BREAST CANCER IN THE ASHKENAZI JEWISH POPULATION OF SOUTH AFRICA: SOME PSYCHOSOCIAL ISSUES.

Cheryl Lisa de Vos

A research report submitted to the Faculty of Health Sciences, University of
Witwatersrand, in partial fulfilment of the requirements for the degree of
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DECLARATION

I, Cheryl Lisa de Vos, declare that this research report is my own work and I have given full acknowledgement to the sources I have used. It is being submitted for the degree of Master of Science in Medicine at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination at this or any other University.

....

Cheryl Lisa de Vos

......day of..........1999

I dedicate this thesis to all the Ashkenazi Jewish women who have suffered as a result of breast cancer.

PUBLICATIONS AND PRESENTATIONS

de Vos C, Rapoport B and Kromberg J. Psychosocial issues and breast cancer in South African Ashkenazi women. In: Abstracts from the Seventeenth Annual Educational Conference of the National Society of Genetic Counsellors. October 24-27 1998. Denver, Colorado. *Journal of Genetic Counseling.* 1998; 7:453-454.

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ABSTRACT

Specific mutations in the breast cancer susceptibility genes 1 and 2 (BRCA1 and BRCA2) have been found to be the cause of breast cancer (BRCA) in about 20% of cases in the Jewish population. Affected women often experience a variety of emotional and social issues, which need to be addressed. The aim of this study was to investigate some of the psychosocial issues associated with BRCA, the knowledge of and feelings about it, its treatment and screening strategies, and attitudes to genetic testing in Ashkenazi Jewish women. The subjects were women aged ≥ 18 years with BRCA (30 subjects, Group A), or who had an affected first-degree relative (FDRs) (9 subjects, Group B), or without a family history of BRCA (30 controls, Group C). They were ascertained from the Genetic Counselling files held at the South African Institute for Medical Research (SAIMR), the Medical Oncology Centre of Rosebank, Johannesburg, the Reach for Recovery organisation, the patient network, or, in the case of the controls, from the records of the Union of Jewish Women (UJW). A schedule of questions was specifically constructed (and checked in a pilot study) for use in this study and the Beck Depression Inventory (BDI) was selected to measure depression. A face-to-face interview was conducted with each subject and the schedule and BDI were completed. The average age of the subjects was 57 years, 36 years and 52 years in groups A, B and C respectively. The average age of Group A subjects at diagnosis was 48.7 years and all had had surgery. The subjects' knowledge of the genetics of BRCA scored between moderate and good. Many Group B subjects overestimated the lifetime risk of developing BRCA. Almost half (46.7%) the Group A women reported shock as the dominating emotion after diagnosis and they were very concerned that their children would develop the condition (43.3%) or that the cancer would metastasise (26.7%). Only 13 (26.5%) of the medical practitioners involved in the care of the Group A subjects in this study discussed emotional issues with their patients. The group B subjects, after the diagnosis was made in a relative, reported fear of developing BRCA (5), fear of dying of the disease (5), and feeling out of control (4). Most subjects (87%) felt that women with BRCA and their relatives would benefit from professional counselling. Less than 25% of subjects in all groups undertook regular breast self-examination (BSE), but one-third of group A subjects discovered a lump themselves. Medical practitioners recommended mammograms in older women to all Group B subjects and most (76%) of the Group C subjects. However, regular CBE and BSE were only recommended rarely. Half the Group A and Group B subjects stated that they would request genetic testing if it were available locally, mostly to determine whether their children were at risk, or, in the case of FDR's, whether they should improve their vigilance. In order for holistic treatment to be given to affected women and their relatives' psychosocial and genetic counselling issues should be addressed. Also, the findings suggest that women require further education on the importance of using available screening strategies for the condition and on the possibility of genetic testing for BRCA susceptibility in high-risk families. However, such testing needs to be carefully supported and monitored to prevent or ameliorate any adverse psychological or social responses.

The study has given an insight into the knowledge of BRCA genetics, the emotional burden, and attitudes to screening and testing possibilities, associated with BRCA in the local Ashkenazi Jewish population.

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GLOSSARY

Adjuvant therapy Back up or additional therapy. The word is used when talking about further treatments for cancer, e.g., chemotherapy (Ireland and Ireland, 1993)

Areola The circular darker/pinker area of skin surrounding the nipple (Ireland and Ireland, 1993)

Axilla The armpit (Stoppard, 1996)

Chemotherapy Treatment by one or more drugs which are capable of destroying cancer cells and other rapidly reproducing cells such as hair and marrow (Ireland and Ireland, 1993)

Hormone Replacement Therapy (HRT) Hormonal treatment used to replace oestrogen during and after the menopause (Ireland and Ireland, 1993)

Lobule The glandular part of the breast where milk is produced (Stoppard, 1996)

Lumpectomy Surgical removal of a breast lump (Ireland and Ireland, 1993)

Lymph nodes The junctions of the lymphatic system that becomes enlarged if fighting an infection or cancer (Stoppard, 1996)

Lymphoedoma Swelling, pain, and stiffness of the arm and hand, due to interference with the lymphatic drainage of the axilla following surgery and more often radiotherapy. It is now fairly rare (Stoppard, 1996)

Mammogram Specialised X-ray of the breast (Ireland and Ireland, 1993)

Mastectomy Surgical removal of the breast. In a radical mastectomy chest-wall muscles are removed as well (Ireland and Ireland, 1993)

Metastasis Spread of cancer to a distant part of the body where it forms a secondary tumour (Stoppard, 1996)

Oncogene A genetic locus originally identified in RNA tumour viruses which is capable of transformation of the host cell (Walker, 1989)

RING finger DNA binding structure that is formed by a loop of amino acids between two cysteine residues (Weitzel, 1996)

Secondaries Cancers in other parts of the body which develop from cells spread from a primary tumour (Ireland and Ireland, 1993)

Systemic Relating to the whole system or whole body (Ireland and Ireland, 1993)

Tamoxifen The first option for hormone therapy is tamoxifen, a drug that blocks the stimulatory effect of oestrogen on breast-cancer cells. It may also have other actions, which may stimulate the body's own natural anti-cancer defences (Stoppard, 1996).

ABBREVIATIONS

BDI Beck depression inventory

BM Bilateral mastectomy

BRCA breast cancer

BRCA1 Breast cancer susceptibility gene 1

BRCA2 Breast cancer susceptibility gene 2

CANSA Cancer Association of South Africa

FDR First-degree relatives

KB Kilobases

L Lumpectomy

NCI National Cancer Institute

PM Prophylactic mastectomy

PO Prophylactic oophorectomy

SAIMR South African Institute for Medical Research

TS Tumour suppressor gene

UJW Union of Jewish women

UK United Kingdom

UM Unilateral mastectomy

USA United States of America

WITS University of the Witwatersrand

CHAPTER ONE - INTRODUCTION

1.1 Motivations for the study

Breast cancer (BRCA) is a potentially fatal condition. However, the earlier it is detected the better the survival rate of affected individuals is. It is, primarily, a disease of women but occasionally men present with BRCA. The literature suggests that Ashkenazi Jewish women carry a higher risk for inherited susceptibility to BRCA (Egan *et al.*, 1996; Struewing *et al.*, 1997) than other women and for this reason this group was chosen for investigation in the present study. Breast cancer has become a 'hot issue' and the media coverage of this condition has increased dramatically. In addition in South Africa the month of October each year is dedicated to BRCA awareness. Most of the research on BRCA has focused on the associated medical (Fletcher *et al.*,,1993; McPherson *et al.*, 1997) and genetic aspects (Hall *et al.*, 1990; Easton *et al.*, 1993) but in countries such as The United States of America (USA) some of the psychosocial aspects of the condition have been studied. However, in South Africa, very little research has been dedicated to this aspect of the condition.

Breast cancer can have devastating effects on women diagnosed with this condition and the people around them. Many women equate BRCA with breast mutilation and it was the strong feelings associated with the condition that aroused the interest of the researcher in pursuing this line of research. With the discovery of the breast cancer susceptibility genes 1 and 2 (BRCA1 and BRCA2) and the identification of gene mutations specific to the Ashkenazi Jewish population, it is possible to test for BRCA susceptibility within this population group. However genetic testing for this susceptibility is fraught with the unknown. An individual with a positive test is not guaranteed of developing BRCA and an individual with a negative result is not definitely clear of the condition. As BRCA cannot be prevented, the benefits of knowing one's status is questionable as all that can be offered to those testing positive is additional screening and perhaps prophylactic surgery. In addition, there are indications that mental distress may dominate the lives of some woman who receive a positive result (Lerman, 1994). It is also feared that those testing negative may drop out of screening programs because of wrong and subjective interpretation of the results (Streuwing *et al.*, 1995; Lerman *et al.*, 1996).

Due to the complexities of genetic testing it is essential to determine the attitudes and projected responses to such testing before it becomes commercially available in this country. In order to offer a comprehensive service to women affected by BRCA it is necessary to determine what women know about the condition, where they obtain their information, what the psychological outcomes of such a diagnosis are and how it affects family members and friends.

1.2 Aims of the study

The general objective was to investigate some of the psychosocial issues associated with BRCA in the Ashkenazi Jewish community.

The specific aims were to determine:

1) The knowledge of cancer genetics in women with breast cancer and those who have a first-degree relative (FDR) diagnosed with breast cancer.

2) Women's attitudes and feelings about BRCA, its diagnosis and treatment.

3) The screening methods for the detection of BRCA recommended by medical practitioners and the attitude and use of these methods by Ashkenazi Jewish women.

4) The attitudes and projected responses of women towards genetic testing for the breast cancer susceptibility genes

1.3 Scope and setting of the study

The women included as subjects in this study were all Ashkenazi Jews, over the age of 18 years and living within the Gauteng region. Initially it was hoped that a sample size of 50 women diagnosed with BRCA, 50 first-degree relatives (FDRs) and 50 control women without BRCA could be ascertained for this study. The study was based in the Department of Human Genetics, South African Institute for Medical Research (SAIMR) and the School of Pathology, University of Wiwatersrand (WITS), Johannesburg, where the researcher was a student and where the necessary infrastructure was available.

1.4 Literature Review

1.4.1 The Breast

"From the earliest civilisations, the breast has been a tremendously potent image of womankind. Through war and peace, fashion, religion, art and literature it has been revered, praised, lusted after, reviled, and exploited. A powerful representation of beauty, the breast remains a most compelling symbol of our femininity" (Stoppard, 1996).

A woman's breasts undergo some of the most apparent and drastic development of any part of her body. These secondary sexual organs are located on the anterior surface of the thorax and overlie the pectoral muscles. Breasts are made up of mammary glands (lobes and ducts), connective and adipose tissue (Moore, 1985). Breast development begins early in the embryo with the mammary glands appearing in the sixth week after conception. The new-born infant has depressed and poorly formed nipples that rise from mammary pits soon after birth due to the proliferation of surrounding connective tissues. Only the main milk (lactiferous) ducts are formed at birth, and the mammary glands remain underdeveloped. At puberty (12-15 years of age) female breasts enlarge rapidly because of further development of mammary glands and the deposition of fat. The amount of fat surrounding the glands determines the size of the breasts (Moore, 1985). If pregnancy occurs, mammary glands complete their development probably due to raised oestrogen and progesterone levels (Moore, 1985).

1.4.2 Cancer

People affected with cancer have described feeling as though an alien force has invaded their body, yet malignancies arise from their very own tissue (Cavenee and White, 1995). Characteristically, cancer cells exhibit uncontrolled growth, are immortal and have the ability to spread or metastasise from their original site to other locations in the body. These cells arise from a series of alterations in the expression of genes, that lead to transformation from the normal to the malignant cell (Bodmer, 1994). Knudson (1971) pointed out that if a cancer is due to a series of genetic alterations at the somatic level, then some of these changes could take place in the germline. The implications of this are that changes can be inherited and may be present in every cell of the body. Cancer is a multistep process and individuals that inherit a germline mutation are already one step along the carcinogenic pathway, and it is this head start that can be the basis for a "dominant inherited cancer susceptibility" (Bodmer, 1994). An additional somatic mutation in the same gene could 'knock out' that gene's function completely. The second event leading to neoplasm could be caused by a direct mutation within the gene itself or could involve a mitotic crossover or loss of all or part of the chromosome containing the remaining functional gene (Murphy and Bray, 1997). This is known as Knudson's two-hit hypothesis.

1.4.3 Breast Cancer (BRCA)

Breast cancer is the most common cancer in white South African women. About 1 in 36 women in the country are likely to develop BRCA at some point during their lifetime (Sitas *et al.*, 1998). According to the National Cancer Registry (NCR) study completed in 1997, the lifetime risk of developing BRCA for Asian, Black, Coloured, and White women was 1 in 21; 1 in 81; 1 in 63; and 1 in 13 respectively (Sitas *et al.*, 1998). There appears to be a six-fold increase in risk for white women compared to black women.

Initially the suggested increased risk for BRCA among Ashkenazi Jewish women was attributed to their lifestyle and reproductive patterns (Egan *et al.*, 1996). However, it has since been discovered that members of this population group are more likely to inherit mutations in the BRCA susceptibility genes than women of other ethnic groups (Egan *et al.*, 1996).

1.4.4 Ashkenazi Jewish women

Jewish Law states that anyone born to a Jewish mother or who has converted to Judaism, the Jewish religion, is considered to be Jewish (Cohen, 1979). In broad terms Jews are divided into two groups, the Ashkenazim and Sephardim. The Ashkenazim include the Jews of central and Eastern European and their descendants. The Sephardim include the Jews of Spain and other Mediterranean countries. This report focuses on the South African Ashkenazi Jews.

The Jewish community of South Africa, as it exists today, was largely fashioned by the immigration of Eastern European Jews, between 1881 and 1910 (Gershater, 1955) as illustrated on Table 1.1.

The mass immigration of eastern European Jews to South Africa resulted from the political oppression, economic hardship and overpopulation imposed on them (Saron, 1955), as well as the force of the tales of opportunity and wealth awaiting immigrants to South Africa. It has been estimated that 70% of the Jewish immigrants from Eastern Europe were Litvaks or Lithuanian Jews (Hellig, 1984). Thus, the South African Jewish community was largely homogeneous, retained many characteristics of the country of origin (Goldberg, 1984) and was comprised mainly of Ashkenazim.

Johannesburg and its surrounding areas have accommodated at least 62% of South Africa's Jewish population. Another 25% live in Cape Town and the rest, for the most part were concentrated in major urban centres such as Durban, Port Elizabeth, Bloemfontein and East London (Jenkins *et al.*, 1977; Hellig, 1984). According to some of the remaining South African Jews, many members of their community have recently moved to Cape Town or have emigrated mainly to their homeland (Israel), or to Canada, USA and Australia, due to politico-economic factors.

Table 1.1 Jewish immigration to South Africa 1840-1942*

Year	No. Immigrating	Historical Event
1840-1880	4000	Pogroms**
1881-1900	*23000*	*Pogroms*
1901-1914	21377	End of Pogroms Beginning of WWI
1915-1920	907	
1921-1925	4630	
1926-1930	10044	Pre-WWII
1931-1935	4507	
1936-1939	5300	
1940-1942	2000	
Total	75765	

*Table adapted from Goodman, 1979.

** POGROMS – During the late 1800's Poland and Russia abandoned their policy of toleration for the Jews and as a result thousands of Jews in these countries were killed in a series of massacres called Pogroms (Jick, 1984). Millions of Jews fled Eastern Europe to escape the pogroms and many of these Ashkenazi Jews found their way to South Africa.

1.4.4.1 Genetic disorders in Ashkenazi Jews

Certain genetic disorders, such as Tay-Sachs and Gaucher's disease, are found more commonly in Ashkenazi Jews because of their history, cultural and genetic make-up (Goodman, 1979). The interaction between the environmental and genetic factors implicated in BRCA is still uncertain.

Two of the mechanisms implicated in the increased frequency of certain genes in Ashkenazi Jews are genetic drift and founder effect. Walker (1989) defined genetic drift as "the process by which gene frequencies are changed by the chances of random sampling in small populations". It occurs as each generation is finite in size and possesses a finite sample of genes from a previous generation. The smaller the size of any generation the more evident the effects of genetic drift will be. Genetic drift may occur if a new community is founded by a small number of persons from a larger parent population (Stine, 1989). In such a case it is unlikely that the migrant gene frequency will differ from the gene frequency of the parent population (Stine, 1989). Founder effect is a special feature of drift in which some genes carried by the founder of a new community will by chance differ in frequency from those in the original, or parent population (Goodman, 1979). The gene pool in the new community will soon diverge from that of the parent population due to new revolutionary and environmental pressures and sampling errors (King, 1972).

Early Jewish settlements in Poland and Lithuania were composed of many small groups of no more than a handful of families. These groups were relatively isolated genetically, from other Jewish communities as well as their gentile neighbours. Therefore, the historical background of Ashkenazi Jewry, with its numerous small founding groups and relative genetic isolation, fits well with the features of genetic drift and founder effect and accounts for the establishment of the now characteristic Ashkenazi Jewish diseases. As these founding groups grew in size, became more mobile, and were subjected to diluting forces, the frequency of these genes were diluted, although never to the low frequencies observed in the surrounding non-Jewish populations. This acts as a testament to the cohesive nature of Ashkenazi Jewry (Goodman, 1979).

1.4.5 Risk factors for BRCA

Although BRCA may be regarded as a genetic disease at the level of the cell (van Rensburg, 1997) the exact cause of this disease is unclear. Breast cancer has a multifactorial aetiology, with multiple genetic and environmental factors interacting in the development of malignancies (Hoskins *et al.*, 1995). The general lifetime risk of 1 in

13 (for South African white women [Sitas *et al.*, 1998]) of developing BRCA may be increased or decreased by a variety of different factors. These factors include: age, family history, age at menarche, whether a woman has given birth, age at time of first birth, breast-feeding and age and at menopause (Sattin *et al.*, 1985; Barr *et al.*, 1997; Sitas *et al.*, 1998). Other factors influencing individual risk are exposure to hormones (oral contraceptives and hormone replacement therapy), alcohol consumption, smoking, and exposure to radiation, weight and diet, degrees of stress, benign breast disease and other cultural influences.

Age and family history still remain the two most important risk factors for BRCA. Breast cancer is uncommon in younger women, and most cases are reported in post-menopausal women (Schneider, 1994; Philips *et al.*, 1999). Sixty percent of BRCA cases are reported in women aged 60 years or older (Silliman *et al.*, 1998). Estimated risks of women, in the United States of America, developing BRCA by specific ages can be seen on Table 1.2.

Table 1.2 Age related risk for the development of BRCA*

Age	Risk
By age 25	1 in 19 608
By age 35	1 in 622
By age 50	1 in 50
By age 65	1 in 17
By age 85	1 in 9
Ever	1 in 8

*Adapted from Feuer *et al,* 1993; Schneider, 1994.

The lifetime risk for women (to age 95) in the Western world is 1 in 8 (Collins, 1996). As shown on Table 1.2, the risk of BRCA increases gradually with only women aged 85-95 having a 1 in 8 (12%) lifetime risk of developing BRCA (Schneider, 1994).

A family history of BRCA may indicate that a woman has an inherited susceptibility for the condition in her family. The majority of breast cancers occur sporadically, but approximately 5-10 % of all cases are familial in nature (Claus *et al.*, 1991). Familial BRCA is characterised by: a young age at onset (Greene, 1997); an increased risk of bilateral cancer (Petrakis, 1977); one or more first or second-degree relatives with breast or ovarian cancer (Greene, 1997; Narod, 1994); and in some cases BRCA in men (Hall *et al.*, 1990). A detailed family history provides useful information in attempting to determine the nature of BRCA in a family. On the basis of a family history families can be classified as 'moderate' or 'high' risk (Hoskins *et al.*, 1995). Moderate-risk families have a less striking family history, absence of ovarian cancer and an older average age of onset at time of diagnosis. High-risk families are characterised by the presence of multiple cases of BRCA in close relatives that appear to follow an autosomal dominant pattern of inheritance, have an early age at onset, and may be associated with ovarian cancer (Hoskins *et al.*, 1995).

1.4.6 Overview of the diagnosis of BRCA

Experts do not yet know how to prevent BRCA, although there are risk factors that can be avoided and several means of detecting and diagnosing this condition. The earlier BRCA is detected the better the chance for effective treatment and recovery (Kessler, 1994).

