1.7)</td>
<td>3.6 (1.6)</td>
<td>0.00</td>
<td>4.7 (1.7)</td>
<td>3.7 (1.6)</td>
<td>0.00</td>
</tr>
<tr>
<td>Social Norm</td>
<td>235.4 (59.5)</td>
<td>174.8 (73.6)</td>
<td>0.00</td>
<td>237.1 (59.8)</td>
<td>175.9 (72.4)</td>
<td>0.00</td>
</tr>
<tr>
<td>Barriers-Mammo</td>
<td>3.5 (1.2)</td>
<td>3.5 (1.1)</td>
<td>n.s.</td>
<td>3.4 (1.1)</td>
<td>3.6 (1.1)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Barriers-CBE</td>
<td>3.4 (1.1)</td>
<td>3.4 (1.0)</td>
<td>n.s.</td>
<td>3.2 (1.0)</td>
<td>3.4 (1.1)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Socio economic status</td>
<td>2.0 (0.6)</td>
<td>1.9 (0.6)</td>
<td>n.s.</td>
<td>1.9 (0.6)</td>
<td>1.9 (0.5)</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

Note: M (SD) denotes the mean and standard deviation for each category.
BEHAVIORAL INTENTION (CBE) PREDICTORS

In tables 9 and 10, independent variables which were found to have a significant association with behavioral intention 1 (cbe) (tables 6 and 7) were included in the model to find predictors of behavioral intention 1 (cbe).

Table 9: Adjusted Odds Ratios and 95% CI for Behavioral Intention CBE Amongst Both Study Groups (Full Model)

<table>
<thead>
<tr>
<th>EFFECT</th>
<th>OR</th>
<th>CONFIDENCE INTERVAL 95%</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LOWER</td>
<td>UPPER</td>
</tr>
<tr>
<td>Health Behavior</td>
<td>1.31</td>
<td>0.99</td>
<td>1.73</td>
</tr>
<tr>
<td>Origin</td>
<td>3.24</td>
<td>1.27</td>
<td>8.28</td>
</tr>
<tr>
<td>Social Norm (SN)</td>
<td>1.01</td>
<td>1.0</td>
<td>1.01</td>
</tr>
</tbody>
</table>

Health behavior (Odd ratio=1.31 95% CI: 0.99-1.73) and origin (Odd ratio=3.24 95% CI: 1.27-8.28) were found to have a positive effect on behavioral intention CBE; whereas, SN had no effect (p=0.12).
Similar results were received with the parsimonious model; Health behavior (Odd ratio=1.40
95% CI: 1.07-1.84) and origin (Odd ratio=2.92 95% CI: 1.18-7.25) were found to have a
positive effect on behavioral intention CBE.

Health behavior and origin were found to be significant predictors of behavioral intention
1 (cbe); whereas, SN was not a predictor of behavioral intention 1 (cbe).

*includes only significant variables
CBE PERFORMANCE PREDICTORS

In tables 11 and 12, the variable behavioral intention 1 (cbe) and independent variables which were found to have a significant association with CBE performance (table 8) were included in the model to find predictors of CBE performance.

Table 11: ADJUSTED ODDS RATIOS and 95% CI FOR CBE PERFORMANCE AMONGST BOTH STUDY GROUPS (FULL MODEL)

<table>
<thead>
<tr>
<th>EFFECT</th>
<th>OR</th>
<th>95% CONFIDENCE INTERVAL</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>LOWER</td>
<td>UPPER</td>
</tr>
<tr>
<td>Social Norm (SN)</td>
<td>1.01</td>
<td>1.00</td>
<td>1.02</td>
</tr>
<tr>
<td>KNOWLEDGE</td>
<td>5.05</td>
<td>1.38</td>
<td>18.53</td>
</tr>
<tr>
<td>BI1 (cbe)</td>
<td>13.73</td>
<td>3.56</td>
<td>52.90</td>
</tr>
<tr>
<td>RELIGIOSITY</td>
<td>0.82</td>
<td>0.24</td>
<td>2.78</td>
</tr>
<tr>
<td>FAMILY HISTORY</td>
<td>1.99</td>
<td>0.48</td>
<td>8.26</td>
</tr>
<tr>
<td>ATTITUDES</td>
<td>2.47</td>
<td>0.76</td>
<td>8.03</td>
</tr>
<tr>
<td>HEALTH BEHAVIOR</td>
<td>1.245</td>
<td>0.88</td>
<td>1.76</td>
</tr>
</tbody>
</table>

When SN, Knowledge, BI1, Religiosity, Family history, attitudes and health behavior were entered into the model with CBE performance as the dependent variable, SN (Odd ratio=1.01 95% CI: 1.00-1.02), knowledge (Odd ratio=5.05 95% CI: 1.38-18.53), and BI1 (Odd ratio=13.73 95% CI: 3.56-52.90) significantly increased CBE performance. Religiosity, family history, attitudes and health behavior had no influence on CBE performance.
Table 12: ADJUSTED ODDS RATIOS and 95% CI FOR CBE PERFORMANCE AMONGST BOTH STUDY GROUPS (PARSIMONIOUS MODEL)*

<table>
<thead>
<tr>
<th>EFFECT</th>
<th>OR</th>
<th>CONFIDENCE INTERVAL95%</th>
<th>P&lt;sub&gt;v&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Norm (SN)</td>
<td>1.01</td>
<td>1.00 1.02</td>
<td>0.00</td>
</tr>
<tr>
<td>KNOWLEDGE</td>
<td>5.34</td>
<td>1.60 17.78</td>
<td>0.01</td>
</tr>
<tr>
<td>BI1 (cbe)</td>
<td>14.64</td>
<td>4.07 52.66</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Similar results were found in the parsimonious model.

Predictors of CBE performance in both the full and parsimonious models, include SN, knowledge and behavioral intention 1 (cbe). Religiosity, family history, attitudes and health behavior were not found to be predictors of CBE performance.

