UNIVERSITY OF SOUTHAMPTON

Faculty of Social and Human Sciences

School of Psychology

Body image and body image investment in mastectomy and breast reconstruction

Volume 1 of 1

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This thesis is submitted in partial fulfilment of the degree of

Doctorate in Clinical Psychology

January 2012

Word count: 19169

ABSTRACT

Breast cancer is the most common cancer in women in the UK and both diagnosis and treatment can cause significant levels of distress and impaired quality of life. There are many factors that relate to psychological distress in women coping with breast cancer including changes in body image. Appearance-related side effects, such as hair loss, are often reported as more severe than side-effects such as nausea and fatigue.

A review of the literature explores the links between mainstream body image models and breast cancer. The impact of mastectomy on body image and mental health outcomes is discussed as well as the role of breast reconstruction, as this may help to alleviate women's body image difficulties and emotional distress following surgery. The need to understand the role of body image investment within theoretical models as well as for breast cancer patients facing mastectomy and immediate reconstruction is highlighted, especially in light of the inconsistencies found within the literature.

The empirical paper investigates the psychosocial and body image outcomes of two groups of women: those undergoing mastectomy alone and those undergoing mastectomy with immediate breast reconstruction. It also examines whether investment in body image acts as a moderating variable between surgery type and subsequent psychological distress. Both groups reported deteriorations in their body image following surgery, though this did not always correspond with increased emotional distress. Women who reported a higher body image investment who underwent mastectomy alone had the poorest outcomes.

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ACKNOWLEDGEMENTS

With much thanks to:

All of the participants who generously gave their time to take part in this study.

Shirley Holmes, Sonnya Dabill (Salisbury District Hospital), Lorraine Brown and Lyn Booth (Royal Hampshire County Hospital) for their hard work and support in the recruitment of patients.

The research team at Breast Cancer Care for all their support.

Dr Kate Jenkins (clinical supervisor) and Dr Catherine Brignell (research supervisor) for the help and support during the preparation of this thesis.

Nick for always being there.

My beloved Mum who passed away suddenly in August 2011 before I was able to finish this thesis. You will be missed forever.

Literature Review Paper

The impact of mastectomy and breast reconstruction on body image in women with breast cancer

Helen Le Vesconte

Psychological Bulletin was used as a guide in determining the preparation of this paper (see Appendix 1 for notes to contributors)

ABSTRACT

There are many factors that relate to psychological distress in women coping with breast cancer, including changes in body image. Treatment of breast cancer can be an invasive process that can itself cause additional physical illness and emotional distress. Appearance-related side effects, such as weight gain, hair loss, and breast disfigurement are often reported as more severe than side-effects such as nausea and fatigue. However, body image has not always been clearly defined in the psychosocial oncology literature and in recent years researchers have sought to integrate mainstream body image models with cancer literature. This article aims to summarise the current theoretical models of body image in oncology to further understand the role of body image in breast cancer patients. It will then examine the research on body image and psychosocial adjustment associated with mastectomy and breast reconstruction. In light of the inconsistencies found within the literature, moderating variables and methodological issues are highlighted. Implications for treatment and future directions will then be discussed.

Key words: breast cancer, body image, mastectomy, breast reconstruction

INTRODUCTION

Breast cancer affects approximately 12% of women (around 1 in 9) in the UK and is the most common cancer in women (Down & Pereira, 2008; Office for National Statistics, 2010). Each individual's risk varies depending on many factors, including family history and lifestyle factors. Increased exposure to the hormone oestrogen through early onset of menstruation and/or late menopause is strongly associated with increased likelihood of developing breast cancer. Risk is also higher amongst women whose first pregnancy takes place after the age of 30 or who have never been pregnant. These reproductive patterns may explain the increased incidence of breast cancer amongst higher socioeconomic groups (Shack, Thomson, Mak & Moller, 2008). However, vulnerability to breast cancer significantly increases with age and 81% of breast cancer occurs in women who are over 50 years old (Cancer Research UK, 2009).

Breast cancer diagnosis and treatment can cause significant levels of distress and impaired quality of life for some women (Hartl et al, 2010). Upon diagnosis, patients face multiple physical and psychological demands of local and systemic treatment, which could include surgery, radiotherapy, chemotherapy or endocrine therapy. Approximately 20% of newly diagnosed patients will experience long-term psychological problems, particularly if they have had pre-existing psychological disorders (Griffen & Fentiman, 2002). These negative effects can be present a year post-diagnosis, regardless of improved physical functioning (Pinto, Clark, Maruyame & Feder, 2003). This is particularly significant given that psychological factors may be significantly associated with survival or recurrence (Falagas et al, 2007).