(1) Methods of detection or diagnosis

The methods for the detection of BRCA include breast self- examination (BSE); clinical breast examination (CBE); and screening with mammography.

Breast self- examination and clinical breast examination

Breasts come in all shapes and sizes and do not remain the same throughout a woman's life. Breast examinations for unusual lumps can be done either by women themselves (breast self-examination) or by a physician (clinical breast examination) and most tumours are first detected by the women themselves (The Cancer Association of South Africa (CANSA), 1998). The Cancer Association (1998) recommends that women examine themselves once a month and have a clinical examination (physical examination by a health professional) every 1-2 years.

Mammography

Mammography is a radiographic technique used to detect breast masses (Moore, 1985). There is strong evidence showing that regular mammograms for women between the ages of 50 and 69 years leads to a reduction in BRCA mortality of 25%-30%, 10-12 years later (NCI/PDQ, 1998). In general, scientific evidence supports both BRCA screening with mammograms alone and/or with clinical breast examinations for women 50 years and older (NCI/PDQ, 1998). If a lump is detected a biopsy can be performed and breast tissue can be removed either by needle biopsy (a needle is inserted into the lump and fluid is withdrawn) or by excisional biopsy (the lump is surgically removed) (Barr *et al.*, 1997). A pathologist then determines whether the breast tissue is cancerous. If this is the case, further treatment is required.

(2) Reaction to a diagnosis of BRCA

A woman confronted with a BRCA diagnosis is likely to experience a kaleidoscope of emotions (Renneker and Cutler, 1952; Schomer and Horwitz, 1993). She may have very strong feelings that are part of the normal response to a BRCA diagnosis. The most common of these feelings are: shock, fear, grief, depression, powerlessness, vulnerability, guilt, betrayal, self-hate, anxiety, sadness, loneliness, shame and resentment. The many issues faced by these women include: fear of death, distorted body image, insecurity about their sexuality, isolation, communication problems with family members, friends and health professionals, and other relationship problems, reduced feelings of self-worth, fear of recurrence, femininity and treatment concerns, fatigue, and other side effects (Rennecker and Cutler, 1952; Kemeny *et al.*, 1988; Fallowfield and Hall, 1991; Schomer and Horwitz, 1993).

1.4.7 Treatment for BRCA

Following a diagnosis the patient should ideally meet with her family, family physician, oncologist, radiotherapist, general surgeon, plastic surgeon, and psychologist or counsellor, and in combined consultation they should determine the best and most complete therapeutic approach (Shaer, 1993).

Breast cancer is generally referred to as early or advanced, this reflects whether the condition is operable or not, and determines the type of treatment. ‘Early’ usually encompasses Stages I and II and ‘advanced’ Stages, III and IV. These stages are defined as follows:

STAGE I: Uncontrolled growth, which starts in a single cell

STAGE II: Localisation as a mass

STAGE III: Invasion of local tissues

STAGE IV: Metastasis (spread) to other parts of the body via blood stream or lymph systems or both (Barr *et al.*, 1997).

These terms are also used to reflect the aggressiveness of the tumour. Some patients do quite well with large ulcerated cancers that have been present for some time but which are not rapidly growing, and have not spread. A small primary tumour, on the other hand, can spread quickly to other organs if it is very aggressive.

In most cases local conservative therapy is achieved by the use of surgery and the extent of this surgery depends on the size of the tumour, its position, whether it forms a discrete lump, and how aggressive it seems to be (Barr *et al.*, 1997). There are basically two types of surgery: mastectomy (removal of the entire breast) or lumpectomy (removal of the lump). Mastectomy used to be the only option available but during the mid to late 1970's, there was a move towards more conservative surgery (Fallowfield and Hall, 1991). In certain situations mastectomy may still be the treatment of choice, or the only choice available. The amputation of the breast, however, may cause a profoundly negative effect on feelings of femininity, self-esteem and body image, resulting in psychological and sexual dysfunction (Rennecker and Cutler, 1952). Patients are generally still suffering from the shock of having been diagnosed with BRCA when faced with the knowledge that they may have to undergo the 'defeminising' operation of mastectomy (Shaer, 1993). Therefore it is important for women facing surgery to be educated on the possibility of breast reconstruction as an alternative to be considered either at the time of surgery or at some future date, thereby assisting them to confront the pre- and post-operative fear of disfigurement. The other procedure, a lumpectomy can be performed if the lump is about 4cm (over 4cm in large breasts) in diameter, not central or aggressive, with no evidence of spread. The surgeon removes the lump and some of the surrounding tissue leaving the remainder of the breast in tact. Radiation therapy always follows a lumpectomy. It seems that levels of anxiety and depression are about the same regardless of the type of surgery, but women who have had mastectomies face more problems regarding clothing and self-image (Ganz *et al.*, 1992). Fallowfield and Hall (1991) stated that with lumpectomies there might be greater levels of anxiety around the possible recurrence of BRCA.

Once surgery is over, a woman diagnosed with BRCA moves into the next phase of treatment. By the time that BRCA is diagnosed, some of the cancer cells may have spread beyond the lump or the breast itself, and they may be left behind after surgery. If these cells are allowed to grow, cancer could come back at the same site (local recurrence) or could spread to form secondary tumours elsewhere in the body (metastases). For this reason additional forms of treatment (adjuvant therapy) are often given to destroy remaining cancer cells (Barr *et al.*, 1997).

In radiation therapy doses of high-energy X-rays are beamed accurately at the breast area of the chest wall and occasionally the axilla and the area above the collarbone (Stoppard, 1996). An average course of radiotherapy is given over a six-week period, followed by a booster dose of radiation to completely destroy any remaining cancer cells (Ireland and Ireland, 1993; Stoppard, 1996). As with most other treatments for BRCA, there are both physical and emotional side effects associated with radiation therapy. Physical side-effects include: mild to severe 'sunburn', itching, tingling, change in skin pigment, change in breast tissue consistency, inflammation of the lining of the oesophagus, loss of hair under the arm, and fatigue. Women also may not wash the radiated area. As always any body changes can elicit an emotional reaction such as anger, sadness or fear. The most distressing physical side effect is often fatigue. The sudden depletion of energy can leave women feeling depressed, angry, in despair, impatient, out of control and self-critical and while these are normal responses they may act to magnify the impact of the radiation-induced fatigue (Kaye, 1991).

Chemotherapy and hormone therapy aim to kill off cancer cells throughout the body, thereby preventing any cells that have migrated from the original tumour from causing metastases in organs such as lungs, liver, and bones. Chemotherapy can be administered either orally or by injection and it is what many cancer patients fear most. The fear stems from the many horror stories about this treatment or what Kaye (1991) refers to as 'chemythology'. Some of the side effects most often experienced by patients undergoing this treatment include tiredness, nausea, hair loss, loss of appetite, mouth soreness, pain, sickness, sore eyes, weight change, hot flushes, night sweats and depression (Tierney *et al.*, 1991). Hair loss can have a devastating effect on women. First they may have dealt with the loss of a breast(s) and then the loss of their hair. For some women looking at themselves in the mirror can be an ordeal, as they are reminded that something precious is being taken from them. Also public appearances can be stressful. Many patients may feel naked, exposed, unfeminine and vulnerable (Kaye, 1991). In 1991, the study by Tierney and associates revealed that fatigue was one of the more unexpected side effects experienced as a result of chemotherapy. Many women reported that 'giving in to tiredness' and not being able to cope with work and domestic responsibilities resulted in additional anxiety and stress.

The aim of hormone therapy is to manipulate the hormone environment to prevent the cancer cells from thriving and it takes the form of oestrogen blockers. The most frequently used drug is tamoxifen, which blocks the stimulatory effect of oestrogen on BRCA cells (Kessler, 1994). Chemotherapy in premenopausal women and tamoxifen in postmenopausal women each reduces the relative risk of death by approximately 25% at 10 years (Barr *et al.*, 1997).

1.4.8 Psychological healing

Psychosocial has been defined as the " interaction between characteristics of the social structure and the psychology of the individuals; 'the person-in-his-situation'. The situation refers to the environment of the individual and includes family, friends, employer, teacher and others" (Hollis, 1964). With the increase in genetic knowledge and the growing possibility of genetic testing for many genetic conditions it is essential that the psychosocial impact of genetic disorders be investigated. Within the field of genetic counselling studies focus on knowledge, risk perception and decision-making processes of affected individuals and their families (Hsia and Hirschhorn, 1979). The psychosocial adjustment to predictive testing for late onset conditions is also being investigated for many conditions such as breast cancer (Croyle, 1999) and Huntington's disease (Lawson *et al.*, 1996). Studies have also been undertaken on extended families of affected individuals and genetic knowledge in general (Evers-Kiebooms *et al.*, 1992). This study focuses on the psychosocial issues that arise as a result of a diagnosis of, treatment, screening, and genetic testing for breast cancer.

Breast cancer and its treatment can have profound effects on women. However, it is uncommon for women to request psychological assistance. Family and friends tend to focus on positive and hopeful aspects, as they are removed from the personal trauma of the situation. This may compound feelings of anxiety and isolation in affected women already experiencing negative thoughts about themselves, which may prevent them from expressing their true feelings. Between 25 and 35% of all women with BRCA develop depression or anxiety at some stage of their treatment (Fallowfield and Hall, 1991). Furthermore it is normal for women with BRCA to experience fear of recurrence and death, to feel loss of control and changes in interpersonal relationships (Freddette, 1995). Therefore, even women with some personal resources to deal with their trauma may benefit from seeing a professional counsellor. In addition, women are faced with the probability of disfigurement, which involves two separate issues. The first is how a woman feels about herself, and the second is her fear about being unacceptable to others. Many women fear rejection by their partners because of their altered appearance (Kaye, 1991). These feelings need to be heard, understood, accepted, and treated with compassion in order to be resolved. It may also be helpful for women to realise that their reactions are normal and that others have survived the ordeal. Peer groups can play an invaluable role in supporting the patient and providing some psychological healing (Cope, 1995).

1.4.9 Women with a first- degree relative (FDR) diagnosed with BRCA

Thus far, the focus has been on women diagnosed with BRCA. Another group of women concerned about developing BRCA is those who have a family history of BRCA, especially those with affected first degree-relatives (FDR). A positive family history is the most important determinant of a woman's risk of developing BRCA. Having one affected FDR increases the risk twofold to threefold over that of the general population (Anderson, 1972). The earlier the age of onset and the greater the number of affected first-degree relatives, the higher the probability that a positive family history results from a predisposition to BRCA (Lerman, 1994) as shown on Table1.3.

Table 1.3 Risk for family members with a relative(s) affected with BRCA*

Risk Factors	Typical Relative Risk
Overall (normal) risk	12.5%**
1st – degree relative>60 years	1.4 X normal risk
1st – degree relative<60 years	2 X normal risk
2 affected 1st –degree relatives	4 X normal risk
No 1st degree relative	6.25%

*Adapted from Barr *et al.*, 1997. ** Normal risk given was based on 1in 8 risk for women in the Western world (Collins, 1996).

First-degree relatives of affected women may have a variety of emotional responses, both positive and negative, to their risk of developing BRCA (Schneider, 1994). Many FDRs may feel tremendous anger at their uncertain future. They may experience fear of finding a lump, of disfigurement and/or death. Guilt is a normal response when other family members develop BRCA and it is termed 'survivor guilt' (Peters and Stopfer, 1996). First-degree relatives may feel that they are unable to control whether they will develop the condition or not, and this lack of control may affect other aspects of their lives leading to feelings of vulnerability and low self-esteem (Schneider, 1994). The current reaction of a FDR may be coloured by past experiences, such as biologic proximity and emotional ties to affected relatives, beliefs and fears about cancer, history of childhood trauma, loss or abuse, major life transitions, outcomes of cancer diagnoses and family communication styles (Schneider, 1994; Peters and Stopfer, 1996). The age of a daughter during her mother's illness can be significant. Those who are adolescents at the time of their mothers' diagnosis may have more difficulties than other women later in life, especially regarding the resolution of their own risk and sexuality issues (Peters and Stopfer, 1996). It has been found that if a FDR shares a resemblance with an affected relative, this may cause her to assume that she will also develop BRCA (Peters and Stopfer, 1996).

1.4.10 Genetics and BRCA

It appears that some population groups may be more predisposed than others to BRCA confirming the belief that there is a genetic basis to this type of cancer and that founder effect may be present. Scientists have begun to unravel some of the major susceptibility genes involved in the development of BRCA.

Breast Cancer Susceptibility Gene 1 (BRCA1)

Breast Cancer Susceptibility Gene 1 (BRCA1) was mapped to chromosome 17q by linkage analysis in large families containing multiple affected women (Hall *et al.*, 1990); specifically the gene was localised to chromosome 17q12-17q21 (Futreal *et al.,* 1994; Langston *et al.*, 1996). Miki and colleagues (1994) identified a strong candidate for the BRCA gene and they showed that mutations in this gene segregated with the BRCA1 susceptibility alleles. This BRCA1 gene consists of 22 exons encoding 5592 nucleotides distributed over a genomic region of about 200kb; the protein that it encodes is 1863 amino acids long. One exon (exon 11) contains about 60% of the coding sequence, while the remaining 21 exons are relatively small (Weitzel, 1996). The function of the BRCA1 protein is not clear. One suggestion is that since it contains a putative RING (zinc-binding) finger domain near the amino terminal, it may regulate transcription (Davies, 1994; Fitzgerald *et al.*, 1996; Weitzel, 1996; Gayther and Ponder, 1997). On the basis that many familial cancers result from mutations in tumour suppresser (TS) genes one theory is that BRCA1 belongs to this group of cancer causing genes. A prediction would then be that sporadic cancers would have acquired mutations in the same genes. Thus far, somatic point mutations are rare in both BRCA1 and BRCA2 in sporadic primary breast and ovarian cancer (Greene, 1997). Assuming the gene predisposing to BRCA is a TS gene one would expect that tumours would display a loss of heterozygozity affecting the wildtype chromosome. Smith and colleagues (1992) found this to be true in familial BRCA. Additional support for the theory that BRCA1 has a TS function comes from experiments in which retroviral gene transfer of wildtype and mutant BRCA1 genes into cultured cells was used to reveal that BRCA1 inhibits the growth of breast and ovarian cells in vitro (Holt *et al.*, 1996).

Over 300 different mutations in the BRCA1 gene have been identified mainly in families with multiple cases of breast and/or ovarian cancer. Many types of mutations (missense and nonsense mutations, deletions, insertions and intronic mutations) are found throughout the coding sequence (Breast Cancer Information Core, 1999), a characteristic of inactivation of TS genes (Fitzgerald *et al.*, 1996). Many of the mutations observed in BRCA1, cause frameshifting and premature protein termination (Fitzgerald *et al.*, 1996; Langston *et al.*, 1996). Often the functional consequences of amino acid substitutions or other mutations are unknown (Fitzgerald *et al.*, 1996). Several substitutions occur commonly in the general population and are probably harmless polymorphic variants (Fitzgerald *et al.*, 1996). Two mutations in BRCA1, which occur at high frequency in certain population groups, are 185delAG and 5382insC. They account for approximately 22% of all reported mutations in BRCA (Struewing *et al.*, 1995). One percent of all Ashkenazim carry the 185delAG mutation (Struewing *et al.*, 1995) and approximately 20% of all Ashkenazi BRCA cases diagnosed under the age of 40 years have been attributed to this mutation (Struewing *et al.*, 1995).

Breast Cancer Susceptibility Gene 2 (BRCA2)

Easton and Colleagues (1993) presented evidence that a second major breast susceptibility gene existed from a study in which only about half the families with BRCA were attributed to BRCA1. By means of a genomic linkage search a second BRCA susceptibility gene, BRCA2, was identified on 13q12-13 (Wooster *et al.*, 1995). This gene consists of 10254 nucleotides with 26 exons encoding a 'predictive' protein of 3418 amino acids. Two exons of about 5000 nucleotides (exon 11) and about 1000 nucleotides (exon 10) comprise almost 60% of the coding sequence. As in BRCA1 the remaining exons are relatively small. Chen *et al.*, (1998) showed that BRCA1 and BRCA2 interact with RAD51. They co-exist in a common biochemical complex and co-localise in subnuclear foci in somatic cells and on the axial elements of developing synaptonemal complexes. Like BRCA1 and RAD51, BRCA2 participates in a common DNA damage response pathway associated with homologous recombination and double-strand break repair. Dysfunction of this pathway may be the usual phenomenon in many breast and/or ovarian cancers. The BRCA1/BRCA2 complex has been implicated in post replication repair processes activated during the synthesis stage of the cell cycle (Chen *et al.*, 1999)

More than 70 distinct germline mutations of BRCA2 have been identified (Stratton, 1996). Like BRCA1, multiple distinct mutations in BRCA2 are scattered evenly throughout the gene (Greene, 1997) The majority of disease causing mutations result in premature termination of translation of BRCA2 protein or absence of transcripts. Approximately 75% of the truncating mutations are small deletions, 15% are small insertions and 10% base substitutions (Stratton, 1996). Two mutations account for 33 % of all germline mutations and are common in specific population groups (e.g. Ashkenazi Jews and Icelanders). The mutation 6174delT is common in Ashkenazi Jews and accounts for about 8% of early onset BRCA (Gayther and Ponder, 1997). The 6174delT mutation is also present in approximately 1% of all Ashkenazi Jews free of cancer

(Greene, 1997). The 997del5 mutation appears to be common in Icelanders. Breast cancer susceptibility gene 2 mutations account for most highly penetrant breast cancer in Iceland, with BRCA1 having only a low frequency (Gayther and Ponder, 1997).

1.4.11 Genetic testing

Genetic testing for BRCA susceptibility has become feasible with the identification of some of the specific mutations in BRCA1 and BRCA2. In most cases genetic testing has been used in the detection of the genes for well-defined monogenic syndromes such as Huntington's Disease, Cystic fibrosis and Tay Sachs disease (Lerman, 1994). For these diseases, inheritance of the gene mutation(s) leads to expression of the disease phenotype. However, whether a BRCA mutation carrier develops cancer depends on the penetrance of the mutation and environmental factors. Penetrance is the likelihood that the effect of the mutation will become clinically apparent (Weber, 1996). The best-suited professionals to provide individuals, interested in genetic testing, with the necessary genetic information and support are genetic counsellors. Genetic counselling may be defined as a communication process that deals with the medical, psychological, and genetic issues associated with the occurrence or risk of a genetic condition in the family (Fraser, 1974; Emery, 1984) and as such it is appropriate for families with a history of cancer.

The Cancer Genetics Research Unit, Department of Human Genetics, University of Pretoria is offering genetic testing for breast cancer susceptibility genes on a research basis. According to Dr L van Rensburg, a familial cancer clinic is run once a week and

Ashkenazi Jewish and other families are offered the opportunity to participate in this research project. Families that fit the criteria (are at high-risk) and wish to participate receive extensive genetic counselling. Blood samples are taken and screened for the three common gene mutations found in this population group. If one of these mutations is not found then the two BRCA genes (BRCA1 and BRCA2) are sequenced in an effort to find a gene mutation. In these cases it is preferable to test a live affected relative initially. Of the four families thus far screened, one of these three gene mutations has been found in three families (van Rensburg, personal communication, 1999).

Several issues should be addressed before BRCA susceptibility testing becomes commercially available (as a diagnostic test) in South Africa. These issues include: (1) the risks for developing cancer associated with specific mutations, (2) education of the at-risk populations, (3) psychosocial aspects of testing, and (4) the effectiveness of surveillance and preventative strategies in mutation carriers (Wonderlick and Fine, 1997).

(1) Risks of developing BRCA associated with specific mutations.

The general population incidence of BRCA1 mutation carriers is estimated to be between 1 in 500 and 1 in 2000 (Easton *et al.*, 1994). The International Breast Cancer Linkage Consortium has shown that 85% of women who carry a BRCA1 mutation will develop a malignancy; thus the overall penetrance of a BRCA1 mutation is 85% (Weber, 1996). A study by Fodor *et al.*, (1998) showed the lifetime risk for a mutation carrier to be 36%. They attributed this lower penetrance to the fact that their study included not only individuals selected for family history or other BRCA risk factors as other studies had.