*includes only significant variables
BEHAVIORAL INTENTION (MAMMOGRAPHY) PREDICTORS

In tables 13 and 14, the independent variables which were found to have a significant association with the variable behavioral intention 2 (mammography) (tables 6 and 7) were included in the model to find predictors of behavioral intention 2 (mammography).

Table 13: ADJUSTED ODDS RATIOS and 95% CI FOR BEHAVIORAL INTENTION MAMMO AMONGST BOTH STUDY GROUPS (FULL MODEL)

<table>
<thead>
<tr>
<th>EFFECT</th>
<th>OR</th>
<th>CONFIDENCE INTERVAL 95%</th>
<th>P&lt;sub&gt;v&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOWER</td>
<td>UPPER</td>
<td></td>
</tr>
<tr>
<td>ORIGIN</td>
<td>4.36</td>
<td>1.43</td>
<td>13.30</td>
</tr>
<tr>
<td>Social Norm (SN)</td>
<td>1.01</td>
<td>1.00</td>
<td>1.02</td>
</tr>
<tr>
<td>HEALTH BEHAVIOR</td>
<td>1.40</td>
<td>1.04</td>
<td>1.90</td>
</tr>
<tr>
<td>ATTITUDE</td>
<td>1.61</td>
<td>0.58</td>
<td>4.45</td>
</tr>
<tr>
<td>KNOWLEDGE</td>
<td>2.17</td>
<td>0.77</td>
<td>6.13</td>
</tr>
</tbody>
</table>

Origin (Odd ratio=4.36 95% CI: 1.43-13.30), SN (Odd ratio=1.01 95% CI:1.00-1.02), and health behavior (Odd ratio=1.40 95% CI:1.04-1.90) have a positive significant influence on the behavioral intention to perform a mammography. The variables attitude (p=0.36) and knowledge (p=0.14) have no significant influence on BI2.
Table 14: ADJUSTED ODDS RATIOS and 95% CI BEHAVIORAL INTENTION MAMMO AMONGST BOTH STUDY GROUPS (PARSIMONIOUS MODEL)*

<table>
<thead>
<tr>
<th>EFFECT</th>
<th>OR</th>
<th>CONFIDENCE INTERVAL95%</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LOWER</td>
<td>UPPER</td>
</tr>
<tr>
<td>ORIGIN</td>
<td>3.83</td>
<td>1.33</td>
<td>11.05</td>
</tr>
<tr>
<td>Social Norm (SN)</td>
<td>1.01</td>
<td>1.00</td>
<td>1.02</td>
</tr>
<tr>
<td>HEALTH BEHAVIOR</td>
<td>1.44</td>
<td>1.06</td>
<td>1.94</td>
</tr>
</tbody>
</table>

Similar results were received with the parsimonious model.

Predictors of behavioral intention 2 (mammography), in both the full and parsimonious models, include: origin, SN and health behavior. Attitudes and knowledge were not found to be predictors of behavioral intention 2 (mammography).

*includes only significant variables
MAMMOGRAPHY PERFORMANCE PREDICTORS

In tables 15 and 16, the variable behavioral intention 2 (mammography) and the independent variables which were found to have a significant association with the variable mammography performance (table 8) were included in the model to find predictors of mammography performance.

Table 15: ADJUSTED ODDS RATIOS and 95% CI FOR MAMMOGRAPHY PERFORMANCE AMONGST BOTH STUDY GROUPS (FULL MODEL)

<table>
<thead>
<tr>
<th>EFFECT</th>
<th>OR</th>
<th>CONFIDENCE INTERVAL 95%</th>
<th>P&lt;sv&gt;sv&lt;/sv&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LOWER</td>
<td>UPPER</td>
</tr>
<tr>
<td>Age</td>
<td>1.13</td>
<td>1.05</td>
<td>1.23</td>
</tr>
<tr>
<td>Social Norm (SN)</td>
<td>1.01</td>
<td>1.00</td>
<td>1.02</td>
</tr>
<tr>
<td>Attitudes</td>
<td>6.47</td>
<td>1.31</td>
<td>31.88</td>
</tr>
<tr>
<td>BI2 (mammography)</td>
<td>17.91</td>
<td>3.57</td>
<td>89.69</td>
</tr>
<tr>
<td>RELIGIOSITY</td>
<td>0.30</td>
<td>0.07</td>
<td>1.33</td>
</tr>
<tr>
<td>FAMILY HISTORY</td>
<td>3.68</td>
<td>0.61</td>
<td>22.34</td>
</tr>
<tr>
<td>KNOWLEDGE</td>
<td>2.97</td>
<td>0.70</td>
<td>12.64</td>
</tr>
<tr>
<td>HEALTH BEHAVIOR</td>
<td>0.96</td>
<td>0.64</td>
<td>1.44</td>
</tr>
</tbody>
</table>

Age (Odd ratio=1.13 95% CI: 1.05-1.23), Attitudes (Odd ratio=6.47 95% CI: 1.31-31.88), BI2 (Odd ratio=17.91 95% CI: 3.57-89.69) and SN (Odd ratio=1.01 95% CI: 1.00-1.02) were found to have a positive significant effect on mammography performance; whereas, religiosity, family history, knowledge and health behavior had no significant effect on performance.
Table 16: ADJUSTED ODDS RATIOS and 95% CI FOR MAMMO- PERFORMANCE AMONGST BOTH STUDY GROUPS (PARSIMONIOUS MODEL)*

| EFFECT                      | OR  | LOWER   | UPPER   | P<  
|-----------------------------|-----|---------|---------|------
| AGE                         | 1.12| 1.04    | 1.21    | 0.00 |
| Social Norm (SN)            | 1.01| 1.00    | 1.02    | 0.05 |
| ATTITUDES                   | 5.88| 1.34    | 25.85   | 0.02 |
| KNOWLEDGE                   | 3.93| 0.99    | 15.51   | 0.05 |
| BI2 (mammography)           | 12.26| 3.13    | 47.95   | 0.00 |

Age (Odd ratio=1.12 95% CI: 1.04-1.21), SN (Odd ratio=1.01 95% CI: 1.00-1.02), attitudes (Odd ratio=5.88 95% CI: 1.34-25.85), knowledge (Odd ratio=3.93 95% CI: 0.99-15.51) and BI2 (Odd ratio=12.26 95% CI: 3.13-47.95) were also found to have a positive significant effect on mammography performance with the parsimonious model.