There are many factors that relate to psychological distress in women coping with breast cancer, and changes in body image can be one of these. There are many body image issues that women with breast cancer face, such as weight gain, hair loss and breast-related changes. In general, many women are concerned with their appearance, their weight and their body (Cash, Melnyk & Hrabosky, 2004; Harris & Carr, 2001). Such premorbid concerns are often deeply ingrained and can be an important contributor to psychological distress in women treated for breast cancer (Pinto, Clark, Maruyame & Feder, 2003).

Existing body image research has found that body image problems are often associated with poor self-esteem, social anxiety, self-consciousness and depressive symptoms (Cash & Fleming, 2002). These problems can also be common in women with breast cancer. A recent analysis of cancer research reported a need to "broaden the research agenda beyond psychological distress to include...body image and sexual problems" (Thompson et al., 2008). However, body image has not always been clearly defined in the psychosocial oncology literature and researchers have often failed to integrate mainstream body image models with cancer literature (White, 2000). There appears to be a need to integrate theory and practice.

This narrative review will therefore focus on linking body image theory to the psychosocial oncology literature. The paper will begin with an overview of two of the most prominent theoretical models of body image from the perspective of mainstream psychology that have influenced body image work in oncology. An integrated model of body image in oncology will be considered and used to further understand the role of body image in breast cancer. Women's body images issues will be discussed, focussing

on the impact of mastectomy on body image and mental health outcomes. The role of breast reconstruction will also be considered as it has been suggested that this may help to alleviate women's body image difficulties (Roth, Lowery, Davis & Wilkins, 2005). In light of the inconsistencies found within the literature and certain gaps highlighted in theoretical models, moderating variables and methodological issues will also be highlighted. Implications for treatment and future directions will then be discussed.

A literature search was carried out using Psychinfo, Medline, and CINAHL databases using the search terms body image; quality of life; outcome; psychosocial; mastectomy; breast reconstruction; reconstructive surgery; breast cancer surgery. Further relevant articles were identified from the reference lists of papers detected by the search. The search was limited to studies published in English up to and including March 2011. Apart from seminal studies, papers published before 2000 were excluded in order to limit the review to current practices.

MODELS OF BODY IMAGE

Defining body image

There is a general consensus in the literature that body image consists of both attitudinal and perceptual elements: "the picture we have in our minds of the size, shape and form or our bodies; and to our feelings concerning these characteristics and our constituent body parts" (Slade, 1994, p.497). Hence body image is a complex, multidimensional construct that consists of one's attitudes, perceptions and experiences pertaining to one's physical self. It therefore includes physiological, psychological and sociocultural components (Cash, Santos & Williams, 2005).

It is widely accepted that dimensions of body experience are highly subjective, and do not necessarily reflect objective reality. Perceptions, thoughts and feelings relating to body image have been argued to encompass elements such as body size, physical competence and function. Body image dimensions are in many ways inseparable from feelings about the self and are linked with social and societal factors. They are often related to earlier life experiences and relationships with early caregivers (Smolak, 2002; Tantleff-Dunn & Gokee, 2002). They are sensitive to mood, environmental context and developmental stage and are generally acknowledged to exert significant influence on information processing, self-presentation and interpersonal relationships (Cash, Santos & Williams, 2005; Cash & Fleming, 2002).

Body image development

Despite various conceptualisations of body image, contributors to body image problems are fairly well documented (Smolak, 2002). These can be split into biological contributors (such as body weight and shape, gender, appearance and temperament) and

sociocultural influences (such as parents, peers and the media). It is unlikely that there are direct biological contributors to body image problems. However, body weight, shape and appearance have a strong genetic basis and given that certain body weights/shapes are seen as socially undesirable, someone's actual appearance may be an indirect contributor to body image difficulties. Societal attitudes towards fat people are such that by the age of 6 children are already aware of this bias. Furthermore the relationship between body weight and body image varies with gender and ethnicity, suggesting that societal attitudes may moderate this relationship (Smolak, 2002; Tiggemann, 2002). The impact of physical characteristics is particularly significant on the development of body image during adolescence, when physical appearance may change dramatically over the course of puberty (Cash, 2008).

Equally, different personality characteristics have also been associated with body image problems. High levels of social anxiety and social comparison have been linked to poorer body esteem during childhood (Smolak, 2002), and having an insecure attachment pattern may promote body image insecurity to the extent that one expects or worries about the rejection of one's physical self (Cash, Theriault & Annis, 2004). Perfectionism has also been linked to body image problems, in particular the need to present oneself to other people as perfect or flawless. This is likely to increase an individual's vulnerability to body image problems (Rudiger, Cash, Roehrig & Thompson, 2007).