Together the BRCA1 *mutations* 185delAG *and* 5382insC as well as the BRCA2 mutation 6174delT may affect as many as 1in 40 Ashkenazi individuals or 2.5% of this population.

2) Education and psychosocial aspects of genetic testing

It is crucial that researchers and clinicians understand the factors that will motivate women to be tested and how they may react to the results of genetic testing. Studies in Manchester, United Kingdom (UK), and Washington, USA, concerning the anticipated interest in genetic testing for BRCA susceptibility have found that 60-96% of women surveyed indicated that they would undergo such testing (Evans, 1995; Lerman *et al.*, 1995). The results of the study by Lerman *et al* (1995) indicate a strong interest (91% of participants) in genetic testing among FDRs. This interest in genetic testing may be due to an inflated sense of risk which is characteristic of FDRs of BRCA patients (Lerman *et al.*, 1995). However, these studies did not assess how well the participants had understood the facts of BRCA genetics (Wonderlick and Fine, 1997). Genetic counsellors or other health professionals involved in the care of affected patients need to assess their prior conceptions and knowledge of BRCA (Wonderlick and Fine, 1997). Lerman and co-workers (1996) found that baseline knowledge was strongly related to the decision to receive BRCA1 test results. Beliefs of the women and her family about cancer aetiology, her prior life experiences with BRCA, and general BRCA knowledge (Peters and Biesecker, 1997), can affect her comprehension and response to BRCA information (Hoskins *et al.*, 1995).

Unlike other medical tests genetic testing may provide information not only about the individual tested but also about the individual's parents, siblings and children. The risks of psychological distress, family disruption and the non adherence to recommended screening strategies are high if the individual tested is not properly educated or counselled (Croyle *et al.*, 1997). The psychological impact of testing can be heavy (see Table 1.4) and some patients have reported feeling as though 'the seed of their destruction lies' in their genetic makeup (Croyle *et al.*, 1997).

Table 1.4 Advantages and disadvantages of testing for BRCA susceptibility genes*

	Potential Risks		**Potential Benefits**	
	Positive Result	Negative Result	Positive Result	Negative Result
Medical	Increased cancer risk, Delay in seeking medical care (due to fear of developing cancer)	Delay seeking medical care (due to underestimated risk)	Cancer detection and prevention options	Cancer risk is the same as for average person, extra cancer surveillance not required
Psycho-logical	Anxiety, depression/ suicide, lowered self-esteem, lowered goals set	Survivor guilt, depression (cancer is not the source of all life problems)	Resolution of uncertainty, establishment of control over the future including reproductive decisions.	Relief and joy
Familial	Strained relationships with partner, children and other relatives	Strained relationship with partner, children and other relatives	Increased supportiveness, children may be eligible for testing, children can be offered cancer surveillance	Children cannot inherit gene alterations
Social	Loss of insurance, discrimination by employers, colleges and social service agencies, stigma			
Financial	Cost of extra cancer surveillance		Increased ability to plan for future	Savings from less cancer surveillance, increased ability to plan for future

*adapted from Schneider, 1994; Schneider *et al.*, 1995

3) Methods of BRCA surveillance and prevention for mutation carriers.

Genetic testing will not prevent women who carry the gene mutation from getting the disease, nor will it cure existing disease. The choices available to women at-risk for or who have inherited a BRCA susceptibility gene are surveillance (screening by mammography and physical examination) and prophylactic surgery. If surgery is not chosen mammograms should be undertaken yearly and clinical breast examinations done frequently (Lerman *et al*, 1989; King *et al.*, 1993). The benefits of screening for BRCA is improved prognosis for many cases detected by screening, less radical treatment for many early cases and reassurance for those with negative test results. The disadvantages include: discomfort of mammography, possible radiation hazard, false reassurance for those with negative results, anxiety and sometimes morbidity for those with false positive results, unnecessary medical intervention for those with false positives results, over diagnosis of questionable abnormalities, and longer morbidity for cases whose prognosis is unaltered (Austoker, 1994).

The types of surgery available to these women are prophylactic mastectomy (PM) or prophylactic oophorectomy (PO). A PM involves the surgical removal of superficial breast tissue (King *et al.*, 1993). However, some subcutaneous tissue may still remain and BRCA could still develop. For this reason careful surveillance should still be recommended following this type of surgery (Lerman *et al.*, 1989). The psychological aspects of PM have not been widely explored but Lerman (1994) commented that it may reduce long term uncertainty and worry.

Prophylactic oophorectomy (surgical removal of the ovaries) has the advantage of elimination of oestrogen hormone, which has been associated with the development of BRCA in some women. The disadvantages of this procedure is that there are known adverse affects to oestrogen deprivation such as cardiovascular and skeletal compromise (Lerman *et al.*, 1989).

In a BRCA prevention trial done by the National Surgical Adjuvant Breast and Bowel Project (NSABP), 13388 women at increased risk for developing BRCA were randomised to receive tamoxifen or a placebo for 5 years. The results of this trial showed a 49% ($p<0.00001$) reduction in invasive BRCA and a 50% ($p<0.002$) reduction in non-invasive BRCA (Fisher *et al.*, 1998). The group concluded that despite side-effects the use of tamoxifen as a preventative agent against BRCA, in women at increased risk for the disease, was appropriate (Fisher *et al.*, 1998).

1.4.12 Summary

This study was initiated because the researcher developed an interest in BRCA and, had access to the Ashkenazi Jewish community. Furthermore gene mutations responsible for this type of cancer, in this population, had recently been identified thereby, making the subject topical. The study aimed to investigate BRCA in women of Ashkenazi Jewish descent with reference to their knowledge of the genetics of BRCA, their emotional responses to BRCA its treatment and screening strategies, as well as their attitudes to genetic testing for BRCA susceptibility genes.

All women are at risk for developing BRCA although the risks for certain women may be increased on the basis of their family history, age or population group (e.g. Ashkenazi Jews). The prognosis for BRCA has improved with the advancement in the treatments, but despite this, the word 'cancer' still promotes images of death and dying and the threat of disfigurement may result in feelings of vulnerability and disturbed body image. A diagnosis of BRCA impacts on the life of the affected women (in most cases), and her family and friends. Daughters in their teens when their mothers' are diagnosed with BRCA are reported to be most affected by their mother's illness. This may result in many awaiting their own diagnosis as though it was a legacy certain to pass from mother to daughter.

With the identification of specific mutations in BRCA1 and BRCA2, which are found more commonly in Ashkenazi Jews, genetic testing in this community has become possible. However the dangers of such testing may be great if candidates are not fully educated to understand the meaning of the results. It is essential to understand how BRCA impacts on the lives of women in order to provide them with holistic treatment, thereby, assisting them and their families to cope with this distressing condition.

CHAPTER TWO METHODOLOGY

2.1 Introduction

The aim of this chapter is to describe the materials and methods used to obtain the necessary data for this research project. The design of the study, ascertainment and selection of research subjects will be detailed. The construction of the schedule of questions, the pilot study and the choice of the Beck inventory for assessing depression will be discussed. Furthermore, the collection and analysis of the data will be described. Initially the researcher was required to present a protocol to the University of Witwatersrand's Postgraduate Committee and to submit an application, with supporting documents, for Ethics Clearance to the Committee for Research on Human Subjects. Both Committees approved the project, after some amendments to the protocol had been made. A copy of the Ethics clearance appears in the Appendix A.

2.2 Design of study

The study was planned, as a descriptive prospective one. The first step taken was to review the literature thereby familiarising the researcher with the topic. Research questions and aims were then formulated. Three schedules of questions (differing only slightly for each of the three subject groups, as was appropriate) were constructed and tested in a pilot study. The Beck depression inventory was selected to use in testing depression in the experimental and control groups. The three groups of subjects were: Group A, women diagnosed with BRCA; Group B, women with a first-degree-relative (FDR) diagnosed with BRCA; and Group C women who did not have BRCA nor had an affected FDR. These subjects were ascertained from various sources including the

Genetic Counselling Clinic files held in the Department of Human Genetics, SAIMR; the Medical Oncology Centre of Rosebank, in Johannesburg; The Reach for Recovery organisation (a BRCA support group); an informal patient network; and the Union of Jewish Women (UJW) within the Gauteng region. All the subjects were over 18 years of age. Each subject was contacted and a face-to-face interview, using the constructed schedules and the Beck Depression Inventory (BDI), were conducted by the researcher in the homes of the subjects. The data obtained from the interviews were computerised and analysed. The results were presented, and compared with similar research available in the literature, and finally conclusions were drawn.

2.3 Ascertainment and selection of subjects

The 10 subjects ascertained for the pilot study were all Ashkenazi Jewish women over 18 years of age. Five of these subjects had had BRCA and were ascertained through the Medical Oncology Centre of Rosebank. The other five subjects had not had BRCA nor did they have first-degree relatives with the condition and they were ascertained through various acquaintances.

The subjects for this study were all Ashkenazi Jewish women over the age of 18 years, and they were allocated to an experimental or a control group. The experimental group was divided into two sub-groups: Group A, women previously diagnosed with BRCA; and Group B, women who had a first-degree relative (FDR) with BRCA. The control group (Group C) was assembled from women from the study population who had neither been diagnosed with BRCA nor had a first-degree relative with BRCA.

2.3.1 Experimental subjects

The Group A subjects (women previously diagnosed with BRCA) were obtained from several sources: (1) the Genetic Counselling Clinic records held in the department of Human Genetics, SAIMR; (2) the Medical Oncology Centre of Rosebank; (3) the Reach for Recovery organisation (a BRCA support group); and (4) the informal patient network.

2.3.1.1 Sources of ascertainment of subjects for Group A

(1) SAIMR Records

The name and telephone number of only one appropriate subject was obtained from the SAIMR Genetic Counselling Clinic records. She was contacted telephonically and agreed to participate in the study. Six other possible subjects had to be excluded, as the counsellors involved in their cases were unable to contact them to ask their permission for providing their names to the researcher.

(2) The Medical Oncology Centre of Rosebank

Dr B Rappoport, the oncologist at this centre, was approached and asked to contact any eligible patients (to protect confidentiality) and request their participation. As a result of his enquiries the names and telephone numbers of 14 Jewish women were ascertained for this study. Of these women one was found not to be eligible for the study, as she was a Sephardic Jew, and another woman refused to participate.

(3) Reach for Recovery and the Patient Network

Many of the women interviewed were in contact with other women who had had BRCA through an informal network. They were requested to contact these women and ask for their participation. In this way seven more women were ascertained for the study. It was through this network that the Krugersdorp representative of Reach for Recovery (a support group for women with BRCA) was interviewed, she volunteered to contact various affected women with whom she had had contact and ask for their participation. A further 12 women were ascertained by this means, and 10 of these women agreed to participate in the study.

Of the 14 women ascertained from the Medical Oncology Centre of Rosebank, eight were members of a private support group, based in The Northern suburbs of Johannesburg.

Altogether 30 women with BRCA participated in the study.

2.3.1.2 Sources of ascertainment of subjects for Group B

Group B (women who had a first-degree relative diagnosed with BRCA) subjects were obtained by asking the Group A subjects to request their sisters, mothers and/or daughters to participate. This was not particularly successful due to the emigration of many family members. Of the remaining eligible women, many did not wish to participate or the affected relative did not wish to ask their relatives to participate. When a women (over the age of 18 years and of Ashkenazi Jewish descent) with an affected first-degree relative agreed to participate in the study, she was interviewed with a slightly modified version of the schedule. Altogether 9 FDRs were interviewed

2.3.2 Control group

A list of 87 Jewish women was obtained from the Union of Jewish Women (UJW) an every second women was contacted telephonically to request participation and verbal consent. If this woman did not fit the criteria i.e. over age 18 years and Ashkenazi Jewish, or did not wish to participate in the study, then the next person on the list was contacted. When a suitable control subject was obtained she was interviewed with a slightly modified version of the questionnaire. Altogether 30 controls were interviewed.

Each subject was presented with an information sheet detailing the nature of the study, as well as a consent form stating that participation was voluntary, confidentiality would be maintained and that the subject could withdraw at anytime during the study period with no negative repercussions (a copy of these documents appears in the Appendix B).

In total, the subject group consisted of 69 Ashkenazi Jewish women over the age of 18 years: 30 of the women had been diagnosed with BRCA (Group A), 9 women had a first-degree relative with BRCA (Group B), and 30 women who did not have BRCA nor a first-degree relative with BRCA.

2.4 Research tools

The first research tool used in this research project was a schedule of questions. The schedule was used in a face-to-face interview, conducted in the subjects' homes, during which the interviewer (the researcher) read the questions to the respondent who answered orally. The responses were then written down on the schedule by the interviewer. The face-to-face interview is superior to other formats such as a questionnaire which is mailed to subjects, for gaining comprehensive information, which can be verified by discussion, and for probing in problem areas (Guy *et al.*, 1987). In addition a research interview is rewarding for most people as the personal contact is inherently enriching if the partner is pleasant, responsive and considerate (Guy *et al.*, 1987).

2.4.1 Construction of the schedule

The researcher was unable to find a published questionnaire or schedule that addressed all the aims of the present study, and so an interview schedule was specifically constructed.

A schedule consisting of 99 items was used for group A. The schedule was modified for groups B and C as was appropriate. There were 76 and 71 items in the schedules for group B and C respectively. Copies of these schedules appear in the Appendix C.

2.4.1.1 Types of items included in the schedule

The schedule of questions used in this study consisted of mainly closed ended questions but included several open ended questions. This format allowed intergroup comparison and statistical analysis for most questions, while providing the subjects with some opportunity to qualify, explain and express opinions in a creative and expressive manner if desired. The open ended items also allowed for more complex and meaningful responses where appropriate.

The schedule was divided into six sections: (1) Biographical details; (2) Taking of a family pedigree; (3) Knowledge about BRCA genetics; (4) Responses to BRCA; (5) Feelings about treatment (Group A) or screening and prevention (all groups); and (6) Attitudes and projected responses to genetic testing. Sections 4 and 5 were modified, as appropriate, for the different groups of subjects.

Section One

Section one aimed at eliciting the biographical data from the subjects. It contained 19 items, which included questions on age, education, employment and religion. Items on age at the birth of children, breast-feeding, smoking and the use of oral contraception also appeared in this section, as these factors have been implicated in the development of BRCA (Salber *et al.*, 1969; Robertson *et al.*, 1997; Millikan *et al.*, 1998; Sauerbrei *et al.*, 1998;).

Section Two

A pedigree was drawn up and the ages of living and deceased relatives, as well as any cancer occurring in a relative were entered on the pedigree. It was extended to both maternal and paternal lineage to the third or fourth generation back when possible. From the pedigree it could be determined whether the subject belonged to a high or moderate risk family. Constructing the pedigree with the subject was helpful in establishing rapport and sometimes in providing insight into the family dynamics.

Section Three

Section three consisted of 9 items, which were designed to obtain information about the subjects' knowledge of BRCA and genetics. The items were adapted from those used in a study by Wonderlick and Fine (1997). The aim of this section was to compare the knowledge of breast cancer genetics between the three subject groups and the subjects interviewed in Wonderlick and Fine's (1997) study. This section contained questions on: the causes of breast cancer; the role of gene mutations in the development of breast cancer; populations at increased risk; and sources of information about breast cancer genetics.

In this section an overall knowledge score was computed for each subject by adding up the number of correct responses to the six items in the interview schedule. Four of these questions were categorical and two, the first and last, were continuous. For the first question "In your opinion what is the chance for any women to develop breast cancer during her lifetime?" responses of 15% or less were counted as correct. For the last question "If a woman carries a gene mutation associated with breast cancer, what do you think is the chance that she will pass the gene mutation on to any child she has?" the answer of 50% was considered correct (as in the study by Wonderlick and Fine 1997). Knowledge was rated as 1= none; 2 - 3= moderate; 4 -5= good; and 6= excellent.

Section Four

The items in Section four entitled Response to breast cancer, differed for the three groups of subjects as was appropriate. Questions featured in this section were based on some of the questions presented in the book by Katherine Schneider (1994), which details strategies useful to genetic counsellors who counsel patients with BRCA.

Items for Group A. Women diagnosed with BRCA

The 44 items in this section were aimed at gaining insight into the emotional and psychosocial reactions to diagnosis of BRCA. Questions focused on: screening strategies prior to a diagnosis; care received by medical practitioners, problems with medical insurance; fears and emotions surrounding the diagnosis; available support infrastructures and the impact of BRCA on women's lives. In addition, questions concerning any affected relatives were included for comparison with the other two subject groups.

Items for Group B. Women with a first-degree relative diagnosed with BRCA

For this group, section four contained 26 items that focused on the impact of having had a first-degree relative with BRCA. Questions also covered fear and concerns about the possible development of BRCA, sources of support, medical insurance and employment.

Items for Group C. Control group

Section four for group C differed from that for groups A and B in that the questions, which concerned relatives with BRCA, referred instead to anyone the subject knew with BRCA. The section contained 25 items.

Section Five

Again, the section five items differed according to the requirements of each subject group, as was appropriate. In Group A (22 items) questions centred around treatment, breast reconstruction, care received from medical practitioners, Medical Insurance companies, employers, support groups and whether women with BRCA or their FDR's should be offered emotional support. In groups B and C (17 items per group), questions focused on screening and preventative measures taken by subjects, care by medical practitioners, medical insurance, and whether affected individuals and their family should receive emotional support.

Section Six

This section entitled Genetic Testing, aimed at determining the demand for genetic testing and the projected impact of such testing in this population group. There were 7 items in this section adapted from those used in the study by Lerman and co-workers (1995). This section tapped desire to test, reasons not to / to test, possible reactions to a positive or negative test result, the possibility of having the gene and the demand for genetic counselling for BRCA. The nature of the responses within and between each group was compared.

2.4.2 Beck Depression Inventory

The second research tool selected was the Beck Depression Inventory (Beck *et al.*, 1961), which was used to determine whether women with a diagnosis of BRCA or women with a first-degree relative affected with this condition suffered from depression more often than women in the general population did (See Appendix D). The inventory is arranged into 21 groups of statements, each grouping describes a particular behavioural manifestation of depression and consists of a graded series of four self-evaluating statements. These statements are ranked to demonstrate the range of severity of the symptoms from neutral to severe. Numerical values (0-3) are assigned to each statement indicating the degree of severity, 0 being mild and 3 severe (Beck *et al*, 1961), and a total score (including all 21 items) is assigned to each subject. Altogether seven categories of depression are detected by the BDI including: 1 = The ideal (score of 0), 2 = Ups and downs that are considered normal (score of 6-10), 3 = mild moody disturbances (score of 11-16), 4 = Borderline clinical depression (score of 17-20), 5 = moderate depression (score of 21-30), 6 = severe depression (score of 31-40), and 7= extreme depression (score of over 40). The higher the score the more severe the depression.

At the end of the interview session with the subjects they were handed a copy of the BDI and they completed it. At the bottom of the BDI was a section where the subjects were invited to make comments about the study or about BRCA.

2.5 Pilot study

The completed interview schedule and BDI were pre-tested in a pilot study. This was undertaken to detect any unforeseen problems, to determine if the questions were logical and understandable, and how long the schedule and BDI took to complete.

Ten Ashkenazi Jewish women were selected for the pilot study. The subjects were interviewed using the schedule of questions and then presented with the BDI to complete. The first five subjects were women who had been diagnosed with BRCA and their details were obtained from patient files at the Medical Oncology Centre of Rosebank. The other five women did not have BRCA nor did they have an affected relative. These women were obtained through various acquaintances. These pilot study interviews were not used in the final study.

The pilot study subjects took between 1-2 hours to complete the interview and the BDI but none of the women objected to the length of the interview. All the subjects stated that they were pleased that they had participated in the study. Although the subjects seemed to have little trouble answering the questions, the researcher felt that some items required clarification. Also, from the comments of the subjects it appeared that several items needed to be added. The schedule was therefore revised by changing the wording of some questions and including further relevant items.

Specific changes made to the schedule of questions were as follows:

- In question 3.2 " What causes breast cancer?" the category of " stress" was added.
- In questions 3.8, 3.9 and 4.17 the category of "other (specify)" was added.
- Question 5.15 was changed from " Do you think you should see a psychologist, social worker or genetic counsellor?" to "Do you think women diagnosed with breast cancer or women with an affected first degree relative should see a psychologist, social

worker or genetic counsellor to talk about any feelings or questions around breast cancer, in depth?"