Predictors of mammography performance, in both the full and parsimonious models include: age, SN, attitudes, knowledge and behavioral intention-mammography. Religiosity, family history, and health behavior were not found to be predictors of mammography performance.

*includes only significant variables
FINAL MODELS

Figure 1 is a diagram of the results of the final models, which show the predictors of behavioral intention 1 (cbe) and CBE performance. All of the associations are positive.

FIGURE 1

PREDICTORS OF BEHAVIORAL INTENTION 1-CBE AND CBE PERFORMANCE

HB\[\rightarrow\]BI1\[\rightarrow\]CBE

SN\[\downarrow\]

ORIGIN

Knowledge

BI 1 (cbe) is a mediator of CBE performance for the variables HB and origin.

The variables SN and knowledge have a direct effect on CBE performance.

HB= health behavior
SN= social norm (social influence)
BI 1= behavioral intention 1 (cbe)
Figure 2 is a diagram of the results of the final models, which show the predictors of behavioral intention 2 (mammography) and mammography performance. All of the associations are positive.

**FIGURE 2**

**PREDICTORS OF BEHAVIORAL INTENTION 2-MAMMOGRAPHY AND MAMMOGRAPHY PERFORMANCE**

- **HB**
- **ORIGIN**
- **SN (borderline)**

Knowledge → BI 2

Age → MAMMOGRAPHY PERFORMANCE

Attitudes → MAMMOGRAPHY PERFORMANCE

BI 2 (mammography) is a mediator of mammography performance for the variables HB, origin and SN.
The variables knowledge, attitudes, age and SN have a direct effect on mammography performance.
The primary purpose of this study was to identify the personal, social and cultural factors that may contribute to late stage diagnosis of breast cancer among Jewish ultra orthodox women by comparing health behavior, related to breast cancer screening, among ultra orthodox women in comparison to non ultra orthodox women. More importantly, to discover the factors that most significantly contribute to the explanation of motivation in relation to breast cancer screening behavior among the ultra orthodox women. Understanding the predictors of early detection practices such as breast cancer screening may help improve outcomes.

**Discussion Concerning Hypothesis 1:**

*The knowledge, attitudes and practices of Jewish charedy women concerning CBE and Mammography are different in comparison to Jewish non charedy women*

This hypothesis was partially rejected. Differences were found between the two study groups for knowledge and practices but not for attitudes.

Differences between the charedy and non charedy groups were found for the variables *knowledge, practices* (mammography and CBE), *fatalistic beliefs 2* and *social norm*; however, no differences were found between the groups for the variables *attitudes, barriers, health behavior, perceived control* and *fatalistic beliefs 1*.

Knowledge about breast cancer and screening procedures was found to be significantly lower among the ultra orthodox women in comparison to the non orthodox women. A larger percentage of charedy women (80%) have a low level of knowledge in comparison to 61% of the non charedy women who have a high level of knowledge. The lack of
knowledge among the charedy women was an expected finding since the attributes which are unique to the orthodox women in Israel include the fact that they have no access to TV programs and secular newspapers and are not exposed to the secular mass media (חזרות, 1998), where these subjects are brought up often. Between 34%-38% of the ultra orthodox population in Jerusalem, which constituted approximately 40% of the ultra orthodox families in Israel before the year 1998 (דדן, 1998) didn’t read newspapers at all and part of the population had no access to the radio (חזרות, 1998) so that information about breast cancer prevention most probably didn’t reach this population and may be the reason for a lack of knowledge on the subject.

A significantly larger percentage of the non charedy group (61%) perform mammography in comparison to the charedy group (37%). A borderline difference was found for the variable CBE performance; 39% of the charedy women perform CBE in comparison to 59% of the non charedy women. Since knowledge was found to be a predictor of mammography performance, lack of knowledge may explain the reason for significantly less performance of mammography screening by the ultra orthodox group. Gullatte (2006) found that the most common patient controlled delays in screening, among African American women, were lack of education and knowledge.

The fact that no significant differences were found between the behavioral intentions concerning breast cancer screening or attitudes between the two study groups, and that these variables significantly influence breast cancer screening performance and are predictors of mammography performance, strengthens even more the idea that a lack of knowledge is a barrier to breast cancer screening performance among the charedy group.
Fatalism influences attitudes towards illness and sometimes functions as a barrier to health promotion initiatives. Studies have highlighted fatalistic ideas linked with cancer held by some minority groups (Watts et al, 2004; Petro-Nustus and Mikhail, 2003; Spurlock and Cullins, 2006). Glanz et al (1996) found that African American people showed pessimism about the potential to prevent and cure cancers, while Sadler et al (1998) noted that Asian American women believe that even thinking about cancer may cause the disease. In this study, the majority of women don’t believe that talking about cancer will cause its onset. 77% of the charedy group and 86% of the non charedy group don’t have such a fatalistic belief. No significant differences were found between the study groups in fatalistic beliefs 1 and the variable had no influence on behavioral intentions or performance of screening procedures; therefore, it can not be considered as a barrier to breast cancer screening among the charedy women. On the other hand, the variable fatalistic beliefs 2 was found to be significantly different between the two study groups; charedy women believe that they are more protected against breast cancer than the general population because of multiple pregnancies and breast feeding. However, this belief had no influence on behavioral intentions or performance possibly because of the small sample size; therefore, it was not included in the final model. Neither of the fatalistic beliefs variables influenced behavioral intentions or performance of breast screening procedures; therefore, both were excluded from the final model.