Given the differences in levels of body image across gender, ethnicity, and age, it is clear that culture and society play a major role in the construction and development of body image. Cultural socialisation via media messages and parental and peer pressure

are very powerful. From skewed gender roles on TV and "perfect" dolls and actions figures to magazine articles, messages are delivered about what the "ideal" body looks like and the benefits of looking this way (eg. success, love, admiration). Although not all women are equally affected, there is sufficient evidence to link media exposure to idealised images with deteriorations in mood and body satisfaction (Tiggemann, 2002; Cash, 2008).

It is also clear that our interpersonal relationships with peers and family members can have both positive and negative effects on body image development. This can be directly by making comments, selecting clothes or requiring the child to look a certain way, or indirectly via modelling. Having a parent who consistently complains about their appearance or who diet frequently may teach children to focus on and be dissatisfied with their own body. There is also a clear link between peer messages about appearance and body dissatisfaction, more so in girls than boys (Tiggemann, 2002). Relationships with romantic partners are also very important, with greater body dissatisfaction associated with lower relationship satisfaction (Tantleff-Dunn & Gokee, 2002).

Psychodynamic models

Psychodynamic perspectives on body image view the body and evolving mental representations of it as the foundations for a sense of self. During an individual's early years, life is experienced primarily through the body as a conduit for physical and sensory experiences, as well as a tool for communication. Over time, this changes and so body image develops as a cumulative set of images, fantasies and meaning about the body and its functions, and is an integral part of self-image and self-representation.

Psychodynamic models conceptualise body image as a dynamic and evolving mental representation of the physical self, forming a bridge between mind and body (Krueger, 2002).

The development of body image involves learning to integrate inner and outer experiences, as well as learning to differentiate between internal and external states. Later development will then include the integration of multiple body images and an understanding of the physical self as a container of the psychological self. This helps to form a cohesive sense of identity and continuity. Hence one's body image is part of a developmental process that undergoes gradual maturational change around a cohesive core. Developmental difficulties may impede this process, and body image and emotional states may not always be easy to differentiate. Body image and emotional states may become linked; hence during periods of low mood or distress an individual's body image may become distorted (Kreuger, 2002; Clinton, 2006).

Much of the psychodynamic research on body image comes from the eating disorders literature in which distorted perception of the body is extreme. However, it can be surmised that any acquired disfigurement, especially if it an abrupt change, can distort an individual's body image and influence their sense of identity, self-esteem and mood. If the individual's sense of self is a cohesive core, then it may be that bodily changes are gradually integrated into a new body image and do not result in psychological problems. However, for those without a stable sense of self, such changes may cause significant adjustment problems and psychological distress.

Cognitive behavioural models

A number of cognitive-behavioural models of body image have emerged in the literature. Altabe and Thompson (1996) conceptualised a body image schema which serves as a cognitive framework for self-evaluative information about one's appearance. Once activated by contextual events, this body-image schema influences subsequent cognitive processing of information about one's appearance. The authors suggest that this schematic activation results in the negative thoughts and avoidance behaviours seen in individuals who have problems adjusting to an altered appearance. Body images schemas reflect an individual's core assumptions or beliefs about the importance and influence of their appearance in life, including the importance of appearance to an individual's sense of self.

Higgins (1987) self-discrepancy theory has also been applied to body image experiences. This theory conceptualises the self in different domains: the actual self and the ideal self. The theory postulates that people are motivated to match their ideal and actual states and that discrepancy in these domains result in negative psychological states. When this discrepancy is brought to the individual's attention, the magnitude of the self-discrepancy has been shown to relate to the intensity of the negative affect (Higgins, Bond, Klein & Strauman, 1986). This highlights the importance of body image in self-evaluation within the context of environmental and cultural norms and expectations.

However, Cash (1994) proposed that body image was not only influenced by an evaluative component, but by an investment component as well. That is, body image is made up of not only how an individual evaluates themselves but also how much

significance they place on their body image. Cash conceived that body image evaluations (ie. positive or negative appraisals, beliefs about appearance, body image satisfaction) stemmed from the degree of discrepancy or congruence between self-perceived physical characteristics and personally valued appearance ideals. Hence a perceived self-discrepancy may be present (as in Higgins' model) but cause little distress as it is not seen as important by that individual (ie. they have little investment in it). This also explains how a single self-discrepancy of major importance can have a psychological impact that is as significant (if not more) as having multiple self-discrepancies that are considered less important (Cash & Szymanski, 1995). Investment in body image is seen as a trait-level construct linked to self-schema (Cash, 2002) so it is not seen as a changing variable. According to White (2000), "neglecting investment in body image means treating physical attributes as if they are of equal psychological importance".

Cash (2002) further conceptualised a model of body image that combines historical and developmental influences with present events and processes. Hence body image is seen to consist of schemas and attitudes that are informed by cultural socialisation, interpersonal experiences, physical characteristics and personality attributes for that individual. Formative body image experiences and/or messages are internalised and convey standards and expectation about appearance, attractiveness, gender and sexuality. These values foster the acquisition of basic body image attitudes, which will predispose an individual to construe and react to life events in particular ways.