- Question 5.16 "Have you ever been treated for depression?" and question 5.17 "Have you ever had the opposite of depression where you felt very happy, elated, could not sleep, had excessive energy and had to seek medical attention for these symptoms?" were added.
- In questions 6.2, 6.3, 6.4 and 6.5 the category "none of the above" was added.

The statistician at the Biostatistics department at the SA Medical Research Council was approached for assistance. She gave advice on the questionnaire layout and the type of statistical analysis that was appropriate for the data obtained in the schedules of questions.

2. 6 Data analysis

The data obtained from the interviews was entered into the Symantec Q & A database version 4.0 for Windows, which was commercially available. The data were then analysed both quantitatively as well as qualitatively. The statistician recommended by the South African Medical Research Council was approached and she aided in determining the best statistical approaches to obtain the desired information from the data.

2.7 Statistical methods used

Descriptive statistics were mainly utilised in this study due to the small sample size within and between groups. However, chi-squared analysis was performed on categorical data in specific circumstances and the non-parametric Kruskal-Wallis one-way analysis of variance was used on continuous data. The significance level selected was $p<0.05$ in all these analyses. Group B was not included in the statistical analysis due to the small sample size (9) obtained.

2.8 Summary

This study was a prospective descriptive one, which was carried out between March and December 1998. Approval for this study was obtained from Committee for Research on Human Subjects of the University of Witwatersrand. The schedules of questions (differing for each group as was appropriate) were specifically constructed by the researcher for the purpose of this study and were completed by each subject. Each subject also completed the BDI. A pilot study was conducted to check the schedule of questions and the BDI for comprehensibility, length, and relevance, and the schedules were revised where necessary. The data were then collected, from a total of 69 Ashkenazi Jewish women (30 women diagnosed with BRCA; 9 women with a FDR with BRCA and 30 control women without BRCA or an affected FDR) in face-to-face interviews conducted at the subjects' homes. The information obtained from the completed schedules and BDI were computerised, analysed, and submitted for statistical testing where necessary and the results were derived from this analysis.

CHAPTER THREE RESULTS AND DISCUSSION

3.1 Introduction

In this chapter the results obtained from some of the biographical information given by the subjects, and from the analysis of the responses to the schedules of questions will be presented and discussed with reference to the relevant reports found in the literature. The responses made by the subjects on the Beck Depression Inventory were also scored to assess whether Group A women and/or Group B women were more depressed than the Group C.

The time taken to complete the interviews and questionnaire with the subjects was between 45 minutes and 2 ½ hours. Some participants, who required more time, found some of the items painful to think about and they wished to discuss these in more detail. Other subjects had some unanswered questions about BRCA that they wished to discuss with the interviewer. The majority of participants reported that they enjoyed the interview and some even thanked the interviewer for including them in the study. One woman reported that in the eight years since her diagnosis she had never been able to talk about her experience of BRCA and now felt unburdened.

In many of the tables appearing in this chapter the more interesting results are highlighted in red for convenience.

3.2 Characteristics of the subjects

The characteristics of the subjects who were all Ashkenazi Jews over the age of 18 years is presented on Table 3.1. The average age of participants was 56.6 years (range: 42-79 years) in Group A, 36.2 years (range: 24-56 years) in Group B and 52.4 years (range: 42-79 years) in Group C. Since many of the Group B subjects were daughters of Group A subjects, the average age is lower than that of the Group A and Group C subjects. A Kruskal Wallis one-way analysis of variance was performed on the data and no significant difference between the ages of the subjects in Groups A and C was found ($0.3>p>0.5$). The majority of subjects had completed high school, with many having had tertiary education, and they were currently working in a variety of professions. Those not working were housewives, retired women or students. No subjects reported that they were unemployed. The majority of Group A and C subjects were married at the time of the study and all of Group A women had children. Most of the Group C women also had children.

Table 3.1 - Subject demographics

	Group A (N=30)		Group B (N=9)		Group C (N=30)	
	N°.	Percent	N°.	Percent	N°.	Percent
Education						
Completed High School	27	90.0	9	100	27	90.0
Tertiary Education	20	66.7	5	55.6	23	76.7
Occupation						
Housewife	7	23.3	0		7	23.3
Retired	5	16.7	0		9	30.0
Business/Professional	5	16.7	0		2	6.7
Administration	6	20.0	2	22.2	4	13.3
Education	6	20.0	1	11.1	2	6.7
Healthcare	1	3.3	5	55.6	3	10.0
Other*	0		1	11.1	3	10.0
Marital Status						
Married	23	76.7	5	55.6	27	90.0
Divorced	4	13.3	0		0	
Widowed	3	10.0	0		1	3.3
Single	0		4	44.4	2	6.7
Children	30	100	4	44.4	24	80.0
Average N°. of children	3		1		2	

* One Group B subject was a student, One Group C subject was an artist, another did community work (charity), the last was a historical researcher.

3.3 Some environmental factors influencing the risks for BRCA

Some of the environmental factors possibly implicated in the development of BRCA include the age of a woman at the birth of her first child (Salber *et al.*, 1969; Robertson *et al.*, 1997), whether or not she breast fed her child/children (Salber *et al.*, 1969), whether she smoked (Palmer *et al.*, 1991), or used oral contraceptives (Sauerbrei *et al.*, 1998). Data were collected on these factors in the present study and the results are reported on Table 3.2.

Table 3.2 Environmental factors associated with BRCA: data from 60 subjects

Factor	**Group A (N=30)**		**Group C (N=30)**	
	N°.	%	N°.	%
Average age at birth of first child (range)	25yrs (20-37yrs)		24.7yrs (19-30yrs)	
Breast fed children	24	80.0	21	70.0
Have smoked	16	53.3	10	33.3
N° of years – Average	20.4yrs		18.3yrs	
Range	4 - 48yrs		1 - 48yrs	
N° per day – Average	21.7		14.5	
Range	4 – 60		5-35	
Taken contraceptive pills	14	46.7	18	60.0
N° of years – Average	4.4yrs		11.3yrs	
Range	1 - 15yrs		1 - 21yrs	

In 1969, Salber and co-workers reported that the mother's age at the birth of a first child could be an important BRCA risk factor. Further, Robertson and colleagues (1997) showed that there was a 5.3% increase in risk per year of maternal age at first birth, for the development of BRCA. As can be seen on Table 3.2, however, the present study, showed no significant difference in the ages of women in Group A and Group C subjects at the birth of their first child ($p > 0.2$). There was also no significant difference between these groups with respect to the number of women who had breast-fed their children, and the study by Salber and colleagues (1969) supports this suggestion that breast-feeding does not affect the development of breast cancer. Newcomb and co-workers (1994) however, reported a decreased risk of BRCA among premenopausal women who had breast-fed their child/children.

Although there were more Group A subjects (16) compared with Group C subjects (10) who had smoked cigarettes and the former group had smoked about 30% more cigarettes per day, the difference between the groups was not significant (p>0.2). A study by Millikan and co-workers (1998) showed no association between smoking and BRCA risk in premenopausal women. However their study shoed a small increase in risk for past smoking in postmenopausal women.

The two study groups did not differ significantly with regard to oral contraceptives as seen on Table 3.2. These results are in agreement with those of Sauerbrei and colleagues (1998) and Sitas *et al.,* (1998). In contrast, Brinton and co-workers (1995) reported an increased risk of developing BRCA among women under 35 years who had used oral contraceptives for at least six months and a slightly increased risk for women between 35-44 years. They also demonstrated a higher risk for long term use especially if taken before the age of 18 years (Brinton *et al.*, 1995)

The findings regarding possible environmental risk factors, therefore, suggest that in the small sample investigated in the present study these risk factors were not obviously associated with the development of breast cancer in the Group A subjects. While the described risk factors may have a cumulative effect on the development of BRCA, on their own, each factor plays a minor role in the development of this disease. Therefore a large sample size is required to determine the significance of each of the above mentioned factors.

3.4 Breast cancer knowledge

The results on the subjects' knowledge of various aspects of BRCA and the genetics of the condition are reported on Table 3.3. There are various estimates given for the lifetime risk for developing BRCA including 1 in 8 (12.5%) in the Western world (Collins, 1996), 1 in 36 (2.8%) for South African women and 1in 13 (7.7%) for white South African women (Sitas *et al.,* 1998). Approximately half of Group A (53.3%) and Group C (46.7%) subjects estimated this risk to be 6 - 15%. However, there was a significant difference between the Groups A (53.3% of whom estimated the risk to be between 6-15%) and B (11.1 % of whom estimated the risk to be between 6-15%) regarding this risk estimate ($p<0.05$). Although over half (55.6%) of the Group B, at-risk subjects overestimated the risk and reported it to be between 16-25% (1 in 6.5 to 1 in 4), no significant difference between Group B and Groups A and C for this risk estimate ($p > 0.1$) was found. Sagi and colleagues (1998) also reported that FDRs of affected women tend to overestimate the risk of developing BRCA. These findings differ from those of Wonderlick and Fine (1997), who showed that, in their study of American women, the mean of both BRCA patients (27 subjects) and FDRs (47 subjects) underestimated the lifetime risks for developing BRCA to be 1 in 13.5 and 1 in 14 respectively, compared to the 1 in 8 lifetime risk for women in the Western world (Wonderlick and Fine, 1997).

Although not significant, approximately 30% more Group C subjects were aware that the risk of BRCA increases with age.

In contrast to the results obtained in the Wonderlick and Fine study (1997) where 63% of the subjects had heard of a gene mutation resulting in a higher chance of developing BRCA, the minority (12 of 69 [17.4%] of the subjects, in the present study, had heard of such a gene mutation.

Table 3.3 Knowledge of BRCA and its genetics

Item	**Group A** (N=30) N°.	 %	**Group C** (N=30) N°.	 %
Lifetime risk of developing BRCA*:				
Less than or equal to 5 %	1	3.3	3	10.0
6-15 %	16	53.3	14	46.7
16-25 %	7	23.3	7	23.3
≥26 %	4	13.3		
Causes of BRCA:				
Environmental factors	4	13.3	4	13.3
Genetic factors	2	6.7	8	26.7
Both environmental and genetic factors	18	60.0	17	56.7
Stress	5	16.7	1	3.3
Other	1	3.3		
Risk of BRCA increases with age:				
Yes	16	53.3	26	86.7
No	9	30.0	2	6.7
Unsure	5	16.7	2	6.7
If have a gene mutation will develop BRCA:				
Yes	6	20.0	4	13.3
No	19	63.3	18	60.0
Unsure	5	16.7	8	26.7
Those with BRCA have gene mutation:				
Yes	7	23.3	9	30.0
No	15	50.0	13	43.3
Unsure	8	26.7	8	26.7
Chance of passing a gene mutation on to any child*:				
<49 %	8	26.7	10	33.3
50 %	13	43.3	14	46.7
>51 %	7	23.3	5	16.7

*Some subjects did not respond

The total knowledge scores (correct answers, scoring one point each, for the six items presented on Table 3.3 were summed to obtain the total score) are shown on Figure 3.1. The majority of women in Groups A and C had a moderate (two to three out of six correct answers, 63.3% and 43.3% respectively) or good (four or five correct answers, 36.7% and 43.3% respectively) knowledge of the subject. The average scores (out of 6) for the Group A and Group C subject groups respectively were 3.3 and 3.5.

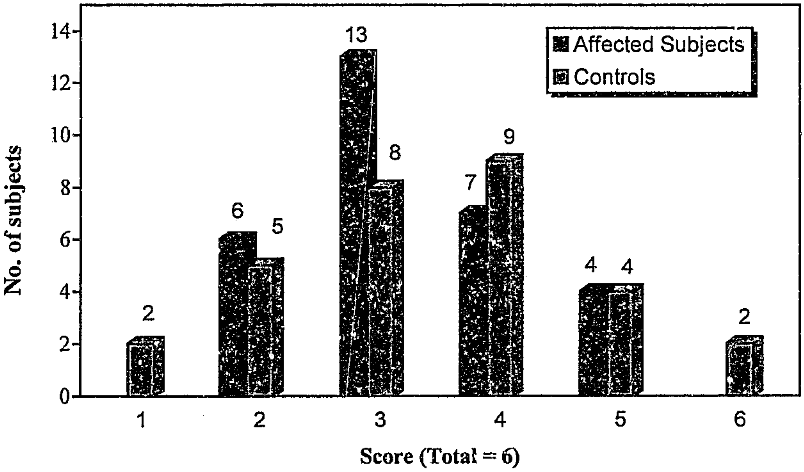

Figure 3.1 Knowledge about the genetics of BRCA in two groups of subjects

Using the Kruskal Wallis one-way analysis of variance no significant difference between the groups was found (p>0.3) so the level of knowledge in the two groups was similar. This finding suggests that either women, in general, are being educated about the genetics of BRCA, or that women diagnosed with BRCA have not had any additional education on this subject (as measured by the few (6) items in the schedule used in this study).

Data were collected on the sources of information on BRCA reported by the subjects and the results are presented on Figure 3.2. All the subjects interviewed reported two or more sources of information on BRCA genetics, with magazines being the most commonly cited source (23, 76.7% of Group A and 27, 90% of Group C), followed by newspapers, and family and friends. Twenty-two (73.3%) subjects in Group A reported physicians as a source of information.

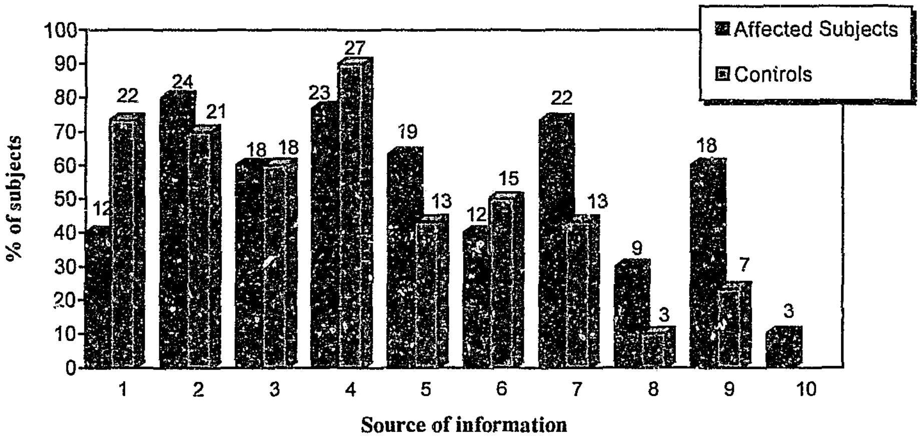

Figure 3.2 Sources of information regarding BRCA Where 1= Friends/family, 2 = Newspaper, 3 = Television, 4 = Magazines, 5 = Books, 6 = Radio, 7 = Physicians, 8 = Other health professionals, 9 = Associations such as CANSA, and 10 = other (such as Internet). Bar labels represent number of subjects

Silliman and co-workers (1998) reported that older women with BRCA (over 55 years of age) said that their physicians were their primary source of general information regarding their disease. However, since the Group A (average age at diagnosis was 48.7 years old) subjects' level of knowledge of the genetics of BRCA is no better than that of the Group C subjects, in this study, perhaps the level of knowledge about BRCA genetics of medical practitioners needs to be evaluated and/or updated. Also, if the patients were given information too soon after their diagnosis, while they were in a state of shock, they may have forgotten it. The medical practitioner in this situation may need to repeat complex genetic information associated with BRCA, utilising different terminology and explanations, to ensure understanding, on more than one occasion (Hsia and Hirschhorn, 1979). However, many medical practitioners do not have the available time or skills to give lengthy explanations at the appropriate time. Hence having a trained counsellor or genetic counsellor on their staff, or referral of the patient to a genetic counselling clinic may be necessary to provide the patient with better knowledge of the genetics of BRCA.

The question of whether the subjects were aware that Ashkenazi Jews seem to be more predisposed to the development of BRCA was also investigated. Many of the subjects (40% and 67 % of Groups A and C respectively) interviewed felt that all women were at equal risk for the development of BRCA. Fewer of the subjects felt that Ashkenazi Jewish women were at an increased risk for BRCA (27% and 23% of Groups A and C respectively). While the point may be debatable, Ashkenazi Jews appear to be at increased risk for carrying some specific BRCA susceptibility genes. Struewing and colleagues (1997) reported that over 2% of Ashkenazi Jews carry mutations in BRCA1 or BRCA2 and these mutations might confer an increased risk of developing cancer of the breast, ovaries or colon. An education program may need to be implemented to increase awareness among this community. An example of a successful educational program running locally is the Tay Sachs disease screening program aimed at reducing the number of infants born with this disease in this high-risk population (Jenkins *et al.*, 1977). The high uptake of testing, offered through this screening program, has meant that the numbers of affected infants expected has dropped from about one per year to about one per 10 years (Kromberg, 1999, personal communication).

3.5 Emotional responses to BRCA

Past experiences may determine the way in which individuals handle their current situation and the results relating to various experiences with BRCA reported by the subjects appear on Table 3.4. Four (33%) subjects in Group A, 7 (78%) in Group B and 13 (54%) in Group C, totalling 24 out of 45 (53%) subjects (with personal experience of BRCA), reported that having known someone with BRCA had increased their anxiety about developing the condition. The majority of subjects in Group A and B had also cared for an affected close relative such as a mother or sister, and most of the subjects were young (<40 years) at the time of the death of that relative.

Table 3.4 Experiences with a BRCA diagnosis

Experience	Group A (N=30)		Group B (N=9)		Group C N=30)	
	N^{O}/total	%	N^{O}/total	%	N^{O}/total	%
Had relative/friend with BRCA	12	40.0	9	100	24	80.0
Relationship to Subject:						
Mother	6	20.0	7	77.8		
Sister	1	3.3	2	22.2		
Other – relative	5	16.7			5	16.7
Friend/acquaintance					19	63.3
Mean age of subjects at diagnosis of affected individuals (in years)	35.0		25.8		44.4	
Range (years):	10-48		13-44		20-72	
Cared for affected relative –yes	7/12	58.8	7/9	77.8	1/24	4.2
Affected person died from BRCA -yes	5/12	41.7	1/9	11.1	6/24	25.0
Age of subject at time of death						
Average (in years):	30.3		37		42.5	
Range (years):	15-50		N/A		36-73	
Anxiety about BRCA increased as a result of knowing affected individuals	4/12	33.3	7/9	77.8	13/24	54.2

Various concerns about BRCA are reported on Table 3.5. Several of the subjects in Group B (7, 77.8%) and Group C (22, 73.3%) reported that they think about developing BRCA ‘occasionally’ or ‘sometimes’. Although the sample size was small there was a significant difference between Groups B and C subjects ($p<0.05$) with Group B than Group C subjects reporting 'sometimes' thinking about their risk for developing BRCA. A study done by Sagi and co-workers (1998) found that women with a family history of BRCA frequently think about their risk for BRCA. This may be attributed to their past experiences with this disease and the knowledge that there is an inherited factor in the aetiology of BRCA. Breast cancer has been reported to impact greatly on the lives of affected individuals and the people around them (Renneker and Cutler, 1952; Kaye, 1991; Kelly, 1992; Ireland and Ireland: 1993; Schomer and Horwitz, 1993; Schneider, 1994; Silliman *et al.*, 1998). Approximately half the Group A subjects in this study were concerned that the condition would affect their relationships with their partners, and/or relatives and friends.

Table 3.5 Concerns about BRCA

Concerns	Group A (N=30)		Group B (N=9)		Group C (N=30)	
	No.	Percent	No.	Percent	No.	Percent
Think about developing BRCA	*N/A					
Never			1	11.1	6	20.0
Occasionally			1	11.1	18	60.0
Sometimes			6	66.7	4	13.3
Often			1	11.1	2	6.7
All the time						
Concerns that BRCA will affect relationships with:					N/A	
Partner	10	33.3	1	11.1		
Family	16	53.3	3	33.3		
Friends	8	26.7				
Concerns that BRCA will impact on ability to make long-term plans or commitments: yes	3	30.0	1	11.1	N/A	
Concerns that BRCA affect ability to concentrate: yes	14	46.7	2	22.2		
Medical Insurance:						
Had medical insurance: Yes	27	90.0	8	88.9	28	93.3
Discrimination because of BRCA /Asked about BRCA	6	20.0	1	11.1	4	13.3

*N/A not applicable

The subjects were also asked about medical insurance and the majority (90%) of the Group A subjects had had medical insurance at the time of diagnosis. Of these women, six (20%) felt medical insurance companies discriminated against women with BRCA, and would not pay for all medication and/or procedures required, and three had their premiums loaded subsequent to their diagnosis. Eight (88.9%) of Group B subjects had medical insurance, one had difficulties getting this type of insurance and had to pay high premiums because of the family history of BRCA, but only one subject felt this to be unfair. In Group C, 93.3% of subjects had medical insurance, and ten (33%) recalled being asked about BRCA in their families. Four (13%) reported that they thought this was unfair and indicated discrimination against people with family histories of BRCA.