A borderline difference was found between the two study groups for the variable Social norm (SN). Contrary to the expected, SN was higher among the non charedy group than the charedy group. In other words, social influence has a greater impact on
positive breast screening behavior among the non charedy group of women than the charedy group of women (possible explanation in next hypothesis).

The level of knowledge and practices concerning breast cancer screening procedures were significantly different among the two study groups. However, no differences were found for the variable attitudes; therefore, this hypothesis was partially rejected.

**Discussion Concerning Hypothesis 2:**

*The contribution of social and cultural factors, in predicting the intention to having a CBE and a mammography, will be stronger amongst the Jewish charedy group in comparison to the Jewish non charedy group.*

This hypothesis was rejected for both the social and cultural variables. *The contribution of social factors, in predicting the intention to having a CBE and a mammography, was found to be stronger amongst the non charedy group than the charedy group and the cultural factors were not predictors of behavioral intentions.*

Unexpectedly, a significant relationship was found, only for the non charedy group, between the social factor (GSN) and behavioral intentions (CBE and mammography). Most ultra orthodox Jews live in tightly knit communities in which there is religious and cultural congruence between the structure of their communal organizations, their families and the way individual members construe their world (Wieselberg, 1992). Members of religious communities may conform to religious norms because they fear the threat of embarrassment and possible social sanctions. They also tend to alter their lifestyles to make them consistent with those of reference group members (persons they consider worthy of emulation) (Ellison, 1998). Therefore, social influence is expected to be very strong among such a community. However, in contrast to this expectation, GSN was not
a predictor of behavioral intention 1 (cbe) or behavioral intention 2 (mammography) for the charedy group of women. This may be explained by two factors: the practice of modesty among the ultra orthodox population and a lack of breast cancer screening knowledge.

Modesty is practiced by the ultra orthodox society. It includes: a dressing code, modesty of speech, modesty of behavior (Webster, 1969) and living a modest way of life (Ganzfried, 1963). According to The code of Jewish Law, Jews are expected to “desire only those things which are actually needed for a healthy existence, and without which it is impossible to live...A man should cultivate the virtue of silence, and should converse only on matters appertaining to the study of the Torah and the necessities of life, and even when talking of the latter, he should not talk too much about them...” (Ganzfried, 1963). In the Gemara Chagiga, it is written, that when a person dies and his soul goes to heaven, when the soul is being judged, he will be shown even the small talk between him and his wife (לוצאטו תשלח). Talking about breast cancer or subjects that have to do with intimate parts of a person’s body, may be considered inmodest by the ultra orthodox women; therefore, they don’t discuss such subjects with each other; even newspapers which the ultra orthodox population reads don’t include such subjects in their articles for the same reason; therefore, there is no social influence on such matters. On the other hand, the secular society talks openly about all subjects and they are exposed to the secular mass media, where these subjects are spoken about openly and often; therefore, we find social influence on such subjects as breast cancer screening among the non charedy group.

Another explanation for GSN (social influence) not being a predictor of behavioral intention 1 (cbe) and behavioral intention 2 (mammography), is the fact that the ultra orthodox women have a lack of knowledge about breast cancer screening; therefore,
they don’t discuss the subject with their family or friends. When she is asked: “Do you think that most of the people that are important to you (significant others) will encourage you to perform breast cancer screening?” (GSN) she may think that they probably don’t know anything about this subject so they won’t encourage her and she’ll give a low score to this question. This in turn will cause GSN to have a lower score among the charedy study group in comparison to the non charedy study group.

As for the cultural factors, no significant differences were found between the two study groups and the cultural variables had no influence on either of the behavioral intentions or on performance; therefore, they were not included in the final model and are not predictors of behavioral intentions or performance among each of the study groups.

This hypothesis was rejected for both the social and cultural variables. On the contrary to the expectation, the contribution of social factors, in predicting the intention to having a CBE and a mammography, was found to be stronger amongst the non charedy group than the charedy group and the cultural factors were not predictors of behavioral intentions or performance in either of the study groups.

Discussion Concerning Hypothesis 3:

_The contribution of health behavior to the intention of having a CBE and mammography performed among the Jewish charedy women and Jewish non charedy women will be similar._

_This hypothesis was partially rejected since the contribution of health behavior to the intention of having a CBE was not similar amongst both study groups and the intention to having a mammography performed was better predicted by health behavior amongst the non charedy group of women._
Evidence suggests that attendance of women at breast screening procedures, particularly by mammography, is associated with several positive health behaviors such as regular dental check-ups, seatbelt use, eating a balanced diet, refraining from smoking and exercise patterns. These women, who attended breast screening procedures, were more likely to report awareness of health issues than women who did not perform breast screening (Hiatt et al, 2002; Rutledge, 2001; Champion, 1985; Meissner, 2004). Since the Code of Jewish Law encourages Jews “to strive to acquire habits that will help him to become healthy” (Ganzfried, 1963) as is written in Deuteronomy (4:15): “Take you, therefore, good heed of your souls.” (Ganzfried, 1963) the contribution of health behavior to the intention of having a CBE and mammography performed among the charedy women and non charedy women was expected to be similar. However, the behavioral intention to perform CBE was predicted by health behavior only in the non charedy group and the behavioral intention to perform mammography was predicted by health behavior in both of the study groups but was better predicted amongst the non charedy group of women in comparison to the charedy group of women. Therefore, this hypothesis was partially rejected. These results may also be explained by the lack of knowledge of the charedy study group. Charedy women who practice preventive health behaviors, have a lack of knowledge about breast cancer screening; therefore, they don’t have the same screening intentions as the non charedy women.