When specific events or situations activate an individual's schema, subsequent information will be processed in line with existing body image schema. This could be

looking in the mirror, social feedback or comparisons, weighing oneself or changes in appearance. People with significant body image or appearance schema have been found to place more importance on, pay more attention to and preferentially process information relevant to appearance (Williamson, Stewart, White & York-Crowe, 2002)

Body image models in oncology

Body image has been operationalised in cancer research in a variety of ways, with little reference to mainstream psychological models. Many body image models used in cancer settings have been criticised for being too simplistic, and which do not allow for individual variations (Cash, 2002). Psychodynamic models have been criticised in their lack of validated tools for assessing body image, and in general body image investment is often excluded. As cognitive-behavioural therapies have been shown to be effective for body image disturbances, it is not surprising that recent body image models in cancer have used a cognitive-behavioural framework.

Adjusting to the physical changes caused by breast cancer treatment (eg. breast-related changes, hair loss, and weight gain) can represent a loss of self and identity that adds to the distress caused by a cancer diagnosis. Cognitive-behavioural models highlight that body image is linked to feelings about the self, but that people differ in the amount of significance they place on their appearance or the extent of importance on appearance as a criterion for defining one's sense of self. Hence some women have a pronounced sense of body image, whereas others may regard their physical self as a less insignificant part of their identity.

White (2000) proposed a heuristic cognitive-behavioural model for body image which serves as an integration of psychological models of body image within a cancer framework. The model includes an objective or perceived appearance change, reflecting the fact that the extent or nature of the cancer-related appearance change may be a subjective one. Perceived appearance changes will then be processed in terms of an individual's beliefs about themselves (self-schema) and specifically, their appearance (body image schema). The content of an individual's schema will determine their investment in the altered physical feature(s), and the discrepancy between the ideal and actual self. If this self-discrepancy relates to a physical attribute in which they have significant personal investment, the result will be negative appearance-related assumptions, thoughts, images, emotions and compensatory behaviours.

For example, many women have an altered body and body image after mastectomy. If an individual highly values her breasts or her body shape, her physical self may become an important factor in her identity and sense of self. If she then undergoes a mastectomy, she may become dissatisfied at the discrepancy between her ideal and actual state. Depending on the extent to which her identity is linked to her physical state, the greater the difference between her actual appearance and her ideal one, the greater the psychological impact for her. This might elicit negative thoughts and assumptions, distress and compensatory behaviour such as withdrawal from others, self-deprecating behaviour, low mood and anxiety.

The model suggests that the more invasive the surgery (ie. lumpectomy vs mastectomy) and the larger the difference between a woman's altered body shape and her pre-surgical shape, the more distressed she will be. However, it further suggests that whilst

some women will adapt to an altered body without significant body image distress and mental health problems, others will not. This issue is explored further in the next section which provides an overview of the most current research in this area.

BODY IMAGE AND MENTAL HEALTH OUTCOMES AFTER MASTECTOMY

Many of the studies into body image issues are specifically linked to breast cancer treatments, not the breast cancer itself. Treatment for breast cancer varies according to specific diagnosis, current medical opinion and, in some cases, the patient's personal preference. However all cancer treatments are, by their very definition, destructive. Treatment of breast cancer can therefore be an invasive process that can itself cause additional physical illness and emotional distress. Approximately 38% of women diagnosed with breast cancer in the UK will undergo a mastectomy, many of whom have no other surgical option (Down & Pereira, 2008).

Mastectomy as a surgical procedure

Current surgical treatment for breast cancer involves removing part or all of the breast. Within the treatment of cancer, there has been a move towards more conservative surgery in which only the malignant lump and surrounding tissue are removed (lumpectomy or wide local excision) (NICE, 2009a). The choice of conservative treatment versus mastectomy is dependent upon the size and position of the malignant tumour and the woman's own preference. However, all women with breast cancer will be required to have some form of surgery (i.e. a lumpectomy or mastectomy). Many of these surgeries cause deformities in the breast or skin, such as asymmetry of shape or size. When breast-conserving treatment is not possible patients must undergo a mastectomy (surgical removal of the entire breast).

Until the mid-1970s a mastectomy involved removing the muscle of the chest wall in addition to the breast tissue. This left a woman clearly disfigured, with a concave chest

and visible ribcage (Baum & Schipper, 2005). However, current surgical techniques are less extreme. Women undergoing a simple mastectomy will have the breast tissue as far as the axilla (armpit) removed together with the skin and the nipple, but the chest wall is left. Patients are left with a flat chest and a single scar, which are much easier to disguise with clothing and external breast prosthesis if the individual wishes (Roberts, Livingston, White & Gibbs, 2003).