3.5.1 The experiences with BRCA of Group A subjects

The average age of the Group A subjects at the time of their diagnosis was 48.7 years (range 36-69 years). It appears as though the Group A women in this study were on average younger than what is expected in the general population where there is a 2% risk of developing breast cancer for women before the age of 50 years (Schneider, 1994). Twelve (40.3%) subjects had had family members with BRCA. Of these, seven were first-degree relatives (six mothers and one sister), and five subjects had been involved in the care of their affected relatives. Four of the subjects were between 10-20 years of age when their FDR was diagnosed (two of these were mothers who had died). Five of the mothers and one sister had died from BRCA and the subjects reported varied emotional responses, such as anger, sadness and guilt.

The subjects were asked about the types of treatment they received following their diagnosis, how they felt about treatment and the effects it had on them. The results are reported on Table 3.6.

Nearly half the subjects had had lumpectomies (Ls), a third had had unilateral mastectomies (UMs) and a few had had bilateral mastectomies (BMs). Among those who had undergone reconstructive surgery, five had UMs, three had had BMs and two Ls. Of the subjects who were happy about their decision whether or not to have reconstructive surgery, 10 had had surgery and 15 had not. More than half (17, 57%) the women felt that the treatment had affected their feelings of femininity. Altogether, six (6/14, 43%) of these subjects had Ls, nine (9/11, 82%) had UMs and two (2/5, 40%) had had BMs.

Table 3.6 Treatment for BRCA in 30 Group A subjects

	Yes		No		Unsure	
	N°	Percent	N°	Percent	N°	Percent
Type of Treatment						
Lumpectomy	14	46.7				
Unilateral Mastectomy	11	36.7	N/A		N/A	
Bilateral Mastectomy	5	16.7				
Had best possible treatment	27	90.0	3	10.0		
Had breast reconstruction	10	33.3	20	66.7		
Happy with decision regarding reconstruction	25	83.3	4	13.3	1	3.3
Treatment Group A:						
Feelings of femininity	17	56.7	13	43.3		
Self-image	15	50.0	15	50.0		
Feelings of illness (increased)	7	23.3	23	76.7		
Involved in a support group	16	53.3	14	46.7		

Fallowfield and colleagues (1990) reported no significant differences in anxiety and depression between women who underwent mastectomies and those who had lumpectomies. However, Kemeny and co-workers (1988) found that women who had had mastectomies suffered more often from negative body image and psychosocial problems than women who had had segmentectomies (lumpectomies).

The Group A subjects were asked questions relating to the care they received from medical practitioners and the results are reported on Table 3.7. According to the subject approximately half (25 of 49, 51%) of the medical practitioners involved in their care, did not discuss all the available treatments, thereby excluding them from a fully informed decision making process. Of those who reported not being involved in making decisions, 76% (23/30) were happy to allow the medical practitioner to make the decision for them, while others had a variety of responses (subjects reported more than one response), including feeling helpless (8), afraid (4) and angry (3).

Table 3.7 Care received from medical practitioners

Item	Yes		No		Unsure	
	N°	Percent	N°	Percent	N°	Percent
Doctor discussed all treatments available (N=49) *	23	46.9	25	51.0	1	2.0
Choice about treatment received	18	36.7	30	61.2	1	2.04
If not, happy to let Dr. make decision (N=30)	23	76.7	4	13.3	3	15.0
Satisfied with care by doctor/s (N=49)*	42	84.0	7	14.3		

* Some of the subjects had two doctors involved in their care (a surgeon and an oncologist). Forty-nine doctors were involved in the treatment of the 30 subjects.

According to the subjects only 13 (26.5%) of the medical practitioners (49 in total), involved in their care, discussed with their patients their emotional responses to BRCA and its treatment. Almost all of these women (12 out of 13) reported feeling more calm and in control as a result of having their medical practitioner acknowledge their feelings. However, most subjects (42, 84%) were satisfied with the care they received from their medical practitioner(s). Schomer and Horwitz (1993) concluded that the manner in which medical professionals communicate and treat their patients affects the levels of anxiety experienced by the individual. Nevertheless, several women (14, 46.7%), in the present study, were unconcerned as they felt that it was not the traditional role of the medical practitioner to address the emotional aspects of a diagnosis of BRCA.

3.5.1.1 Emotions following a diagnosis of BRCA

The Group A subjects were asked to report on their emotional response to the diagnosis of BRCA and the results are depicted on Figure 3.3. Almost half (46.7%) the subjects reported shock as the dominating emotion. In comparison, four (44.4%) of the Group B subjects and nine (30%) of the Group C subjects reported feeling shocked when the diagnosis was made in their FDR or other relative or friend respectively. The majority

(14, 86%) of women diagnosed with BRCA in the 1993 study by Schomer and Horwitz also reported feeling shock following their diagnosis.

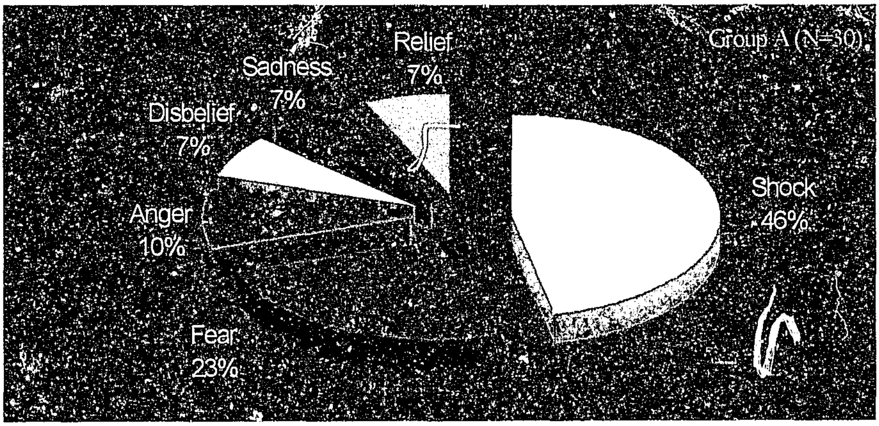

Figure 3.3 Emotions experienced by subjects with BRCA following their diagnosis

Other emotional responses to a diagnosis of BRCA in the present study included fear (7 subjects), anger (3), disbelief (2), sadness (2), and relief (2). The two women who reported feeling relief at their diagnosis of BRCA had both had mothers who were diagnosed with the same condition while the subjects were quite young (aged 12 and 20 years respectively). Both reported that they felt as though they had just been waiting for their diagnosis of BRCA and once they had been through the treatment they felt they could then 'begin to live'. Although these women reported that the history of BRCA had not influenced their daily living it seemed to the researcher that it had had a profound effect on them. Kelly (1992) reported this kind of response to be common in women with an affected relative. Despite the improved prognosis of BRCA, many emotional responses are associated with such a diagnosis (Cope, 1995) and it appears as though these emotional issues are still not being managed effectively in many cases.

The subjects were asked about various psychological and social consequences of their diagnosis and the results are recorded on Table 3.8. When asked about their greatest fear with regards to BRCA almost half (43.3%) the women reported that they were concerned that their children could develop the condition, while 26.7% were afraid of the cancer spreading. Schneider (1994) reported both these responses to be among the greatest concerns of BRCA survivors.

In the present study, one third of the Group A subjects thought about their diagnosis of BRCA often. One woman had been so traumatised by her experience of BRCA that she stated that it had taken her a year to come to terms with her diagnosis. This situation apparently impacted hugely on the lives of her children who resented their mother's neglect of them, with one child developing a drug problem during this time.

Table 3.8 Consequences of a diagnosis of BRCA

Consequence	Group A Subjects (N=30)	
	Number	%
Think about their diagnosis:		
Never	2	6.7
Occasionally	9	30.0
Sometimes	8	26.7
Often	10	33.3
All the time	1	3.3
Worry about another diagnosis of cancer:		
Never	6	20.0
Occasionally	5	16.7
Sometimes	15	50.0
Often	4	13.3
Greatest fear after diagnosis of BRCA		
Children developing BRCA	13	43.3
Cancer spreading	8	26.7
Undergoing treatment again	4	13.3
Leaving children/family	3	10.0
Being sick (again)	1	3.3
Other	1	3.3
Breast cancer had affected relationships with:		
Partner	14	46.7
Family	10	33.3
Friends	5	16.7
Working at time of diagnosis:	16	53.3
Employers were supportive/sympathetic: Yes (n=15*)	8	53.3

* One woman was self - employed i.e. only 15 women had employers.

The women with BRCA in this study had had many different emotional experiences. For example, one woman reported that even though her diagnosis was made in 1972, she found that BRCA was always at the back of her mind. Several other subjects stated that they felt anxious about every ailment and pain that they experienced. Jacobs and Gibson (1998) also reported this response. A further subject in the present study said that her medical practitioner increased her anxiety by becoming over excited at each ailment that she mentioned. Another woman, with a maternal aunt with BRCA, was shocked at her own diagnosis, since she felt that while her maternal relatives were all large breasted she, like her paternal relatives, was small breasted. No one in her paternal lineage had reportedly had BRCA so she had felt almost immune to it. Distress was experienced by another woman who had not had her questions properly answered. Many women expressed the need to be around people and to continue with life, because as one subject stated 'if you do not you just sink'. However, another subject reported being quite happy with her new improved breasts.

Regarding the effect on relationships after the BRCA diagnosis, 16 (53.3%) Group A women reported no change in their relationship with their partner after their diagnosis. Of the one third who reported changes, three mentioned positive changes (one woman stated that she now really felt secure in her partner's love and commitment to her) and seven negative changes. When the latter group were asked to elaborate, four reported psychosexual issues to be the problem. One woman reported that her husband could not discuss her BRCA with her, changing the dynamics of their relationship, and another women that her partner did not share the same priorities anymore and she was considering getting a divorce.

Concerning their families, 20 (66.7%) Group A women reported that the diagnosis had not affected their relationships with their families. A few (5) described positive changes, with strengthened family ties, and nine women described negative changes in the relationships with people around them, especially difficulties with teenage children. One woman's guilt over the possibility that she would pass the gene mutation for BRCA to her daughter changed the dynamics of their relationship resulting in some manipulation of the mother by her daughter. Four other women reported problems with children who became hostile or 'clingy'. Other reasons given to explain changed relationships were either 'overbearing' relatives or relatives denying the reality of the diagnosis. However, most (25) women reported no changes in their relationships with their friends. Those relationships that changed did so because in times of difficulty the women had discovered which friends supported them. However, Fredette (1995) noted that individuals without BRCA sometimes withdraw from women with the condition because of their own fears of developing the condition and/or of death. Schomer and Horwitz, (1993) stated that personal relationships seemed to improve after a diagnosis of BRCA.

In the present study approximately half the employers (53.3%, see Table 3.8) were very supportive of their employees with BRCA. The study by Oliviere and Golding (1996) also showed that most employers played a supportive role to women with BRCA. The work place is where many people find themselves for the major part of the day and, consequently, many women with BRCA may find that returning to work may represent a return to normality and the continuation of life (Fredette, 1995).

3.5.1.2 Impact of BRCA

Immediately following the diagnosis of BRCA half (50%) of Group A subjects felt that their lives would change in some way (Q 4.14 and Q 4.14.1 Appendix C). This change was generally perceived as being potentially negative and in retrospect, 26 (86.7%) of the Group A subjects reported that BRCA had indeed impacted on their lives, but all of these women suggested that, in general, the change was positive. They all mentioned that they gained a greater appreciation of people and nature, a greater sensitivity and compassion towards others coupled with the ability not to focus on the insignificant, and a greater enjoyment of life. One observed trend, also reported by Kaye (1991) and Fredette (1995), was the desire of several subjects (11, 36.6%) to help other women cope with their disease. Of note, these women did belong to support groups, which may have created an ascertainment bias.

3.5.1.3 Support infrastructures

Social support can be obtained from family members, friends, support group members, a religious community and/or a health professional. Primary support is received from family or friends and if this proves to be inadequate professionals in psychology, social workers, counsellors or members of appropriate support groups may be sought to deal with specific psychological issues (Cope, 1995). On Table 3.9 the results are presented regarding the people who the subjects in this study depended upon for emotional support, what their opinions were regarding whether women with BRCA and their relatives should be offered professional support, and whether or not the Group A women had been treated for depression.

About half of the women in this study reported that they had received the most emotional support from their partners in times of crisis (16, 53.3% of Group A, 4, 44.4% of Group B and 17, 56.7% of Group C) (Question 5.13 in Appendix C). Schomer and Horwitz (1993) stated that most BRCA patients acknowledged that it was the support received women suggested that, in general, the change was positive. They all mentioned that they gained a greater appreciation of people and nature, a greater sensitivity and compassion towards others coupled with the ability not to focus on the insignificant, and a greater enjoyment of life. One observed trend, also reported by Kaye (1991) and Fredette (1995), was the desire of several subjects (11, 36.6%) to help other women cope with their disease. Of note, these women did belong to support groups, which may have created an ascertainment bias.

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Table 3.9 Emotional support for women with BRCA and their relatives

	Group A (N=30)		**Group B (N=9)**		**Group C (N=30)**	
	N°.	Percent	N°.	Percent	N°.	Percent
Most emotional support received from:						
Partner	16	53.3	4	44.4	17	56.7
Parent	0		1	11.1	8	26.7
Child	2	6.7	0		3	10.0
Other family member	0		1	11.1	2	6.7
Friend	3	10.0	1	11.1	0	
No-one	1	3.3	0		0	
Other- Self	2	6.7	0		0	
Professional *	3	10.0	1	11.1	0	
Everyone	3	10.0	0		0	
Been involved with support Groups?	17	56.7	N/A		N/A	
BRCA patients **should** see a counsellor	26	86.7	8	88.9	29	96.7
FDR of affected individuals **should** see a counsellor	21	70.0	7	77.8	20	66.7
Been treated for depression	7	23.3	1	11.1	5	16.7

*In Group A one subject was supported by a psychologist, another by a social worker and the third, a professional counsellor. In Group B one subject obtained the most emotional support from a psychologist.

3.4.1.4 Support groups

Support groups have traditionally been run by volunteers and organisations, by individuals in the community, or in hospitals or clinical settings. Cancer support groups provide people with cancer and their families with information and support by sharing the illness experience as well as the personal feelings. The group members help provide strength by 'being there' for each other, and promoting a sense of belonging (Cope, 1995, Oliviere and Golding, 1996). Just over half (16, 53.3%) the Group A women were involved in support groups and of those not involved two reported that they would have benefited from such a service. Seventeen of the Group A subjects were ascertained through support groups and this may have resulted in ascertainment bias (i.e. more women actively involved in a support group then would be expected). There were two main groups supported by the subjects: Reach for Recovery which was started in 1952 in the United States of America, and in 1967 in South Africa, as a voluntary and free service of CANSA (Reach for Recovery Pamphlet); and a private group attended by only 8 women (all of whom participated in this study) who all live in the Northern suburbs of Johannesburg. The researcher found it most enlightening to speak with the members of the latter group as they promoted positive thinking and initially all spoke boldly about this positive attitude. However, as the interviews progressed the researcher realised that not all these women were coping well with their diagnosis and two were quite distressed, but, because of the group philosophy they could not express their feelings openly. This highlighted for the researcher the limitations of support groups. While they have a very important role in supporting women with BRCA, they may need to be facilitated by a professional, who can identify those individuals with unresolved feelings or issues and offer them individualised attention.

3.5.1.5 Depression

The accurate diagnosis and treatment for depression is becoming increasingly important in individuals with cancer (Boermeester and Berard, 1998). According to the findings of another study 20-30% of women with BRCA experience a disruption in their quality of life through change of roles, functional abilities and difficulties in relationships with family and/or friends (Irvine *et al.*, 1991). In addition Dean (1987) reported sexual dysfunction, anxiety and depression in subjects one year after a diagnosis of BRCA. In the present study seven Group A women reported that they were treated for depression. However, five of these had treatment prior to their diagnosis. Of the two treated for depression after their diagnosis one was treated after her house burned down and another due to marital problems. The latter two subjects both admitted that BRCA may have contributed to the depression. The subjects in the present study completed the Beck Depression Inventory (BDI) and the data collected were scored and tabulated, and the results are depicted on Figure 3.4.

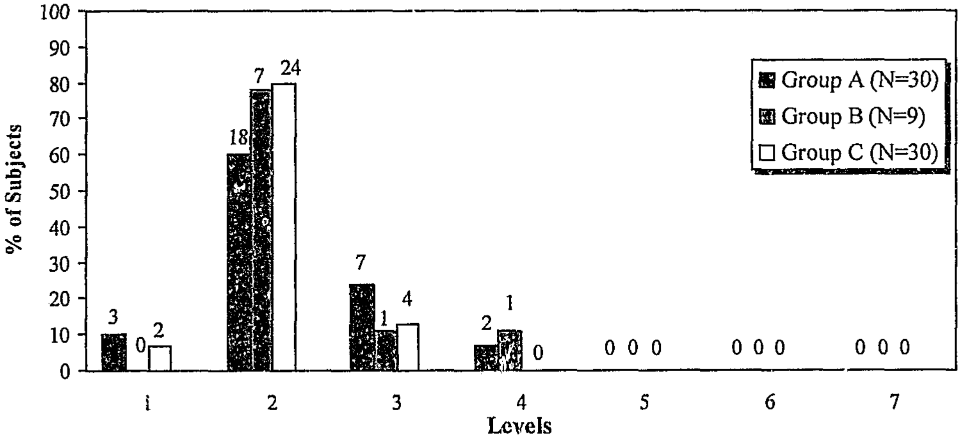

Figure 3.4 Levels of depression as measured by the Beck Depression Inventory 1 = The ideal, 2 = Ups and downs that are considered normal, 3 = Mild moody disturbances and 4 = Borderline clinical depression, 5 = Moderate depression, 6 = Severe depression and 7 = Extreme depression. Bar labels represent number of subjects

None of the subjects participating in this study showed depression levels beyond level 4, 'borderline clinical depression'. However more Group A women (9) than Group B (2), and Group C (4) women displayed either 'mild moody disturbances' or 'borderline clinical depression'. However, using the Kruskal Wallis one-way analysis of variance there was no significant difference between the levels of depression found in the three subject groups ($p > 0.7$). Several subjects in the study commented that they found the BDI categories to be rather rigid and difficult to respond to in some cases. These women felt that some of their true answers fell between categories.

The women in this study were aware of how emotionally straining BRCA is and, therefore, most recommended the use of professional counselling services (63/69, 91.3%). The response of the subjects to the question of whether FDRs of affected individuals should be offered the same support was not quite as strong, although most (7, 77.7%) of the Group B women themselves felt this to be important.

3.5.2 Responses to BRCA in first-degree relatives of affected women (N=9)

Of the nine women with a first-degree relative (FDR) diagnosed with BRCA seven had relatives who were mothers and two were sisters. One subject had both a mother and sister with BRCA. Regarding their FDRs diagnosis the Group B subjects reported feeling shocked (4), angry (2), afraid that their relative would die (1), numb and detached (1) and guilty (1). Kelly (1992) commented that these emotional responses are all found frequently in those with a relative with BRCA. Eight of the nine Group B women reported having a close relationship with their affected relative and seven were involved in the care of this relative. Only one reported that their FDR (mother) died from BRCA and the subject felt relief after her death as it brought an end to her mother's suffering. As the Group B subjects were ascertained through the Group A subjects it is not surprising that most of their affected relatives were still living. The Group B subjects reported that their greatest concern about BRCA was developing it themselves and leaving their families or children (4), being sick (2), having treatment (1), and the possibility of their children developing BRCA and dying of the condition (1).