Although significant differences were found between the two study groups, religiosity was not a predictor of behavioral intention or breast cancer screening performance. Religion plays an important role in many people’s lives and has been proven to have an impact on their health (Lee and Newberg, 2005). While most studies find a salutary effect of religion on health, there has been a debate in the literature as to whether
religion has a positive, negative or no relationship with health (Holt et al, 2003; Steffan et al, 2001 and Ellison and Levin, 1998). It has been suggested that religiosity is a multi-dimensional construct, which may in part account for these mixed findings.

One of the negative effects of religion on health behavior is that certain religious groups may directly oppose certain health care interventions. Mitchell and colleagues (2002) concluded that belief in religious intervention may delay African American women from seeing their physicians for breast lumps. A study of 193 multi-ethnic adults from a community center in Los Angeles, found that African Americans were significantly more likely to believe that prayer can cure disease than were members of other ethnic groups, and that those embracing this belief were less likely to exercise regularly and to be actively involved in their health care (Holt et al, 2003).

Jewish ultra orthodox women also tend to oppose new health care interventions or interventions which conflict with their religious beliefs or are perceived as conflicting with their religious beliefs. Such interventions include: new immunizations on the market, certain prenatal procedures (Remennick, 2006) such as amniocentesis and alpha pheto protein blood test. The performance of breast cancer screening procedures does not conflict Jewish religiosity, on the contrary, religious leaders who are aware of the importance of these procedures, have encouraged women to pursue these exams. The Rambam, a well known Jewish Scholar, writes that since a whole and healthy body is the way of G-d, a person must stay away from things that are harmful to the body and to accustom oneself to things that.

So why is it that the charedy women do not perform breast cancer screening? Maybe because of their belief that they are more protected than the general population (fatalistic belief 2). However, this variable was not found to be a predictor of screening performance among the charedy group of women. Although the variables age, SN,
attitudes, knowledge and behavioral intention 2 (mammography) were found to be positive predictors of mammography performance, knowledge was the only variable with a significant difference between the two study groups. Increased knowledge has been found to be a predictor of breast cancer screening (Dundar et al, 2006; Tolma et al, 2003; Rimer, 1997; Glasgow et al, 2002; Rutledge, 2001) and knowledge was found to be significantly lower among the ultra orthodox women in comparison to the non orthodox women. This is probably the reason for charedy women performing less breast cancer screening than the non charedy women.

It is evident from the existing literature that women from certain minority ethnic groups have limited knowledge or are inadequately informed about breast cancer screening. Lack of understanding cancer screening and routine terminology has been found to be a barrier to screening especially among minority groups (Shokar et al, 2005; Buechner et al, 1991). In a study which examined osteoporosis health related behaviors in secular and orthodox Israeli Jewish women, orthodox participants' level of knowledge about osteoporosis was significantly lower and findings emphasized the need to expand education among ultra orthodox women (Werner et al, 2003). Charedy women seem to have a lack of knowledge about certain health issues including screening procedures; they seem to be unaware of these procedures and their importance to health and therefore perform significantly less mammography (charedy-36%, non charedy-61%) and CBE (charedy-39%, non charedy -59%) than the non ultra orthodox group of women; however, it appears that they would welcome information on breast health and breast cancer screening. During the interview, a large percentage of the charedy women had no knowledge of breast screening procedures. The interviewer had to give a brief explanation about these procedures in order to continue the interview and be able to fill out the questionnaire. During the explanation, women showed interest and asked
questions about the subject. We may conclude that religion is not a barrier of breast
cancer screening intentions and performance among Jewish ultra orthodox women;
rather, a lack of knowledge seems to be the barrier to these procedures.

OTHER FINDINGS

An interesting finding is that, on the contrary to the model assumptions of the theory
of reasoned action, the variable attitudes was a significant direct predictor of
mammography performance and the variable social norm was a direct predictor of CBE
performance, rather than being mediated by behavioral intentions.

The central question that has been raised concerning the theory of reasoned action's
depiction of the intention-behavior relationship concerns whether intention is sufficient to
predict behavior. The theory proposes that intention is the only significant influence on
(volitional) behavior. Any other factors that might be related to behavior are claimed to
have their effect indirectly, via intention (O'Keefe, 1990); however, whenever the
performance of some action requires knowledge, skills, resources, or other's cooperation,
or necessitates overcoming environmental obstacles, the conditions of the model cannot
be met. In such cases, the person may not be able to perform the action even if the
intention to do is strong (Sheppard et al, 1988). This may be the case with our study.
During the interview, a large percentage of women in this group had no knowledge of
breast cancer screening procedures. The interviewer had to give a brief explanation
about these procedures in order to continue the interview and be able to fill out the
questionnaire. In other words, these women couldn't possibly have intentions to perform
screening procedures when they knew nothing about them. Therefore, the conditions of
the model were not met and expected results were not achieved.
All women, regardless of their racial or ethnic origin or heritage, are at risk of developing breast cancer. Numerous studies have reported a more advanced stage of breast carcinoma at diagnosis in ethnic subgroups (Hunter, 2000; Miller, 2006); nevertheless, ethnic minority women tend to use breast screening procedures the least which may result in their lower survival and higher mortality rates (Sun et al, 2002; Foxall et al, 2001). Several studies showed ethnicity to be a significant predictor of mammography screening (Foxall et al, 2001). In this study, origin was not a direct predictor of CBE nor mammography performance; however, it was found to be a significant predictor of both behavioral intentions. In other words, behavioral intention was found to be a mediator between origin and performance.