In addition to the usual risks of undergoing any surgical procedure, mastectomy also brings with it the possibility of lymphoedema (swelling of the arm). Lymph nodes located in the armpit are removed during surgery in order to test whether any malignant cells have spread to the lymphatic system (one of the means by which cancer can spread to other parts of the body). This can cause excess fluid and swelling in the arm, pain and difficulties with movement. Extreme cases of lymphoedema can be disabling and may not always respond to treatment (Chachaj et al, 2010).

The impact of mastectomy on body image

The breast has a societal and social connotation of femininity, motherhood, and sexuality (Khan et al., 2000). For some women the loss or disfigurement of a breast can have negative psychosocial consequences, even in cases of prophylactic mastectomy (Yurek, Farrar & Andersen, 2000; Frost et al, 2005). Many studies have found that greater body image distress is associated with more disfiguring surgery, and researchers consistently report greater body image problems for women undergoing mastectomy than breast conserving surgery (Fobair et al, 2006; Yurek, Farrar & Andersen, 2000). Mastectomy can influence various areas of functioning, including identity, confidence, mood, self-esteem, sexuality, and quality of life (Helms, O'Hea & Corso, 2008).

Moyer (1997) conducted a meta-analysis of 40 studies published between 1980 and 1995 comparing breast-conserving treatment to mastectomy. The timing of evaluations varied and only 6 (15%) of the studies included pre-surgical (baseline) evaluations. Over half the trials had fewer than 50 patients in each arm and the studies used a range of different assessment tools. The meta-analysis showed that patients who had undergone breast conserving treatment had a better body image or self-image than those undergoing mastectomy.

Engel, Kerr, Schlesinger-Raab, Sauer, & Holzel (2004) completed a long-term prospective study comparing 567 patients undergoing breast conserving treatment with 421 patients undergoing a mastectomy over a 5-year period. Patients were required to complete validated instruments every 6 months for 5 years. Mastectomy patients scored consistently worse in variables associated with body image (eg. attractiveness, appearance, feeling whole, cosmetic result, scar, and insecurity). These findings were true regardless of age. However, the authors did not control for differences among the groups, and the mastectomy patients tended to be older and tended to be at a higher stage of the disease. Despite these differences, overall body image and sexual functioning were worse in the mastectomy group and did not improve over time.

However, other prospective studies report that women undergoing mastectomy demonstrate an improvement in body image over time, eventually returning to their pre-surgical level when assessed 12-24 months after surgery (Harcourt et al, 2003; Parker et al., 2007). In fact, some studies have failed to find a significant difference in body image scores of women undergoing mastectomy compared with breast conserving

surgery after 6 months (Harcourt et al., 2003; Arora et al, 2001). These contradictory findings may represent differences in assessment tools and methodologies, such as cross-sectional design, longitudinal design, and retrospective and prospective studies.

Despite this, most studies confirm the finding that mastectomy has a negative impact on body image scores compared to breast conserving treatment (Pusic et al., 1999; Rowland et al., 2000; Ganz et al., 2004; Janni et al., 2001). These findings have also been confirmed in another, more recent, meta-analysis which focused on randomised controlled trials in breast cancer (Goodwin, Black, Bordeleau & Ganz, 2003). Overall, the findings suggest that women who undergo mastectomy show less satisfaction with the cosmetic result and are more likely to feel that their physical appearance has critically changed. They are more likely to feel emotional stress in personal interactions and social situations than women undergoing breast conserving treatment, and are more likely to experience regret over their decision (ie. more likely to choose a different surgical treatment if they could do it again).

Lumpectomy and wide local excision (WLE) of the breast are offered where possible and, in these cases, can offer the same clinical benefits (Veronesi et al, 2002). However, it is important to note that whilst the research suggests that women undergoing breast-conserving procedures are less likely to have significant problems, a proportion of these women consistently report body image problems and significant distress post-surgery (Waljee et al, 2008; Nissen et al, 2001).

Emotional distress and mood

Many studies have consistently found that poor body image is significantly associated with greater psychological distress for breast cancer patients. Holly, Kennedy, Taylor & Beedy (2003) found that poor body image and anxious preoccupation were highly predictive of distress, regardless of surgical treatment. It is widely acknowledged that mastectomy may be an emotional and distressing experience for many women, and up to 50% suffer clinically high levels of anxiety or depression prior to surgery, with some studies showing that 20-30% still report significant problems up to 1 year later (Massie, 2004; Rubino, Figus, Lorettu & Sechi, 2007; Harcourt, 2008). Margolis, Goodman & Rubin (1990) also found that patients who had undergone mastectomies reported more feelings of depression and fleeting suicidal ideations after surgery than patients who had lumpectomies, though no difference has been found in more recent studies (Hartl et al, 2010; Rowland et al, 2000).