For some women at increased risk for BRCA, the fear of cancer can become a focal point for all that is wrong in their lives (Schneider 1994). The Group B subjects were asked about the types of emotional responses experienced since their relatives' diagnosis with regards to BRCA (most [7, 77.8%] of the subjects provided two or more emotional responses) and the results are depicted on Figure 3.5. Six (67%) of the Group B subjects had felt anger since this diagnosis, and five (56%) reported feeling fear of developing BRCA. Several Group B women reported feelings of grief (5) and guilt (2). The latter is a common response as these women think about their affected relatives' suffering and how they could have done more for them in their time of need (Schneider, 1994). Five subjects reported fear of dying and this according to Schneider (1994) may be strongest in those who watched their relative die. Lack of control was reported by four (44.4%) Group B women, and this may result in lowered self-esteem and vulnerability (Schneider, 1994).

The Group B women were on average 25.8 years old (range 13-39) when their FDR's were diagnosed with BRCA and four of the women were between 10 and 19 years old. The literature reports that women whose mother's diagnosis was made whilst they were still in their teens, may have difficulties relating to risk and sexuality issues and may display rebellious behaviour (Kelly, 1992; Peters and Stopfer, 1996). This was highlighted, in the present study, in one of the Group B subjects, aged 16 years at the time of her mother's diagnosis, who reported that she had a lack of sensation in her breasts and a feeling of having already lost them.

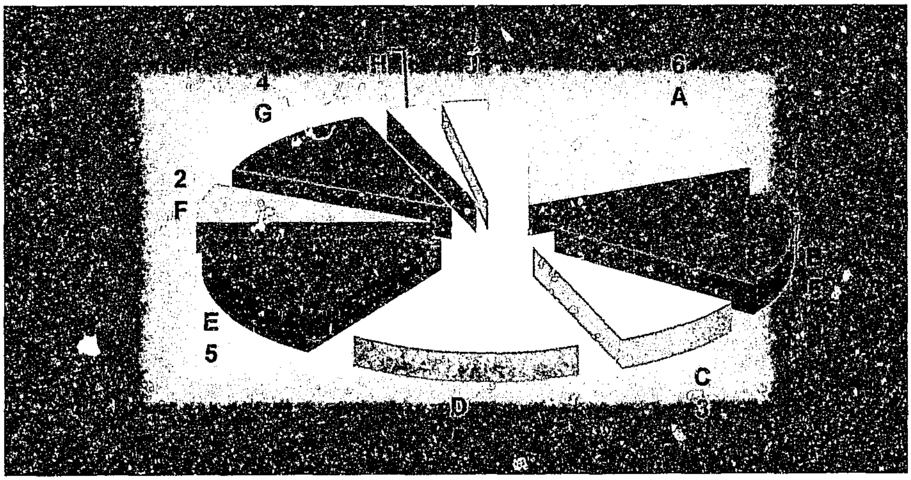

Figure 3. 5 Emotions experienced by subjects with a FDR with BRCA after the diagnosis was made (A = anger B = fear of developing BRCA, C = fear of disfigurement, D = fear of dying, E = grief, F = guilt, G = lack of control, H = negative body image, and J = self-pity).

She was referred to a psychologist who has helped her deal with her anxieties relating to BRCA. This young woman stated that she had begun smoking as a passive aggressive defence to her risk of developing cancer. She also described her feelings of intense anger and subsequently guilt towards her mother with whom she never shared a close bond. Her mother's diagnosis caused further problems within the family as it became a taboo subject, which could not be discussed. Another subject (29 years old when her mother was diagnosed and 37 when she died) reported that she felt as though she was 'living with a time bomb', and just waiting for her diagnosis. Kelly (1992) has also described this phenomenon. One further subject appeared to be in denial about the possibility of developing BRCA and she did not wish to discuss the condition and its influence on her life in more than a superficial fashion. Although this subject reported never thinking about BRCA and that her mother's diagnosis had not affected her life, she stated that she would not use screening methods, as she would be afraid of what she might find. Yet another subject stated that she felt terrified and out of control when her mother was diagnosed with BRCA. She felt as though there had been a reversal of roles and the traditional caregiver was the one requiring the care. She was also angry when her mother was given support by hospital staff while she was left to fend for herself. She felt that it would have been very beneficial if the hospital had appointed a social worker, or some other health care professional, to talk with her about her fears and to answer her questions. On the other hand, other subjects reported that they did not believing in worrying and they just got on with their lives, although they admitted to being aware of the chance of developing BRCA. All of these responses are normal reactions to a potentially devastating situation (Kelly, 1992; Schneider, 1994). It can be deduced from the above paragraph that there is often a range of both positive and negative reactions to a family history of BRCA.

None of the small group of potentially at-risk (Group B) women, investigated in the present study, felt that BRCA had affected their ability to make long term plans or commitments (see Table 3.5). However, according to Schneider (1994) concerns about an impending disease can impact on daily activities and the making of major life decisions in high risk individuals (Schneider, 1994).

3.6 Methods used in screening for BRCA

Screening strategies to identify individuals at-risk for BRCA are the most important tool for the early detection of this disease, and educating the public about these strategies promises to contribute to the early identification of affected women (Philips *et al.*, 1999). The results regarding what screening strategies women in the present study used (prior to their diagnosis in the case of Group A subjects) are presented on Table 3.10.

Table 3.10 Screening strategies used by the subjects

Item	**Group A- Prior to diagnosis (N=30)**		**Group B (N=9)**		**Group C (N=30)**	
	No.	%	No.	%	No.	%
Breast -Self examination						
Never	10	33.3	3	3.3	8	26.7
Once a year/less	2	6.7	0		6	20.0
Few times a year	9	30.0	4	44.4	12	40.0
Monthly	5	16.7	2	22.2	4	13.0
Weekly	2	6.7	0		0	
Daily	2	6.7	0		0	
Clinical Breast Examination	NOT ASKED					
Never			1	11.1	3	10.0
When recommended by doctor			3	33.3	7	23.3
Once only			4	44.4	1	3.3
Every two years			0		3	10.0
Once a year			1	11.1	15	50.0
Other			0		1	3.3
Mammogram						
Never	13	43.3	7	77.8	14	46.7
Whenever recommended by doctor	3	10.0	0		1	3.3
Once	4	13.3	0		8	26.7
Every two years	3	10.0	2	6.7	2	6.7
Once a year	7	23.3	0		5	16.7
Other	0		0		0	

When asked which screening strategies they used for BRCA detection, only five (16.7%) Group A subjects reported doing monthly BSE prior to their diagnosis with this number increasing to eight (26.7%) after diagnosis in those subjects who had unilateral mastectomies or lumpectomies. A third (10) of the affected women detected their lump themselves, despite not doing BSE regularly, emphasising the importance of this type of screening. Only two (22.2%) and four (13.3%) of the Group B and C subjects respectively reported doing regular (monthly) BSE. Kash *et al.*, (1992) stated that high levels of anxiety among high-risk women may act as a barrier to adherence to BSE. Half of the Group C women and only one Group B woman reported having annual CBE. Mammograms are frequently only offered to older women, but it was noted that more Group A (10) subjects had had annual mammograms prior to their diagnosis compared with Group C (5) subjects, although the groups were closely matched for age (the average age at time of diagnosis for Group A subjects was 48.7 years and the average age for Group C subjects was 52.4 years). This may because 7 (23.3%) of Group A subjects had a first-degree relative diagnosed with breast cancer. None of the subjects in Groups B or C had undergone preventative surgery.

The Group B and C subjects were asked to report on recommendations their medical practitioners made regarding screening for BRCA. The results of the subjects' responses appear on Table 3.11.

Table 3.11 Recommendations by medical practitioners regarding BRCA screening for unaffected women

	Group B (N=9)		Group C (N=30)	
	N°.	Percent	N°.	Percent
Discussed BRCA with doctor	8	88.9	17	56.7
Doctor recommended:	(N=8)		(N=17)	
Yearly mammogram	8	100.0	13	76.5
Regular CBE*	5	62.5	2	11.8
Regular BSE**	3	37.5	2	11.8
Nothing			2	11.8
Comfortable with these recommendations		100.0	16	94.1

*CBE = clinical breast examination, **BSE = breast self-examination

In Groups B and C, 8 (88.9%) and 17 (56.6%) subjects respectively, discussed the issue of BRCA with their medical practitioners. Within these groups, medical practitioners recommended mammograms over a certain age (range: 35 to 50 years) to all Group B subjects (8,100%) and to more than half (13, 76.5%) of the Group C subjects. Mammograms should be routinely offered to all women over 50 (CANSA, 1998). There is however still controversy over whether women between 40-49 years of age should be having regular mammograms because the rate of benign surgical biopsies, false positives and follow up costs were seen to be higher in this age group (Frisell and Lidbrink, 1997). Yet according to Rosenberg *et al.* (1998) age seems to be a minor determinant of the senstitivity of mammograms in women 40 years or older.

According to the subjects these same medical practitioners only recommended regular CBE to five (55.6%) Group B and two (6.7%) Group C women, and regular BSE to only 3 (33.3%) Group B and 2 (6.7%) Group C women. Although the sample size in this study is small and the results depend on the accuracy of the subjects' reports, it is of concern that so few medical practitioners apparently recommended these non-invasive screening strategies. However, medical practitioners need to be asked directly about the recommendations they make to women before conclusions can be drawn as many subjects may have forgotten or misinterpreted what their medical practitioners have advised. One subject gave inconsistent responses reporting that her physician had made no recommendations with regards to screening for BRCA, however, she had been for a mammogram and when asked why, replied that her physician had told her she should.

3.7 Attitudes to genetic testing for BRCA susceptibility genes in Group A and Group B subjects

The subjects were asked several questions pertaining to attitudes to genetic testing and its possible emotional outcome. The results are recorded on Table 3.12. About half the Group A and B subjects (56.7% and 55.6% respectively) stated that they would request genetic testing if it became available locally, to identify the genes responsible for their BRCA (Group A) or to determine if they were at high risk (Group B). Only the data from these two subject groups is included in this section as genetic testing is more relevant to them than to Group C subjects. Sixty-three percent of Group A and 88.9% of Group B subjects felt that they had at least a moderately high likelihood of having a mutation in one of the BRCA susceptibility genes (see Table 3.12). Women with BRCA (22,73%) more often than the Group B subjects (3, 33.3%) reported that they wished to test in order to determine whether their children were at risk. This finding corresponds with the fact that 43% of these women stated that their greatest concern was that their children could develop the condition. Schneider (1994) writes that concerns about children developing BRCA is the 'traditional' reason for seeking genetic testing, as children of a parent carrying a cancer susceptibility gene will be at a 50% risk of inheriting the same predisposition. First-degree relatives of affected women, however, mostly (5, 55.6%) reported that they wished to have the test to determine whether they should take better care of themselves.

Only three subjects (one from Group A who had had a lumpectomy and two from Group B) reported that they would opt for prophylactic surgery if they tested positive. Decisions about prophylactic surgery seem to be very personal and based on various cognitive and emotional factors. Schneider and associates (1995) noted that it is rare that an individual's risk is substantial enough to consider this surgery. However, if such surgery affords an individual relief from the anxiety they may feel about developing BRCA it is worth consideration. Nevertheless, caution is advised and such an individual should be referred initially to a psychologist so that this anxiety and the psychological advantages and disadvantages of such surgery can be addressed.

The most commonly reported reasons for not wanting to request genetic testing for women with BRCA (Group A) included concerns about their possible emotional responses (7, 23.3%) and uncertainty about the accuracy of the test results (7; 23.3%). It was noted that almost half (46.7%) the subjects responded 'none of the above' as their reason for not requesting genetic testing. When probed further most reported that they were not interested as they already had had BRCA or it would not be helpful to them to test. First-degree relatives of affected women (Group B) mostly (6; 66.7%) reported that fear of having the gene mutation might be a reason not to request testing (Table 3.12).

When asked about what the impact of a positive result (that they had a specific gene mutation) might be just under half (13; 43.3%) of Group A subjects expected to feel guilty about possibly passing the gene on to their children, compared to Group B where just under half (4; 44.4%) of the subjects expected to feel depressed. Despite these responses, 6 (20%) Group A and 2 (22.2%) Group B subjects expected to feel more in control knowing their status. Regarding a negative result 5 (16.7%) Group A subjects felt that they would still worry about BRCA. Within Group B, 4 (44.4%) subjects reported that if they did not have a susceptibility gene this would have a positive effect on their quality of life. Regardless of the so-called interest in genetic testing only a few of the subjects (8, 26.7% in Group A and 2, 22.2% in Group B) wished to see a genetic counsellor to discuss genetic testing further. This may imply that these women do not understand what genetic counselling is or how it could help them or are showing only a superficial interest in testing and they may not follow through and act on their verbal statements. In a study about uptake of predictive testing for Huntington's Disease only 15.5% of the subjects requested testing. It was however, commented on that, like in this study, that initially many of the subjects expressed an interest in predictive testing but withdrew from the program at a later date (Crauford *et al.,* 1989).

Table 3.12 Attitudes and projected responses to genetic testing of Group A and Group B subjects

	Group A (N=30)		Group B (N=9)	
	N°	Percent	N°	Percent
Would request testing				
Yes	17	56.7	5	55.6
No	8	26.7	1	11.1
Unsure	5	16.7	3	33.3
Reasons for requesting testing				
To see if children are at risk	22	73.3	3	33.3
To plan for future	8	26.7	3	33.3
To take better care	7	23.3	5	55.6
Undergo better screening strategies	2	6.7	2	22.2
To undergo prophylactic surgery	1	3.3	2	22.2
To make decisions about having children	0		1	11.1
Reasons not to request testing				
Concerned about emotional response	7	23.3	5	55.6
Unsure about test accuracy	7	23.3	3	33.3
Fear that have gene mutation	4	13.3	6	66.7
Concerned about family's response	3	10.0	2	22.2
Concern that could affect insurance	2	6.7	2	22.2
Concerned about partner's response	0		1	11.1
None of the above	14	46.7	1	11.1
Having a gene mutation would result in:				
Guilty feelings about passing gene to children	13	43.3	2	22.2
Feeling more anxious	8	26.7	0	
Feeling more in control	6	20.0	2	22.2
Feeling more depressed	1	3.3	4	44.4
A -ve affect on quality of life	1	3.3	0	
A -ve affect on rel./marriage	0		0	
Considerations of suicide	0		0	
None of above	1	3.3	1	11.1
Not having a gene mutation would result in:				
A +ve affect on quality of life	7	23.3	1	11.1
Continued worry	6	20.0	4	44.4
Feeling less anxious	5	16.7	2	22.2
Feelings of guilt if other family members had gene mutation	2	6.7	1	11.1
Feeling less depressed	1	3.3	0	
A +ve affect on rel./marriage	0		0	
None of the above	9	30.0	1	11.1
Chance have breast cancer susceptibility gene:				
No chance	4	13.3	1	11.1
Small chance	7	23.3	0	
Moderate chance	9	30.0	5	55.6
High chance	6	20.0	2	22.2
Have gene mutation	4	13.3	1	11.1
Wish to discuss genetic testing for BRCA with a genetic counsellor:				
Yes	8	26.7	2	22.2
No	22	73.3	5	55.5
Unsure	0		2	22.2

There are situations where the offering of genetic testing can be counterproductive, for example if a person is preoccupied or very involved with the care of an affected relative, he or she may already be immobilised by anxiety about developing BRCA (Peters and Stopfer, 1996). In such situations testing may lead to the stress and tension becoming excessive and out of control.

The interest in genetic testing could be attributed to the perception of high risk and the anxiety about cancer found in the subjects in this study, and it is consistent with the findings of Lerman *et al.* (1995). To prepare for the likely demand for genetic testing for BRCA susceptibility, in the future, guidelines for the provision of a genetic testing service in South Africa need to be established. At-risk women need to understand the complexities and implications of genetic testing and have supportive counselling facilities available so that the adverse psychological affects of testing can be prevented.

3.8 General Discussion

The many facets of BRCA investigated in the present study are summarised below and the main findings are highlighted, with reference to the aims of the study and relevant studies in literature.

The various environmental factors that have been traditionally implicated in the development of BRCA and which were investigated in the present study included: maternal age at birth of first child, breast feeding, maternal smoking and use of oral contraceptives. None of these factors appear to have been involved in the development of

BRCA in this study, although more experimental women smoked more cigarettes there was no significant difference between the study groups. Adami and co-workers (1988) also suggested no association between, use of oral contraceptives, parity, smoking, and BRCA and Salber and co-workers (1969) reported no link between breast-feeding and BRCA. However the results of this study are not in agreement with the reports by Robertson *et al.* (1997) and Sitas *et al.* (1998) who reported that age of a first child is associated with a woman's risk of developing BRCA.

The first aim of the study was to investigate the knowledge of BRCA genetics and the level of knowledge in the Group A and Group C subjects was found to be similar. The results showed that approximately half the Group A and Group C subjects were aware that: both environmental and genetic factors contributed to the development of BRCA; risk increases with age; not all women with BRCA have a gene mutation or visa versa; and that there is a 50% chance of passing a gene mutation to any children they might have. Approximately half the Group A (53.3%) and Group C (46.7%) subjects were aware that the lifetime risk of developing BRCA was between 6% and 15%, but over half the Group B subjects overestimated the risk of BRCA as being between 16-25%. Wonderlick and Fine (1997) reported that their at-risk subjects tended to underestimate this risk. The subjects in the present study mostly reported being involved in the care of their relatives with BRCA. This experience may have increased their anxiety about the condition and made it seem more prevalent. The subjects from both the present study and the study by Wonderlick and Fine (1997) gained their information about BRCA genetics mostly from magazines, but also from television, family members and friends, as well as medical practitioners.

The second aim of the study was to determine the emotional and social consequences of a diagnosis of BRCA and its treatment on affected women and their relatives. The responses showed that BRCA affects many areas of the lives of affected women. Of the Group A subjects, half had had lumpectomies and half either a unilateral or bilateral mastectomy. The most commonly reported response to their diagnosis of BRCA was shock. Schneider (1994) also reported this to be the most common emotional response to a diagnosis of BRCA. Other responses to the diagnosis of BRCA included fear, anger, disbelief, sadness, and relief (in a few who had affected close relatives). A third of the women stated that they often thought about their diagnosis and it affected their ability to concentrate. The greatest fear of Group A women in the study was the possibility that their children might develop the condition or that the cancer would spread. The majority felt they had the best possible treatment and were satisfied with the care received by their medical practitioners. Despite this, less than half the subjects reported that their medical practitioners included them in the decision making process or discussed their emotional well being with them. Fallowfield and colleagues (1990) suggested that good communication between the doctor and patient and shared decision making over treatment has a protective effect on patients' "psychological adjustment". One third of the Group A women reported changes in their relationships with their partners, and other family members, after the diagnosis. Approximately half the women stated that they received most emotional support from their partners as was reported by Schomer and

Horwitz (1993). Half the Group A subjects also belonged to a support group. Twice as many women with BRCA than Group C s in this study had mild and border-line clinical depression, but the numbers in each group were too small to test for statistical significance. The majority of subjects stated that affected women and their first-degree relatives should be offered professional counselling services.

Many of the Group C subjects had known women diagnosed with BRCA and stated that their levels of anxiety around BRCA had been heightened. Over half the Group B and Group C subjects thought about developing the condition occasionally or sometimes.

The small group of FDR participating in this study, many of whom had cared for an affected relative, reported feelings of anger, guilt, lack of control and fears about dying, disfigurement, and/or developing BRCA. Approximately half of these Group B women interviewed reported that their greatest concern about BRCA was developing the condition and leaving their families.

The third aim of the study was to investigate what screening strategies women used. Similar numbers of Group B and Group C subjects in the present study were doing regular BSE (once a month), and about half the control subjects but only one Group B subjects had CBE annually. Thirlaway and Fallowfield (1993) report that at-risk women are no more likely to use available screening strategies than those with no family history. Of the group B and C subjects who discussed screening for BRCA with their medical practitioners few reported that these practitioners recommended regular BSE or CBE.

The medical practitioners did however recommend annual mammograms to the majority of these women.