In this study, age was found to be a predictor of mammography performance. This is consistent with reports from other countries. Many studies of screening behavior, in Israel and other countries, have shown that the age group least likely to use breast screening services is the group of women older than 60 years of age (Remennick, 2006; Antill et al, 2006). Rutledge et al (2001) in their study on knowledge, attitudes and behaviors, of women from Pennsylvania, on breast cancer detection, found that women ages 51-64 were more likely to have had a screening mammogram or had more mammograms in the prior five years than women in other age groups. On the other hand, no difference was found for CBE performance according to age. Azaiza and Cohen (2006) also found that both mammography screening and CBE were predicted by age. Older women may be more susceptible to behavioral barriers than younger women since they may misperceive their breast cancer risk and are unaware that age dramatically increases the risk of breast cancer. This misconception is clearly related to lack of knowledge of breast cancer rates in older populations (Young and Severson, 2005; Remennick, 2006). Another reason for
older women's susceptibility is their low health motivation which is typical for older women in many cultures because of their view of themselves as secondary and subservient to the needs of those close to them; that is, as givers rather than receivers of care and attention (Remennick, 2006).

Studies have shown that women with a family history of breast cancer are better performers of breast cancer screening than women without a family history of breast cancer (Antill et al, 2006). This may be due to their higher awareness on the subject of breast cancer. However, certain women who have a family history of breast cancer tend to avoid performing breast cancer screening, like the findings in this study. This may be attributed to the fact that their close contact to a family member who was afflicted with breast cancer exposed them to the suffering of such a disease and therefore, they have more fear of the disease or anything that has to do with it. During the interviews of this study, most women with a family history expressed negative feelings towards breast cancer and screening procedures. Hailey et al (2000), who examined women with and without a family history of breast cancer, found that women in the group with a family history had more negative attitudes about breast cancer (including more anxiety) but were more likely to engage in appropriate screening behavior. Women from different backgrounds may react differently to the same situation. This may explain why the group of women with a family history of breast cancer reacted differently than the group of women in Hailey's study and engaged less in appropriate screening behavior.

Another interesting finding, is that during the interviews, Jewish charedy women expressed concerns about the impact of a cancer diagnosis on their children's match to a partner in the future, since a parent with cancer is considered a less eligible family to come into marital contact with among some of the charedy families. This may also be a specific barrier to breast screening among the orthodox population.
CONCLUSIONS

Religiosity was not a predictor of breast cancer screening intentions or breast cancer screening performance. However, significant differences were found between the charedy and non charedy study groups for the variables: knowledge, CBE performance, mammography performance, social influence (SN) and the belief that charedy women are more protected against breast cancer than the general population because of multiple pregnancies and breastfeeding.

Deficits in knowledge about breast cancer screening among the Jewish ultra orthodox women were revealed in this study. A significantly larger percentage of charedy women have a low level of knowledge in comparison to the non charedy women. Charedy women also believe that they are more protected against breast cancer than the general population because of multiple pregnancies and breastfeeding and they are concerned about the impact of a cancer diagnosis on their children’s match to a partner in the future. These may be the reasons for the differences in breast cancer screening performance between the two study groups; a significantly larger percentage of the non charedy group perform mammography and CBE in comparison to the charedy group.

Global Social Norm (social influence) was not a predictor of behavioral intention 1 (cbe) nor of behavioral intention 2 (mammography) amongst the charedy group of women, whereas, amongst the non charedy group of women, Global Social Norm was found to be a positive predictor for both behavioral intention 1 (cbe) and behavioral intention 2 (mammography). In other words, social influence predicted intentions to perform screening amongst the non charedy group of women but did not predict such intentions amongst the charedy group of women. The explanation of these results may
be the practice of modesty by the charedy population and a lack of knowledge on breast
cancer screening.

The cultural factors: perceived control, cbe barriers, mammo barriers and fatalistic
beliefs 1 had no influence on behavioral intentions and no differences were found
between the two subgroups for these variables; therefore, they were not included in the
final model.

For the total group, health behavior and origin were predictors of both behavioral
intention 1-(cbe) and behavioral intention 2-(mammography). Social norm was a
predictor of both behavioral intention 2-(mammography) and mammography
performance.

Health behavior was not a predictor of behavioral intention 1-(cbe) for the charedy
group of women; however, was found to be a positive predictor for the non charedy
group. Behavioral intention 2-(mammography) was found to be predicted by health
behavior in both the charedy and non charedy groups.

Predictors of CBE performance, in the total group, were SN (social norm), knowledge
and behavioral intention 1-cbe and predictors of mammography performance were
attitude, age, knowledge, SN (social norm) and behavioral intention 2- mammography.

Differences between performers and non- performers of CBE and mammography
screening in the total group include: religiosity, family history, SN, attitudes, knowledge,
health behavior and age solely for mammography performance. Performers of breast
screening were women without a family history of breast cancer, with positive attitudes
towards breast screening, with a higher level of knowledge on breast cancer, with
positive health behavior, non charedy and are more socially influenced. Women of older
age were also better performers of mammography.
IMPLEMENTATIONS

This study is the first of its kind to explore the predictors of Jewish ultra orthodox women’s breast cancer screening behaviors. This study provides valuable information to healthcare providers as well as researchers and public health educators. The findings indicate a need for community education on early detection of breast cancer through screening. In order to provide culturally competent and appropriate care, the literature suggests that there is a need to be particularly aware of cultural beliefs and values when planning health promoting information initiatives. Attention to strategies in designing and disseminating information is also important. Nevertheless, numerous barriers to effective health promotion with women from minority ethnic groups exist, in particular in relation to breast health. It is essential that health professionals recognize and understand these barriers if they are to offer proactive, innovative care. The findings may make a significant difference in designing guidelines for culturally sensitive interventions to improve breast cancer screening behaviors such as recruiting minority health care professionals to enable better outreach to their coethnics.