Al-Ghazal, Fallowfield and Blamey (2000) retrospectively studied results of 577 women who had undergone a mastectomy or a lumpectomy after their post-operative follow up visits to a clinic. Patients were asked to complete a questionnaire to measure psychological functioning, as well as a measure devised by the researchers to gauge cosmetic satisfaction of the breast. Results showed that significantly more women in the mastectomy group showed signs of depression than in the lumpectomy group, and this was associated with cosmetic satisfaction. These results suggest that the more drastic and invasive the surgery to the breast is, the more it will affect a woman's sense of cosmetic satisfaction, and psychological well-being (Al-Ghazal, Fallowfield & Blamey, 2000). These findings are consistent with current cognitive-behavioural models of body image in oncology.

Reaby, Hort & Vandervoord (1994) compared women who had undergone mastectomy and wore a prosthesis, women who had reconstruction following their mastectomy, and "healthy" controls, ie. women who had not been diagnosed with breast cancer. In contrast to other studies, they found that women in the mastectomy group held more positive images of their bodies, regardless of whether they had opted for reconstructive surgery or not, although women who pursued reconstruction reported the highest levels of self-esteem. These findings were attributed to cognitive dissonance ie. women revaluated their priorities in life so that they cognitively re-framed their mastectomy as a life-saving, positive experience.

It is possible for some women to feel dissatisfied with their body image but to cope well psychologically with breast loss. Some studies comparing mastectomy patients with patients undergoing breast conserving treatment suggested that a decrease in body image did not necessarily translate into psychological problems or distress (Harcourt et al, 2003; Nano et al, 2005). However, some women may have such difficulties adjusting to their altered body image that their psychological distress following breast cancer treatment outweighs the psychological impact of having a life-threatening illness like cancer.

Quality of life

There have been various studies examining the role of body image on quality of life in breast cancer patients (Parker et al., 2007; Yurek, Farrar & Andersen, 2000). In cancer research, quality of life describes an individual's level of emotional, social, and cognitive functioning, global health status and symptomatology. It is therefore

associated with many variables, including age, cancer diagnosis and fear of recurrence. Amongst breast cancer patients, body image and sexuality is often considered to be a component of quality of life outcomes, hence adjustment difficulties following surgery may be associated with a poorer quality of life (Pockaj et al, 2009).

Goodwin, Black, Bordeleau & Ganz (2003) carried out a large meta-analysis of randomised controlled trials in breast cancer. Of the 66 trials included, 5 focussed on surgical outcomes which identified a better body image in women undergoing breast conserving treatment than in mastectomy patients. However, this did not impact on their quality of life, and overall, the authors found no difference in global quality of life among women who underwent different surgical treatments. Similarly, a retrospective study evaluated women 5 years after their initial surgical treatment, comparing mastectomy patients and women who had undergone breast conserving treatment (Janni et al, 2001). The patients were matched by age and tumour stage, and did not include women who had undergone further reconstructive surgery. No differences were found in quality of life among groups. However, some studies have found that for some women, breast conserving treatment is associated with more cancer-related fears and psychological distress over time when compared with mastectomy patients (Pockaj et al, 2009). This may be due to the timing of some of the studies, when the equivalent survival after breast conserving treatment and mastectomy was not widely accepted. However, it is also possible that some women may have significant anxieties about breast conserving treatment and prefer to opt for mastectomy.

However, findings from retrospective and prospective studies appear to differ. A long-term prospective study compared quality of life outcomes for breast conserving

treatment and mastectomy patients (Engel, Kerr, Schlesinger-Raab, Sauer & Holzel, 2004). They found that mastectomy patients scored consistently worse in variables associated with body image, as well as role functioning, social functioning, sexual activity and global quality of life. These findings were true regardless of age, though the mastectomy group were older and tended to have more advanced cancer. These difficulties did not improve over the 5 years in which the study ran. Another prospective study evaluated quality of life after surgery with or without chemotherapy (Ganz et al., 2004). Patients who underwent breast conserving treatment had significantly better physical functioning than patients who had undergone mastectomy, though physical functioning was better for women who had either operation and did not receive subsequent chemotherapy. Overall quality of life was worst for women who had undergone mastectomy with chemotherapy.

PREDICTORS AND CORRELATES OF BODY IMAGE DISTRESS FOLLOWING MASTECTOMY

Age

Researchers have consistently found increased distress in younger women diagnosed with breast cancer compared with older women (Avis, Crawford, & Manuel, 2005). Younger women diagnosed with breast cancer have been found to report more difficulty adjusting than older women, with lowered overall quality of life ratings linked to concerns about body image, partner relationships, sexual functioning, as well as less adaptive coping styles (Avis, Crawford & Manuel, 2005; Broeckel, Thors, Jacobson, Small & Cox, 2002). King, Kenny, Shiell, Hall, and Boyages (2000) conducted a study investigating the psychological and physical impact of breast cancer treatment on women ranging in age from 25 to 81. On average, they found that younger (pre-menopausal) women had a poorer body image after surgery compared to older women, with this finding most pronounced with younger, single women, regardless of surgery type. In addition, the negative impact of mastectomy on body image was strongest among young married women. Although breast cancer is less common in younger women, it appears to have a greater impact on body image issues.