The last aim of the study was to determine women's attitudes towards genetic testing for BRCA susceptibility genes. Approximately half the Group A and Group B subjects had a positive attitude to testing and stated that they wished to test to determine either if their children could be at-risk and/or they should increase screening strategies and take better care of themselves. Lerman and colleagues (1995) also reported similar reasons for wanting testing among 105 FDRs in Washington, USA. In the event of a positive test just under half the Group A women stated that they might feel guilty about possibly passing the gene on to their children while about half the Group B women thought they might become more depressed about their situation. Approximately half the women in both groups felt they had a moderate to high chance of having a gene mutation predisposing them to BRCA, as was reported by Lerman and co-workers (1995). Approximately a third of these women wished to meet with a genetic counsellor to discuss the possibility of testing further.

CHAPTER FOUR CONCLUSION

In this chapter conclusions will be drawn relating to the aims of this study. The limitations of the study, suggestions for further research and applications and recommendations will then be discussed.

4.1 Conclusions relating to the aims of the study

4.1.1 Knowledge of the genetics of BRCA

The overall knowledge of BRCA genetics was moderately good in all three groups, showing that women are receiving some information on this subject from many different sources. Most of the subjects estimated the lifetime risk of developing BRCA to be between 6 and 15% but the Group B group tended to overestimate this risk stating that it was more likely to be between 16-25%. This could be as a result of raised anxiety levels regarding the development of BRCA because they have lived with affected people and know the burden of the disease from a personal perspective (Schneider, 1994).

This study also indicates that the majority of participating women was unaware that Ashkenazi Jews might be at an increased risk for developing BRCA. Therefore, more education is required in this population. Since the most commonly reported source of information was magazines educators should use this medium, initially, to reach the lay public with regards to knowledge of BRCA genetics.

4.1.2 Experience of a diagnosis and treatment of BRCA

Women experience a kaleidoscope of emotional and social responses to BRCA. These include difficult and sometimes, unexpected emotional reactions. The types of treatment experienced by the women diagnosed with BRCA seemed to influence feelings of femininity leading to poorer self-esteem (Kemeny *et al.*, 1988) as supported by this study. Whether medical practitioners involved patients in decision making regarding treatment, however, did not seem to affect whether women were satisfied with the care and treatment received. However, those medical practitioners that acknowledged emotional difficulties experienced by their patients' left their patients feeling calm and more in control. The manner in which these healthcare professionals treat women diagnosed with BRCA may influence the amount of anxiety and stress experienced by them (Schomer and Horwitz, 1993). Responses to BRCA are very individual, often unexpected and need to be considered by health professionals.

The majority of women reported that professional counselling should be offered to women diagnosed with BRCA and their families. From the researcher's experience, those subjects visited by volunteers from the Reach for Recovery support group greatly benefited from seeing women who had coped with their diagnosis of BRCA as they felt understood. The psychological adjustment to a diagnosis of BRCA is apparently not stressed often enough (Rennecker and Cutler, 1952; Fallowfield and Hall, 1991; Schomer and Horwitz, 1993; Silliman *et al.*, 1998). A better understanding of the psychological issues will improve the holistic care received by affected patients allowing them to cope better with their condition.

When someone is informed that a woman closely related to them or a close acquaintance has developed the disease they themselves may experience various emotions including fear for the affected individual, fear of their own mortality and fear that they may also develop the condition (Schneider, 1994). These reactions coupled with the emotional turmoil experienced by the affected women may result in both positive and negative changes in the dynamics of their relationships. It seems that by just being in contact with a women diagnosed with BRCA may raise anxiety levels and increase awareness. This suggestion is supported by the results of this study which show that the Group C subjects had similar levels of knowledge to Group A subjects and that 80% of the Group C s had known someone diagnosed with the condition.

Having a FDR diagnosed with BRCA can result in not only increased awareness but may have a profound effect on women especially if the women were teenagers when their mothers were diagnosed (Peters and Stopfer, 1996). Many of the FDRs interviewed felt that their risks of developing BRCA were increased and some of these women expected to develop BRCA at some point during their lives. Two women diagnosed with BRCA reported that they felt relief at their diagnosis. Since their mothers' diagnosis they had merely been waiting for their turn to come, demonstrating the effect their mother's diagnosis had on their lives. Many of the women interviewed, especially the FDRs of women diagnosed with BRCA, reported that psychological support should be offered to family members of a woman diagnosed with BRCA.

4.1.3 Screening strategies for BRCA

In general, screening strategies for BRCA, such as BSE, CBE and mammograms seem to be, for the most part, underutilised (Kash *et al.,* 1992; Fletcher *et al.,* 1993) as supported by this study. Early detection of BRCA leading to more effective treatment is the best defence women have against this disease and this issue needs to be further explored. Possible reasons for this underutilization of the available screening techniques include fear of finding a lump, apathy, medical practitioners not advocating such measures (as reported by some subjects in this study) or in the case of BSE, women may be uncertain how to perform this procedure. It is essential that medical practitioners be approached about what screening for BRCA they are advocating, to whom, how often and why.

Clinical breast examinations and mammograms should not be replaced with only BSE, as mammograms can detect lumps in earlier stages then BSE (Cassileth, 1992). The Cancer Association of South Africa (1998) recommends that women examine themselves once a month and have a clinical examination (physical examination by a health professional) every 1-2 years. In addition the NCI/PDQ (1998) suggested biennial mammograms alone and/or with yearly clinical breast examinations for women 50 years and older. However, in a third world country such as South Africa where resources are limited, the value of BSE is increased, as the only financial cost involved is to educate women about how and why they should perform BSE. One third of the Group A subjects detected the lumps themselves emphasising the value of this technique.

The role of the medical practitioner is invaluable and the manner in which he/she interacts with the patient may greatly influence the screening habits of patients (Maxwell *et al.*, 1997). Healthy women, who see their physicians rarely, often derive information from the media (mainly magazines). The media therefore have a central role in communicating information about BRCA. It is the responsibility of these magazines, their healthcare reporters and health professionals working in cancer care to ensure that the information reported is accurate and easily understood. Healthcare workers, as well as the women themselves, have to take the responsibility of making sure that screening for BRCA is undertaken.

4.1.4 Genetic testing for BRCA gene mutations

In the present study, approximately one third of both the Group A women and the Group B women reported that they wished to discuss genetic testing for BRCA susceptibility genes with a genetic counsellor. In addition, half of these subjects reported that they wished to undergo genetic testing. Health workers involved in the care of women who have BRCA and those at-risk should be made aware of genetic testing and the importance of genetic counselling services, so they can discuss this service with such patients and refer them to the available genetic counselling clinics.

The knowledge of women with regards to the genetics of BRCA needs to be assessed by genetic counsellors that are approached by women requesting genetic testing. It is also essential that the counsellors learn what past experiences of BRCA, myths, or preconceived ideas individuals consulting them may have about BRCA and its genetics.

This information is required so that the counsellor may correct the misconceptions, help the patients to understand and to come to terms with past experiences, and may educate them appropriately about all the aspects of testing. According to the present study there is some interest in genetic testing among Ashkenazi Jewish women and about half of the subjects had a positive attitude to testing. It is important that individuals requesting testing are counselled and well educated about the meaning of: (1) A positive result which increases the risk that an individual may develop BRCA, but it is not a guarantee (Schneider *et al.,* 1995). There is however concern about the reaction to a positive diagnosis, some women reported that they may feel profound guilt about passing the gene on, others report that they may become more anxious or depressed. However, some women reported that they would feel more in control knowing their genetic status. It is the women whose positive test may result in a negative impact on their lives who are of concern and a more in-depth prospective and retrospective study may need to be conducted to determine which women are likely to have negative reactions to testing and therefore will require more extended support and/or counselling. (2) A negative result which means an individual does not have one of the BRCA genes tested for but that they are at the population risk (1in 13 lifetime risk for white SA women [Sitas *et al.*, 1998]) and they may still develop BRCA (Schneider *et al.,* 1995). Some women with a negative result may not feel reassured and may continue to worry that they may have some predisposition to the condition. Other women may feel 'survivor' guilt about family members who develop BRCA. All these emotions need to be considered and handled by the informed counsellor in the counselling situation.

Many of the Group A women indicate that their greatest concern about BRCA, and their main reason to undergo genetic testing, is concern for the children. For this reason it is important that women are educated about the 'actual' risks of developing BRCA themselves and passing it on to their children. By indicating their concerns for their children the women are showing their awareness of the inherited and genetic component to BRCA. However, it is not clear how much about this component is really understood. It also seemed to the researcher that women participating in the study were unaware that the majority of BRCA cases are due to sporadic mutations and that their children may only be at the population risk for this condition. Thus emphasising the importance of the role of the genetic counsellor in the holistic treatment of women with BRCA and their families. The guilt about passing on the 'legacy of cancer' can result in changes in the family dynamics and negative effects may be increased when people do not understand the nature of the genetics of BRCA.

4.2 Limitations of the study

This research project had to be completed in one year and this proved to be a serious limitation as only a small number of subjects could be ascertained in the limited time available leading to a small sample size. This meant that statistical testing of the data could not be completed as was originally planned. Also only trends could be observed in the results rather than significant differences.

The project focused on only one population group since gene mutations found more commonly in this population have been identified (Struewing *et al.*, 1995; Gayther and

Ponder, 1997) making the study of BRCA in this population group more topical Also, the researcher had access to women in this population group. However, this meant that the results obtained could not be generalised to apply to other South African ethnic groups. Different cultural groups may obviously have different attitudes and reactions to BRCA. Wright (1997) reported that over 80% of black women diagnosed with BRCA at the Groote Schuur Hospital between 1991-1995 did not return for further treatment due to superstitious and cultural beliefs about the causes and treatments for BRCA. The subjects in the present study were well educated with most (91 %) having completed high school, many (75%) having had tertiary education, and they belonged to a socioeconomically advantaged population. As might be expected their overall knowledge about BRCA was moderate to good. Loehrer *et al*, (1991) reported that people within socioeconomically disadvantaged population groups have a higher incidence of mortality from cancer than other groups due to delay in diagnosis. These researchers concluded that lack of education regarding cancer and its treatment resulted in inappropriate 'care-seeking' behaviour. Hacking *et al*, (1988) reported this also to be true for South African Black women.

Another limitation of this study resulted from the emigration of many of the younger generation of the Ashkenazi Jewish community from the area under investigation. Thus, there were very few first-degree relatives of women diagnosed with BRCA available for participation in this study. Therefore the results on this specific group of subjects could not be fully compared with those from similar previous studies focusing on at-risk individuals.

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4.3 Suggestions for further research

This project focused on many different facets of BRCA. However further studies are required to obtain more detailed results on some of the different topics covered. The researcher feels that more research is required to determine what screening strategies women use, under what circumstances, and why A study should also focus on what medical practitioners are advising women with regards to screening for BRCA.

Although some BRCA gene mutation testing is being done in South Africa (within a research protocol) and the present study indicates a projected 50% utilisation rate (question 6.1-Appendix C), before a full testing service is set up and widely used, more work needs to be done on the projected impact of such a service.

4.4 Applications and recommendations

Although this was a descriptive study it highlighted various areas for improvement in the care of women with regards to BRCA. Educational programs are needed to increase awareness not only in at-risk population groups such as the Ashkenazi Jews but in all older at-risk women. Such programmes may lead to the early detection of women with BRCA and therefore a better prognosis for these women. Health professionals also need to be educated in the importance of acknowledging emotional responses to such a diagnosis thus improving coping mechanisms. They also need information regarding available professional and genetic counselling services, and when to refer patients so their patients can receive holistic treatment.

The findings from this study have indicated that women's magazines are one of the sources of information regarding BRCA. The researcher plans to write various articles for the lay public and submit them to some of the more popular magazines to help increase awareness of this condition. The researcher is also intending to write a short report on the findings from this study, and it will be mailed to all participants as well as some of the mammogram and cancer clinics, the Reach for Recovery support group and CANSA.

4.5 Summary and conclusion

This study gives a broad insight into: the knowledge of BRCA genetics in the Ashkenazi Jewish community; the many and varied responses to the diagnosis of BRCA and its treatment; the selected screening strategies used by women and advocated by medical practitioners, and the attitudes of women to them; and attitudes to genetic testing. It may be seen as an exploratory study, which describes trends from which future research may develop.

"The true challenge of breast cancer is to recognise the importance of the crises and to be able to use the experience in a positive way" (Kaye, 1991).

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APPENDIX A

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

COMMITTEE FOR RESEARCH ON HUMAN SUBJECTS (MEDICAL)
Ref: R14/49 de Vos

CLEARANCE CERTIFICATE   PROTOCOL NUMBER M980312

PROJECT   "Breast Cancer In The Ashkenazi Jewish Population of South Africa: Some Psychosocial Issues

INVESTIGATORS   Miss CL de Vos

DEPARTMENT   Dept of Human Genetics SAIMR

DATE CONSIDERED   980327

DECISION OF THE COMMITTEE *

Approved unconditionally

DATE 980401   CHAIRMAN   (Professor P E Cleaton-Jones)

* Guidelines for written "informed consent" attached where applicable

c c Supervisor: Prof JGR Kromberg
Dept of Dept of Human Genetics, SAIMR

[illegible] M 980312

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and ONE COPY returned to the Secretary at Room 10001 10th Floor Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

DATE ... 5/4/98   SIGNATURE

PROTOCOL NO.: M 980312

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX B

INFORMATION SHEET

Breast Cancer in the Ashkenazi Jewish Population of South Africa: Some Psychosocial Issues
RESEARCHER: C de Vos. BSc Hons, MSc (Med) Student
SUPERVISOR: Prof JGR Kromberg. BA (Soc wk) MA PhD
Department of Human Genetics, School of Pathology, South African Institute for Medical Research and the University of Witwatersrand.

I am a MSc student at the Department of Human Genetics, University of Witwatersrand and the South African Institute for Medical Research. As part of the requirement for my degree I am undertaking a study on breast cancer. Breast cancer is the most common type of cancer found among women in the Western world and they have a life time risk of 1 in 8 of developing the condition. Although environmental factors play a role in the cause of breast cancer the strongest determinant of a women's' risk, is a positive family history. Ashkenazi Jewish women seem to be at increased risk for breast cancer and geneticists are beginning to understand some of the genes that are involved in this increased susceptibility. However, the psychosocial and emotional issues associated with breast cancer have not been investigated in South Africa. The aim of this study is to explore some of the psychosocial issues associated with breast cancer in the Ashkenazi Jewish population.

As a member of the Ashkenazi Jewish community, we would appreciate your help and participation in this study. If you agree to participate in this study, you will be asked to respond to a number of questions in an interview. This interview should not take more than an hour of your time. You will also be asked to complete an inventory yourself. There are no right or wrong answers to the questions, you should answer according to your own experiences. Your responses to the questions will help us to understand better how women cope with breast cancer in themselves or their family's.

The information you give will be kept confidential and at no time will your name be disclosed.

It is necessary for you to give your consent to participate in this study and therefore a consent form has been attached for you to sign

Your participation in the study is voluntary and you are free to withdraw at any time.

Your refusal to participate will have no penalty or loss of benefits to which you may be entitled.

INFORMED CONSENT

I consent to participate in a study that involves an interview regarding my experience of breast cancer. I understand that results from this study may be published in a medical journal and that my confidentiality will be respected.

Subject Number:.................................

Name:.. Signature:.....................................

Witness (interviewer):......................... Signature:.....................................

Date:........................ ....

APPENDIX C

BREAST CANCER IN THE ASHKENAZI JEWISH POPULATION OF SOUTH AFRICA: SOME PSYCHOSOCIAL ISSUES.

Schedule of questions.

Section One - Patient's Particulars

1.1 Subject number **1.1.1Date of Birth**....................................... .

1.1.2Age.. **Address**..

Telephone

1.2 Education

1.2.1 High School ☐ Std 6 or lower ☐ Std 7 ☐ Std 8 ☐ Std 9 ☐ Matric

1.2.2 Higher Education ☐ None ☐ University ☐ Technikon ☐ Other (specify)

1.3 Occupation....................................... **1.4 Religion** ....

1.5 Marital Status ☐ Single ☐ Married ☐ Living with partner ☐ Divorced

☐ Widowed ☐ Other (specify)...............

1.6 Number of children ....

1.6.1 How old were you when each of your children were born? (1) (2) (3) (4) (5)

1.7 Did you breast feed one or some of your babies? ☐ Yes ☐ No

1.7.1 If so, for how long with each child? (1). (2). (3). (4). (5).

1.8 Did or do you smoke? ☐ Yes ☐ No

1.8.1 If yes, for how long?.........yrs. **1.8.2 How many cigaretes a day? ......**

1.9 Did / do you take contraceptive pills? ☐ Yes ☐ No

1.9.1 If yes, for how many years? ....yrs.

Section Two- Family History

(Pedigree of at least three generations, if possible, to be drawn in space below)

Section Three. Knowledge (Cancer and Genetics)

(This series of questions has been adapted from a study done by Wonderlick and Fine, 1997)

3.1 In your opinion what is the chance for any woman to develop breast cancer during her lifetime? *(e.g. 1 in 20 or 1 in 100)* **1 in .... or A woman has a ...... % chance of developing breast cancer in her lifetime**

The next few questions focus on the relationship between genes and cancer. Genes are passed from generation to generation through the egg and sperm cells. They contain information that directs the growth, development, and function of the body. Occasionally, *a gene may be altered in some way leading to disease. Such a change is called a 'gene mutation'*

3.2 What causes breast cancer? ☐ Environmental factors (such as smoking, drinking, diet, exercise, birth control pills, where you live) ☐ genes ☐ both are equally important ☐ stress ☐ other factors are important (specify).......................

3.3 The risk for breast cancer increases with age? ☐ Yes ☐ No *☐ Unsure*

3.4 Have you ever heard of a gene mutation that increases women's risk of developing breast cancer? ☐ Yes ☐ No *☐Unsure*

3.5 If a woman carries a gene mutation associated with breast cancer, she will definitely develop breast cancer at some point during her lifetime?
☐ Yes ☐ No *☐ Unsure*

3.6 Every women diagnosed with breast cancer carries a gene mutation associated with breast cancer, from conception? ☐ Yes ☐ No *☐ Unsure*

3.7 If a woman carries a gene mutation associated with breast cancer, what do you think is the chance that she will pass the gene mutation on to any child she has?
......%

3.8 Which population group/s has a higher chance of developing breast cancer
☐ All women are at equal risk of developing breast cancer ☐ Indians ☐ Americans ☐ Muslims ☐ Ashkenazi Jews ☐ French ☐ Other specify)....................................

3.9 Where do you obtain your information regarding breast cancer? ☐ friends / family ☐ newspaper ☐ television ☐ magazines ☐ books ☐ radio ☐ physicians ☐ other health professionals ☐ organizations such as CANSA ☐ other (specify).....

The following two sections applied to women diagnosed with BRCA.

Section Four for Group A- Response to breast cancer

4.1 Prior to a diagnosis of breast cancer, did you ever think about your risk of developing breast cancer? ☐ Yes ☐ No

4.1.1 If yes, did you think your risk of developing cancer was? ☐ high ☐ average ☐ low

4.2 Prior to being diagnosed with breast cancer, you performed breast self-exams
☐ Never ☐ once a year or less ☐ a few times a year ☐ monthly ☐ weekly ☐ daily

4.3 Prior to being diagnosed with breast cancer you had mammograms? ☐ Never ☐ Whenever recommended by your physician ☐ once ☐ every two years ☐ once a year ☐ other (specify)..........

4.4 *(optional)* **What was the name of the doctor/ s who diagnosed the cancer?**
(1) .... **(2)**................................

4.5 What year were you diagnosed with cancer? 19...

4.6.1 Breast cancer was diagnosed in ☐ one breast ☐ both breasts

4.6.2 What type of breast cancer were you diagnosed with? ....

4.7 (If appriopriate) **After treatment for breast cancer did/do you performed breast self-exams**

☐ never ☐ once a year or less ☐ a few times a year ☐ monthly ☐ weekly ☐ daily

4.8 (If appriopriate) **After treatment for breast cancer you had/ have mammograms?**

☐ never ☐ whenever recommended by your physician ☐ once ☐ every two years

☐ once a year

☐ other (specify)...