Community based health promotion activities, targeted to ethnic specific groups, have been shown to increase cancer screening practices. Successful interventions among ethnic minority groups, which may be adopted for the charedy population, have included involving community members from the same ethnic group in health education (community health workers and health providers) and outreach efforts, using the ethnic media and use of existing community networks to promote cancer screening practices (Zambrana et al, 1999). The health care programs should be tailored to the unique needs of the charedy population, such as participation of female health care providers for charedy women and the health system could show more respect for privacy and
modesty. Pasick et al (1996) suggest that tailoring interventions at the community level can move us beyond simple race and ethnic categories to social factors that directly influence behavior and health, such as living environment, opportunities and barriers that effect health beliefs and ethnic-specific behaviors.

Knowledge, being an important predictor of breast cancer screening among the charedy group, must be considered as a key factor in any intervention among this group. It is critical to take into consideration the breast health information needs of these women when planning any kind of intervention. In order to design and disseminate health information about breast health and breast cancer screening for women from minority groups in a sensitive, effective and proactive manner, it is necessary that the program be culturally specific and sensitive to the specific population (Watts et al, 2004).

According to Petty and Cacioppo's model (Petty and Cacioppo, 1981), individuals are more likely to process information actively and thoughtfully (central route processing) if they perceive it to be personally relevant. Studies have shown that messages processed in this way (ie, elaborated on) tend to be retained for a longer period of time and are more likely to lead to permanent change than messages that do not stimulate elaboration (Cacioppo et al, 1994). In other words, the perception of personal relevance leads to more elaboration and thus effective health communication.

Presenting a spiritual message to a spiritual individual should result in increased perceived relevance, thus stimulating cognitive elaboration in response to the message and resulting in persuasion, attitude and eventually behavior change (Mitchell et al, 2002). In our case, we might expect that an ultra orthodox woman who received a spiritually based breast cancer early detection message might generate more positive thoughts (cognitive responses) in response to the materials, relating them to her life and agreeing with the spiritual message. In contrast, an ultra orthodox woman who received
the secular breast health message might not relate to it or elaborate on it cognitively because there may be less of a connection for her to agree with. This latter approach would likely be viewed as less personally relevant than the former. The secular approach may even be met with counterargument or negative cognitive responses (Mitchell et al, 2002). Therefore, it is extremely important to enhance knowledge to the charedy women through a spiritual message and not a secular approach.

Although religion, in this study, was not a predictor of behavioral intentions or performance, this may be an outcome of the small sample size or the definition of religion used in this study. People tend to group all the charedy people into one large homogenous cluster; however, in actuality, the charedy group is made up of many subgroups which are unique and have different customs and habits. They may even give different explanations to religious matters and have differences or similarities in cancer beliefs and cancer screening practices. Different charedy subgroups may have two different beliefs with opposing impacts; a fatalistic effect which promotes the feeling that screening will not help as G-d decides everything. This belief may inhibit participation in screening examinations. The second effect being, the promotion of screening by the belief that G-d will take care of us but you have to help yourself and be active and not passive. These religious beliefs influence women's decisions about care seeking, thus affecting the likelihood that breast cancer will be detected and treated in a timely fashion (Baron-Epel et al, 2004). There may be many more ways in which religious beliefs support or discourage compliance with recommended breast cancer screening practice. Therefore, simple targeting of broad groups may result in interventions that are not sensitive to within-group differences.

One of the well known influences on behavior among the charedy population, and all of the sub-groups, is its almost complete adherence to their religious leaders' commands.
However, there are a few problems to consider: 1. the leaders' unawareness of the importance of these breast screening procedures.

2. Overcoming the problem of ensuring modesty. If leaders decide to encourage women to perform screening activities, messages from leaders are usually written in the charedy media; however, the word "breast" for modesty reasons would never be mentioned.

Finding a way to get the message to the women in a modest way is of great importance.
LIMITATIONS OF THE STUDY

This study has several limitations. The first is that the study design is cross sectional; therefore, provides only a "snapshot in time" of the processes.

Second, although the sample size was calculated by the Power and Precision Program and was adequate enough to detect important differences between the two study groups, a bigger sample may have brought on more and better results.

Third, the sample may have not been representative of all the sub groups of the charedy population. For example, there is a very "closed" sub group of charedy women in Jerusalem called "the Chalmerim". Only two women from this group were interviewed and they had no knowledge about breast cancer screening what so ever. Had the study included more of these women the results may have been different.

Fourth, there may have been some selection bias for two reasons: 1) the researcher interviewed all of the women 2) the outpatient clinics in Bnei Berak and Jerusalem were not of the same kind. In Bnei Berak it was a clinic with patients from all of the kupot cholim; whereas, in Jerusalem women were interviewed in a clinic of only one kupot cholim.
SUGGESTIONS FOR FURTHER STUDIES

Although there is a tendency of the general population to group all of the Jewish ultra orthodox population into a large ethnic cluster, in actuality, it is a very heterogeneous group of people composed of many sub groups. Each group is unique and differs in culture and health beliefs. They may also have differences or similarities in cancer beliefs and cancer screening practices. Therefore, in order to achieve accurate results about health issues, such as breast cancer screening, it would be important to research each sub group of charedy women separately.

This study indicates a need for community education among ultra orthodox women on early detection of breast cancer through screening. Sensitivity to intragroup differences is also an important consideration in planning health education programs. Community based programs targeted to ethnic based groups appear to have been effective in increasing practices in various geographic regions (Zambrana et al, 1999) and should be expanded to include the ultra orthodox women.