However, it should be noted that Figueiredo, Cullen, Hwang, Rowland & Mandelblatt (2004) found that body image was an important factor in treatment decisions for a nearly a third of women aged 67 or older, and that receiving treatment consistent with preferences about appearance was important in predicting long-term psychological adjustment. This highlights that age is not an appropriate criterion for determining treatment or predicting body image.

Satisfaction with outcome

One consistent finding throughout the existing literature is a high level of satisfaction reported by women who have undergone mastectomy, either with or without reconstruction (Al-Ghazal, Fallowfield & Blamey, 2000; Alderman, Kuhn, Lowery & Wlkins, 2007; Guyomard, Leinster & Wilkinson, 2007). Many studies have found that the majority of women do not regret their decision (Harcourt & Rumsey, 2004; Sheehan, Sherman, Lam and Boyages, 2008). However, Margolis, Goodman & Rubin (1990) found that almost half of mastectomy patients stated that, if they had to make their choice again, they would have decided on the radiation/lumpectomy option, based on post-treatment awareness of greater psychological difficulties due to the breast disfigurement that resulted from surgery.

These findings suggest that body image issues are probably not the main source of concern in the initial stages of breast cancer and women who are likely to be focussing more on their disease and ways of survival, only to concentrate on this once the fear of cancer has receded (Harcourt & Rumsey, 2004). It is also worth noting that satisfaction with cosmetic outcome may be very different from satisfaction with treatment outcome.

This is highlighted by another study specifically assessing the relationship between cosmetic appearance of the breast after breast conserving surgery and psychological well-being (Al-Ghazal, Fallowfield and Blamey, 1999). Pictures were taken of women's breasts during a post-lumpectomy appointment. The photographs were evaluated in terms of cosmetic appearance, on a scale of 0 – 10 by a panel, and patients completed the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983), and the Body Image Scale (BIS; Hopwood, Fletcher, Lee, & Al-Ghazal, 2001). Results showed

that there was a significant correlation between cosmetic outcome and depression, as well as body image. These results suggest that the physical appearance of a woman's breast post-surgery can affect her mood and the way she feels about herself. Many studies repeatedly report similar findings; that the better the cosmetic outcome of the surgery (whether objectively or subjectively rated), the better the psychological outcome for the patient in terms of body image and mood (Fallowfield, 2008; Waljee et al, 2008).

Pre-surgical body image

For some women, concern about breast disfigurement and appearance post-surgery can play a role in the initial decision making process about cancer treatment (Mock, 1993; Figueiredo, Cullen, Hwang, Rowland & Mandelblatt, 2004). Several studies have found that concerns about body image disturbance were significantly related to choice of treatment among women with breast cancer. Concerns about feeling deformed and mutilated from the surgery were also significant. The findings imply that one of the most important factors affecting a woman's decision to have a lumpectomy and radiation rather than a mastectomy is the anticipated negative effects on body image, anticipated disfigurement, and expected loss of femininity after surgery (Molenaar et al, 2004; Nold, Beamer, Helmer & McBoyle, 2000).

There are also many studies that suggest that women with a poor body image at the start of treatment have considerably more distress and body image difficulties during and after treatment (Harcourt & Rumsey, 2003; Falk Dahl, Reinertsen, Nesvold, Fossa & Dahl, 2010; Figueiredo et al., 2004). Some findings even suggest that those patients who felt better about their bodies also had a stronger belief in their ability to cope with

breast cancer and its treatments (Pikler & Winterowd; 2003). However, other studies have failed to find this pattern, suggesting that patient reports may depend on the timing of the assessments (Moreira & Canaverro, 2010).

Body image investment

Given the inconsistencies in the literature examining women with breast cancer and their adjustment to physical changes, it has been suggested that investment in body image should be explored as a possible moderating variable (Helms, O'Hea & Corso, 2008; White, 2000). However, there are limited studies that have examined this area of body image.

Investment in body image may be a risk factor for emotional disturbance among patients with breast cancer (Petronis, Carver, Antoni, & Weiss, 2003). Researchers have demonstrated that the greater importance placed on body image and appearance, the more likely women are to experience difficulty adjusting to breast cancer and all the bodily changes that go along with it and its treatment (Lichtenthal, Cruess, Clark, & Ming, 2005). The few studies that have taken this variable into consideration suggest that body image investment may be an important moderating variable between bodily changes such as weight gain, breast disfigurement and hair loss, and subsequent psychological distress.