4.9 Have any women in your family *(other than you)* **ever been diagnosed with breast cancer?**

☐ Yes ☐ No *(please skip to question 4.13)*

4.10 Who in your family has had breast cancer? ☐ Mother ☐ Sister ☐ Daughter ☐ Other

4.10.1 Were you involved in the care of this person? ☐ Yes ☐ No

4.10.2 Did this person die from breast cancer? ☐ Yes ☐ No

4.10.3 If yes, when your relative died you felt ☐sad ☐angry ☐ guilty ☐ sense of relief

☐ afraid for yourself ☐ shock ☐ other (specify)

4.11 How old were you at the time (a) diagnosis....yrs.

(b)*(If relevant)* **When relative/s died....yrs.**

4.12 Has having a relative / s with breast cancer increased your anxiety about developing breast cancer? ☐ Yes ☐ No

It is normal to feel an array of emotions regarding a diagnosis of breast cancer and the prospects that go with it. Many people feel fear about death, fear about disfigurement, anger, loss of control, guilt, negative body image and these emotions can overcome a person at any time and this is quite normal.

4.13 When you were diagnosed with cancer the dominating emotion was ☐ shock

☐ sadness ☐ anger ☐ fear ☐ grief ☐ shame ☐ relief ☐ guilt ☐ disbelief☐ other (specify)...............

4.14 Did you feel that this diagnosis would change your life? ☐ Yes ☐ No

4.14.1 If yes, in what ways?...

4.15 How often do you think about your diagnosis now? ☐ never ☐ occasionally

☐ sometimes ☐ often ☐ all the time

4.16 After your initial diagnosis/ you worry about another diagnosis of cancer ☐ never ☐ occasionally ☐ sometimes ☐ often ☐ all the time

4 16 .1 Do you think your concerns about breast cancer are irrational? ☐ Yes
☐ No

4.17 Which of the following represent your greatest fear ☐ being sick /again ☐ undergoing treatment /again ☐ leaving your children / family ☐ your children getting breast cancer ☐ dying ☐ cancer spreading ☐ other (specify).......................................

4.18 Did/does your doctor/s discuss your feelings about the diagnosis?
(1) ☐ Yes ☐ No **(2)** ☐ Yes ☐ No

4.18.1 If yes, did you feel more calmed and in control? (1)☐ Yes ☐ No
(2) ☐ Yes ☐ No

4.18.2 If no, did this make you feel more

(1)	**(2)**
☐ confused	☐ confused
☐ afraid	☐ afraid
☐ helpless	☐ helpless
☐ relieved	☐ relieved
☐ other (specify)..............	☐ other (specify)................

4.18.3 Have you discussed these feelings with anyone else? ☐ Yes ☐ No

4.19 Do you feel your cancer has affected your relationship with
(a) Partner ☐ Yes ☐ No **Explain**............ **(b) Family** ☐ Yes ☐ No **Explain**
(c) Friends ☐ Yes ☐ No **Explain**.......................

4.20 What was your occupation at the time of diagnosis? (code)

....

4.21 How did your employer react to your diagnosis of breast cancer?..................

4.22 *(If still working)* **Do you still work for the same company?** ☐ Yes ☐ No

4.22.1 If not why? ....

4.23 Do you feel your cancer has affected your ability to concentrate ? ☐ Yes ☐ No

4.24 Were you on medical insurance at the time of the diagnosis? ☐ Yes ☐ No

4.24.1 *(optional)* **If yes, what is the name of Insurance company?** ....

4.25 Are you still on the same medical insurance? ☐ Yes ☐ No

4.25.1 If yes, have your premiums been increased? ☐ Yes ☐ No

4.25.2 If no, why not?...

4.25.2.1 Are you on another medical aid? ☐ Yes ☐ No

4.26 Do you feel you were treated unfairly by your medical aid or discriminated against because you were diagnosed with breast cancer? ☐ Yes ☐ No

<u>Section Five for Group A - Treatment and Screening for BRCA</u>

5.1*(optional)* **What was the name of the doctor/ s who treated or is treating you?**
(1)........(2).........

5.2 Did the doctor tell you about **<u>all</u>** **treatments available to you at that time?**
(1)☐ Yes ☐ No ☐ Uncertain **(2)** ☐ Yes ☐ No ☐ Uncertain

5.3 How was your cancer treated?...

5.4 Did you feel you had a choice about what treatment you were given (1) ☐ Yes ☐ No
(2) ☐ Yes ☐ No

5.4.1 If not, were you relieved or happy to let the doctor/s make the decision for you?
☐ Yes ☐ No ☐ Unsure
Explain...

5.5 Did you feel you got the best possible treatment? ☐ Yes ☐ No ☐ Not certain

5.6 Treatment for breast cancer is surrounded by ideas of disfigurement leaving women feeling unfeminine, scarred and feeling sexually undesirable was this how you felt? `
☐Yes ☐No

5.7 *(In cases where a mastectomy was performed)* **Was reconstructive surgery performed?**
☐Yes ☐No

5.8 Are you happy with this decision? ☐ Yes ☐ No

5.9 Did the treatment affect ☐ your self -image (explain).... ☐ make you feel ill all the time (explain)

5.10 Did you feel that the treatment was effective? ☐ Yes ☐ No

5.11 Were you satisfied with the care given to you by your doctor? (1) ☐ Yes ☐ No(2) ☐ Yes ☐ No **5.11.1 If no, why not? (1) ....(2)......**

5.12*(If not still undergoing treatment)* **How are you followed up now in terms of cancer?**

5.13 Who has given you the **<u>most</u>** **emotional support?** ☐ partner ☐ mother ☐ father ☐ daughter ☐ son ☐ other family member (specify)....... ☐ friend ☐ no-one ☐ other (specify)...

5.14 Do you get support from a patient group e.g. Reach for Recovery? ☐ Yes ☐ No

5.15 Do you think ☐ Women diagnosed with breast cancer ☐ Women with a first-degree relative diagnosed with breast cancer **should see a psychologist, social worker or genetic counsellor to talk about any feelings or questions, around breast cancer, in depth?**

5.16 Have you been treated for depression? ☐ Yes ☐ No

5.17 Have you ever had the opposite to depression where you felt very happy, elated, could not sleep, had excessive energy and had to seek medical attention for these symptoms? ☐ Yes ☐ No

5.18 Has cancer changed your attitude towards life? ☐ Yes ☐ No

The next section applies only to women with a FDR diagnosed with BRCA.

Section four for group B- Response to BRCA

The next section applies only to women who have a first degree relative with breast cancer (group B)

4.1 Do you ever think about your risk of developing breast cancer? ☐ Yes ☐ No

4.2 Do you think your risk of developing cancer is ☐ high ☐ medium/ average ☐ low

4.3 Who in your family has been diagnosed with breast cancer?

4.4 When your relative / s was diagnosed with cancer you remember feeling

☐ shocked ☐ sad ☐ angry ☐ scared that they would die ☐ guilty ☐ fear about your own health ☐ other (specify)..

4.5 Were you close to your relative/s with breast cancer? ☐ Yes ☐ No

4.5.1 Describe your relationship / s

4.6 Were you involved in the care of your relative / s ☐ Yes ☐ No

4.7 Did this relative /s die from breast cancer? ☐ Yes ☐ No

4.8 If yes, when your relative / s died you felt ☐ sad ☐ angry ☐ guilty ☐ a sense of relief ☐ afraid for yourself ☐ shock ☐ other (specify)...

4.9 How old were you at the time

Of diagnosis ....years *(If relevant)***When relative / s died ....years**

4.10 Has having a relative / s with breast cancer increased your anxiety about developing breast cancer? ☐ Yes ☐ No

4.11 You think about developing breast cancer

☐ never ☐ occasionally ☐ sometimes ☐ often ☐ all the time

4.12 The following is a list of emotions sometimes experienced by women who have had a relative with breast cancer. Which of the following emotions have you experienced, if any?

☐ anger ☐ fear of disfigurement ☐ fear of dying ☐ fear of developing cancer

☐ grief ☐ guilt ☐ lack of control over your life ☐ negative body image

☐ a sense of isolation ☐ other (specify)...

4.13 Which of the following represent your greatest concerns about breast cancer

☐ being sick ☐ undergoing treatment ☐ leaving your children / family
☐ your children getting breast cancer ☐ fear of death ☐ other (specify)...............

4.14 Has concern about breast cancer affected your relationship with your

(a) Partner ☐ Yes ☐ No **Explain**...

(b) Family ☐ Yes ☐ No **Explain**...

(c) Friends ☐ Yes ☐ No **Explain**...

4.15 Do you feel that your concerns about breast cancer are irrational?
☐ Yes ☐ No

4.16 Do you think your feelings about developing breast cancer have impacted on your ability to make long-term plans or commitments? ☐ No ☐ Yes (explain)...........

4.17 What is your occupation?...

4.18 Do you think that your feelings about developing cancer has affected your ability to concentrate at work? ☐ Yes ☐ No

4.19 Are you on medical insurance ☐ Yes ☐ No

4.19.1 *(optional)* **If yes, what is the name of Insurance company?** ....

4.20 Did you have difficulty getting insurance / are your premiums higher because you have a relative / s with breast cancer? ☐ Yes ☐ No

4.21.1 If yes, do you feel you were treated unfairly by your medical aid or discriminated against because of your family history ☐ Yes ☐ No

Section Four for Control group -Responses to breast cancer

This section applies the controls (group C)

4.1 Do you ever think about your risk of developing breast cancer? ☐ Yes ☐ No

4.2 Do you think your risk of developing cancer is
☐ high ☐ medium/ average ☐ low

4.3 Do you know anyone who has been diagnosed with breast cancer?
☐ Yes ☐ No *(proceed to question 4.9)*

4.3.1 If yes, what was your relationship with this person / s?.................................

4.3.2 When this person / s was diagnosed with breast cancer you remember feeling
☐ shocked ☐ sad ☐ angry ☐ scared that they would die ☐ guilty ☐ fear about your own health ☐ other (specify)..

4.4 Were you involved in the care of this person / s ☐ Yes ☐ No

4.5 Did this person / s die from breast cancer? ☐ Yes ☐ No

4.6 If yes, when this person / s died you felt ☐ sad ☐ angry ☐ guilty ☐ a sense of relief ☐ afraid for yourself ☐ shock ☐ other (specify)..

4.7 How old were you at the time
Of diagnosis ....years *(If relevant)* **When this person / s died ....years**
4.8 Having a known a person / s diagnosed with breast cancer has increased your anxiety about developing breast cancer? ☐ Yes ☐ No
4.9 You think about developing breast cancer ☐ never ☐ occasionally ☐ sometimes ☐ often ☐ all the time

4.10 The following is a list of emotions sometimes experienced by women with regards to breast cancer. Which of the following emotions have you experienced , if any? ☐ anger ☐ fear of disfigurement ☐ fear of dying ☐ fear of developing cancer ☐ grief ☐ guilt ☐ lack of control over your life ☐ negative body image ☐ a sense of isolation ☐ other (specify)......
4.11 Which of the following represent your greatest concerns about breast cancer
☐ being sick again ☐ undergoing treatment again ☐ leaving your children / family
☐ your children getting breast cancer ☐ fear of dying ☐ other (specify).....................
4.12 Has your concern about breast cancer affected your relationship with your
(a) Partner ☐ Yes ☐ No **Explain**...
(b) Family ☐ Yes ☐ No **Explain**...
(c) Friends ☐ Yes ☐ No **Explain**...
4.13 Do you feel that your concerns are irrational? ☐ Yes ☐ No
4.14 Do you think your feelings about developing breast cancer has impacted on your ability to make long term plan or commitments? ☐ No ☐ Yes (explain)...
4.15 What is your occupation?...
4.16 Do you think that your feelings about developing breast cancer has affected your ability to concentrate at work? ☐ Yes ☐ No
4.17 Are you on medical insurance ☐ Yes ☐ No
4.17.1 *(optional)* **If yes, what is the name of Insurance company?** ....
4.18 Did your medical insurance company question you about cancer in your family?
☐ Yes ☐ No
4.18.1 If yes, do you think this is a fair? ☐ Yes ☐ No

This section applies to both groups B and C

5. Screening and Prevention Strategies

5.1 Have you discussed breast cancer with your doctor? ☐ Yes ☐ No

5.1.1 What course of action did your doctor recommend?..

5.1.2 Are you comfortable with this recommendation? ☐ Yes ☐ No

5.2 Have you discussed breast cancer with anyone else ☐ No ☐ Yes (detail).............

5.3 Did / do you perform breast self-exams ☐ never ☐ once a year or less ☐ a few times a year ☐ monthly ☐ weekly ☐ daily **5.3.1 Why?**..

5.4 Do / did you have clinical breast examinations? ☐ never ☐ whenever recommended by your physician ☐ once ☐ once a year ☐ every two years ☐ other (specify).....**5.4.1 Why?**.........

5.5 Did / do you have mammograms? ☐ never ☐ whenever recommended by your physician ☐ once ☐ once a year ☐ every two years ☐ other (specify)...................**5.5.1 Why?**..

5.6 Have you had any preventative surgery? ☐ Yes ☐ No

5.6.1 If yes, what surgery?...

5.6.2 Was the surgery your idea? ☐ Yes ☐ No (explain) ....

5.6.3 Has the surgery reduced long-term anxiety and worry? ☐ Yes ☐ No

5.7 Who has given you the most emotional support?
☐ partner ☐ mother ☐ father ☐ daughter ☐ son
☐ other family member (specify)............ ☐ friend ☐ other (specify)............

5.8 Do you think ☐ Women diagnosed with breast cancer ☐ Women with a first-degree relative diagnosed with breast cancer **should see a psychologist, social worker or genetic counsellor to talk about any feelings or questions, around breast cancer, in depth?**

5.9 Have you been treated for depression? ☐ Yes ☐ No

5.10 Have you ever had the opposite to depression where you felt very happy, elated, could not sleep, had excessive energy and had to seek medical attention for these symptoms?
☐ Yes ☐ No

<u>Section Six. Genetic testing</u> *(This section has been adapted from Lerman et al., 1995). As previously mentioned gene mutations can cause disease. In a small number of rare families, many family members are affected with breast cancer, often at younger ages. Geneticists believe that in <u>some</u> of these families women who develop breast cancer have inherited an altered copy of a gene (gene mutation) that makes them susceptible to breast* *cancer. For many years it has been known that women of Ashkenazi Jewish descent are at a slightly increased risk of developing breast cancer. This may be because these women are more likely than women of other religions to inherit gene mutations that make them more susceptible to breast cancer. In fact, there are three known gene mutations found more commonly in this sector of the population.*

It may be possible, within a research protocol, to use a blood test to determine whether Ashkenazi Jewish women have inherited one of these gene mutations. A woman with one of these gene mutations would have a much higher risk of developing breast cancer, and possibly ovarian
cancer, in her lifetime. A woman who has the normal copy of the gene would have a risk of developing breast cancer similar to a woman in the general population.

6.1 If such a blood test were to become available to you would you want to take the test?

☐ Yes ☐ No ☐ Uncertain

6.2 Which of the following represent your reasons for wanting to be tested? ☐ I could plan for the future ☐ I could make decisions about getting married ☐ I could make decisions about having children ☐ to learn if my children are at risk ☐ to take better care of myself ☐ to undertake better screening strategies ☐ to consider prophylactic surgery ☐ none of the above

6.3 Which of the following represent reasons for not wanting to be tested?

☐ I am concerned about my emotional response ☐ I am concerned about my partner's response ☐ I am concerned about my family's response ☐ I am not sure about the tests accuracy ☐ I am scared that I do indeed have the gene

☐ I am concerned about how it would affect my insurance ☐ none of the above

6.4 If you did get tested and the test showed that you do have one of the gene mutations making you more susceptible to breast cancer, do you think

☐ you would become very depressed ☐ you would become very anxious ☐ it would have a negative effect on your marriage / relationship ☐ it would have a negative effect on your quality of life ☐ you would feel guilty about maybe passing the gene to your children

☐ you would consider suicide ☐ you would feel more in control ☐ none of the above

6.5 If you did get tested and the test showed that you do not have one of the gene mutations making you more susceptible to breast cancer, do you think ☐ you would become less depressed ☐ you would become less anxious ☐ it would have a positive effect on your marriage / relationship ☐ it would have a positive effect on the quality of your life ☐ you would still worry ☐ you would feel guilty if one of your relatives had the gene ☐ none of the above

6.6 In your opinion, what do you think the chances are that you have an altered breast cancer gene (gene mutation)? ☐ no chance ☐ small chance ☐ moderate chance ☐ high chance ☐ you have the gene mutation

6.7 Would you like to discuss these issues in more detail with a genetic counsellor?

☐ Yes ☐ No

APPENDIX D

Beck Depression Inventory - Completed by the subject.

Please choose the statement in each group that best describe the way you have been feeling lately.

(1)
0. I do not feel sad
1. I feel sad
2. I am sad all the time and can't snap out of it
3. I am so sad or unhappy that I can't stand it

(2)
0. I am not particularly discouraged about the future
1. I feel discouraged about the future
2. I have nothing to look forward to
3. I feel the future is hopeless and that things cannot improve

(3)
0. I do not feel like a failure
1. I feel I have failed more than the average person
2. As I look back on my life all I can see is a lot of failures
3. I feel I am a complete failure as a person

(4)
0. I get as much satisfaction out of things as I used to
1. I do not enjoy things the way I used to
2. I do not get real satisfaction out of anything anymore
3. I am dissatisfied or bored with everything.

(5)
0. I do not feel particularly guilty
1. I feel guilty a good part of the time
2. I feel guilty most of the time
3. I feel guilty all the time.

(6)
0. I do not feel that I am being punished
1. I feel I may be punished
2. I expect to be punished
3. I feel that I am being punished.

(7)
0. I do not feel disappointed in myself
1. I am disappointed in myself
2. I am disgusted with myself
3. I hate myself

(8)
0. I do not feel worse than anyone else
1. I am critical of myself for my weakness or mistakes
2. I blame myself all the time for my faults
3. I blame myself for everything bad that happens

(9)
0. I never have any thoughts of killing myself
1. I have thoughts of killing myself but I would never carry them out
2. I would like to kill myself
3. I would kill myself if I had a chance

(10)
0. I do not cry any more than usual
1. I cry more than I used to
2. I cry all the time now
3. I used to be able to cry but now I cannot even cry when I want to

(11)
0. I am no more irritated now than I ever am
1. I get annoyed or irritated more easily than I used to
2. I feel irritated all the time
3. I do not get irritated at all by things that used to irritate me

(12)
0. I have not lost interest in other people
1. I am less interested in other people than I used to be

2. I have lost most of my interest in other people
3. I have lost all interest in other people
(13)
0. I make decisions about as well as I ever could
1. I put off making decisions more than I used to
2. I have greater difficulty in making decisions than before
3. I cannot make decisions at all anymore
(14)
0. I do not feel I look worse than I used to
1. I am worried that I am looking old and unattractive
2. I feel that there are permanent changes in my appearances that make me look unattractive
3. I believe I look ugly
(15)
0. I can work about as well as before
1. It takes an extra effort to get started at doing something
2. I have to push myself very hard to do anything
3. I can not do any work at all
(16)
0. I can sleep as well as usual
1. I do not sleep as well as I used to
2. I wake up 1-2 hours earlier than I used to and find it hard to get back to sleep
3. I wake up several hours earlier than I used to and can not get back to sleep
(17)
0. I do not get more tired than usual
1. I get tired more easily than I used to
2. I get tired from doing almost anything
3. I am too tired to do anything
(18)
0. My appetite is about the same as before
1. My appetite is not as good as it used to be
2. My appetite is much worse now
3. I have no appetite anymore
(19)
0. I have not lost much weight, if any lately
1. I am purposefully trying to lose weight recently
2. I have been able to loose some weight recently
3. I have lost more weight than I expected recently
(20)
0. I am no more worried about my health than usual
1. I am worried about physical problems such as aches, pains, an upset stomach, or constipation
2. I am very worried about physical problems and it is hard to think of much else
3. I am so worried about my physical problems that I cannot think about anything else
(21)
0. I have not noticed any recent changes in my interest in sex
1. I am less interested in sex than I used to be
2. I am much less interested in sex now
I have lost interest in sex completely

COMMENTS

Are there any comments that you would like to make about breast cancer or this study?

THANK-YOU FOR YOUR CO-OPERATION IN THIS PROJECT

Author De Vos C L
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