Intervention studies should be conducted amongst the Jewish ultra orthodox women to encourage widespread promotion of screening. The scope of such research should involve testing the effects of a given strategy to change patient screening practices, studies to identify barriers to and facilitators of screening and surveillance to distinguish the characteristics of a population or setting that can influence the design and implementation of a screening program. Research should also focus on questions concerning how individual people respond to abnormal test results and ways to increase adherence to follow-up recommendations.
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פרופסור אוניברסיטת תל אביב
הפקולטה לרפואה "ש סאקלר
ה独一 לאפידמיולוגיה

נורמיים המッシיעים על התנאים בריאותית,קשורה לסרטן
השד, בקרב נשיא הרודייט בהשוואה לנשים שאיין הרדייט

חובר לשם קבלת התואר
"דוקטור לפילוסופיה" מאי
אסטר שטרואוס

הוגש לסנטא של אוניברסיטת תל אביב
אוקטובר, 2007
מנחים על העבודה

פרופ' יהודה לורמן-ראש החוג לאפידמיולוגיה באוניברסיטת תל אביב

פרופ' תלמה קוסניר- ראש החוג של הסוציולוגיה של הבנאים
בפקולטה למדעי הבריאות- אוניברסיטת בן גוריון

דר' יהודית ששימ- מנחת המחלקה הרפואית לעובדי המدينة
משרד הבניאות, לשכת הבניאות-מחוז תל-אביב
מרצה בכירה – החוג לאפידמיולוגיה באוניברסיטת תל-אביב
תודה
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העבודה
למנחי
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את
להביע
ברצוני:
פרופ' לૃרמן,
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קושניר,
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השכלה.
רבות
השגיחי
את
מטורת
בכנתית
עבודת
הדוקטורט.

תודה
מיוחדת
נותנה
לב
נרה
קורן,
סטטיסטיקאיית
על
ערזר
המקצועי
והעילית
בעבודת
הנוהים.

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ולסיום,
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תקציר

רקע: לשיעורי התורם העיקרי גורם הוא סרטן מחלת של מתקדם בשלב איבחון השד של מקרצינומה הסובלות נשים בקרב חסריים יהודיות.

הוכחות קיימות, המחלקה של המתקדם בשלב השד סרטן לאיבחון מ젯ים בחוקות חרדיות יהודיות ושים נשים. המחלקה הבכירה את הגורמים הקשורים לאיבוח סרטןخشוע השד לכל מחלק מצוממת שיד ומודעותכל מחלק קרשק. מחקר זה היה

הראשון בין בעד גורמים הקשורים לאיבוח סרטןخشוע השד לכל מחלק מצוממת.

המחלה'>$ך'הבקבוק של מחלק נשים חסריים יהודיות הרדיות.

有意思 המתחק: מטרת המחקר היא לחלק מחסריים נשים, הרדיות והרבותיים מחזורים לאיבוח מחלק סרטןخشוע השד בקרפ מסגרת מחקר

בריאותיו, הקשורים ל(parחון סרטןخشוע השד בקרפ מסגרת מחקר פזמות החברתיות

בריאותיו, בסיום מחקר, לגיל את הגורמים הפיזיותオススメה ל_keyboard המוצבי

ל䔲thane ברור הקשורים לסרוט karde השד בקרפ המסגרת הרדיות בחליפת untranslated

The Theory of Reasoned Action של איבי ופיסבי

השיטה: סונ המחקר היה מחקר חתך שחתך מחקר בקרפ 90 נשים מחשים מחשים קופי' במנ.

ברק ובירוישים. המבצע לכל 43 נשים הרדיות (51%) ו- 44 נשים לא הרדיות (49%). ה órgão

המשמע על הנשים מבנה היה 54.4igm (P=10.3). הנשים רואיות על בסיים של המוסך

שכל פריטים קומריסים, גורשים, השפעת חברתי, אומנות וה مجانيות בריאותיו הקשורים

לסרוט karde השד בתוכנה על התיאוריה של איבי ופיסבי.

המצאות: נמצאו מבלי Bệnh קבוצת הנשים הרדיות ל_EOF תגלה הנשים של איבי והרדיות.

במחלקת הבכירה: 2+ (0.00) (CBE p=0.06; רנתוזה; p=0.02) (CBE p=0.06; רנתוזה; p=0.02) ו- 61 נשים

ל pesos התורם יית מונע סיסטמיס על (p=0.05) ואסף היבחר (p=0.01) לא נמצאו

הבדלים בין הקבוצות למחלקות: גורשים, מחשים ל_EOF בידיות של יחס פיזי,דיא

הباحנות ברייאותי, הפיסט שליה אימונון תיפול.
ולמרות שנמצאו הבילים המשמעותיים بين הקבוצות, המשמעות דתוות. לא נמצאו燮בב של

המשנה: הכוננה בלו אע די ריה (CBE), הכוננה לטבע מומרופ, בזוע.

ביואה מומרופי.

CBE

רמל דע, בנסא סרטנ שיש וידיקות סיקור לסטרנ חש, היהת ברמה מוארת יות ברבר
השניים הדוריים להשאווה לקבוצת הבנייה היה הדורי בית千伏 משמועי (0.00=p), ונמצא

כןבעא על ביצוע CBE המומרופי. 

התרומה של השפעה בריתית, בינוני הכונה לבעז CBE המומרופי, היהת הקחה יותר
בקבר קבוצת הנשים היה הדורי לבעז קבוצת הנשים הדוריית.

ההנגות בריואית לא ממצאו חנצב את הכוננה לבעז CBE קבוצת הנשים הדוריית.

לעומת אחר, נמצאה חנצב חוביי קבוצת הנשים לא הדוריית (p=0.04). 

ההנגות בריואית ממצאו חנצב את הכוננה לבעז מומרופי קבבר קבוצת הדוריית (p=0.04)

קבוצת לא הדוריית

ונמציאו הרבדיות לא נמצאו חנצבים דינו לבוע א ביצוע בדיקות סיקור לסטרנ חש.

בכל חזק מתכובחת.

מסקנה: מחקר זה היה הראושן במעני המנסה לארח מנשבים לתרומת בריואית
הקשורה לסטרנ שיש בקבר מעשה הדוריית בהשאווה של kvinna שיאני הדוריית. מחקר זה מספק

מידות חווית לא Elves מרוככת הבריאות,لوحקים למסתכלים בנתונים העוברים ל#$י

منهجי התערבותים הרצויים כי לسفر התרומת לקשורות לאיבוחוים לקדש של

סרתט השד.