Kraus (1999) compared body image satisfaction in women with breast cancer before and after surgery with "healthy" women (ie. without a diagnosis of breast cancer). She found greater body image satisfaction following surgery among women who reported less apprehension about the physical appearance of their future breast shape and size

prior to surgery. She found that, as long as their investment in their body image was low, women with mastectomies did not have compromised body satisfaction compared to women receiving breast conserving treatment. Similarly, Figueirdo, Cullen, Hwang, Rowland, & Mandelblatt (2004) found that women who placed high importance on physical appearance tended to endorse greater mental health difficulties 2 years after breast conserving surgery than women who had mastectomies. Notably, emotional distress was not associated with treatment among those women who reported placing little importance on physical appearance.

Carver et at (1998) also considered the body image concerns of early breast cancer patients in terms of appearance and body integrity or "wholeness" (frequently reported as a reason for undergoing breast reconstruction by patients (Boughton, 2000). Carver et al. (1998) found that women with high body image investment reported greater distress prior to surgery, and throughout their first year post-surgery than women reporting lower body image investment. This prospective, longitudinal study suggested that the extent to which a woman is concerned with her physical self influences the psychological outcome of mastectomy. Hence investment in body image may be a moderating factor in body image and psychological outcomes, and may account for some inconsistencies in the literature.

BODY IMAGE AND BREAST RECONSTRUCTION

The psychological consequences of mastectomy can be especially substantial as women face the distress and disfigurement caused by the loss of the breast in addition to the fear of a potentially life-threatening disease. Following mastectomy, most women recreate a breast shape by wearing an external, temporary breast prosthesis. These are often

reported to be uncomfortable, inconvenient and potentially embarrassing (Roberts, Livingston, White & Gibb, 2003) in addition to acting as a distressing, daily reminder of the cancer and its treatment.

Breast reconstruction is a surgical alternative intended to offer psychological benefits to women, and aid their adjustment to the diagnosis and treatment of cancer by recreating a breast shape. As such it is viewed within the surgical literature as a procedure aimed at improving quality of life. It is not thought to affect the incidence or detection of local recurrence of breast cancer (Callaghan et al., 2002; NICE, 2009b) and can be carried out either at the time of mastectomy (immediate reconstruction) or as a separate procedure at a later date (delayed reconstruction).

A variety of current reconstructive procedures are available to women, some involving implants, others involving tissue transfer. Regardless of specific procedure, breast reconstruction is a major surgical procedure and usually involves a series of operations until a satisfactory result is obtained. Many women also undergo surgery (e. g. lifting or reduction) on the contralateral breast in order to create an acceptable, balanced appearance with the reconstructed breast. Each operation involves a degree of risk, additional stress and the possibility of surgical failure. Procedures involving tissue being transferred from one area of the body to another (ie. autologous reconstructions) will cause scarring of both the donor site and the breast area, and transferred skin may not match the colour or texture of the existing skin in the area to which it is moved. Procedures involving the repositioning of a muscle may reduce muscle strength at the donor site. In general, women undergoing autologous reconstructions are likely to have some degree of discomfort and difficulty with daily activities, and often need additional

physiotherapy to ensure that muscle function is restored as quickly as possible (Weiler-Mithoff, 2008).

Electing to undergo breast reconstruction therefore carries with it the potential for significant physical and psychological benefits but also the chance of considerable disadvantages and possible distress (Rainsbury, 2008). A reconstructed breast has neither the function nor physiological attributes of the natural breast that was removed by the mastectomy. Despite this, studies indicate high levels of satisfaction with reconstructions (Alderman, Kuhn, Lowery, & Wilkins, 2007; Saulis, Mustoe & Fine, 2007; Guyomard, Leinster & Wilkinson, 2007), however only about 30% of women undergoing mastectomy opt for reconstructive surgery in the UK (Jeevan et al, 2010).

Immediate vs. delayed reconstruction

Originally it was felt that a woman undergoing a mastectomy needed time to grieve for her missing breast and to accept the loss, before she could go on to make a decision about breast reconstruction. This was felt to allow a reconstructed breast to be accepted into her existing body image more satisfactorily (Winder & Winder, 1985). In other words, it was felt that women needed to experience the disfigurement caused by mastectomy in order to adjust to breast reconstruction. However, research does not appear to support this view. Examining immediate breast reconstruction at a time when the procedure was still comparatively rare, Noone, Frazier, Hayward & Skiles (1982) reported high levels of patient satisfaction. They concluded that women did not need prior, personal experience of the disfigurement caused by mastectomy in order to benefit from reconstructive surgery. Viewing photographs and meeting women who had already undergone mastectomy were considered sufficient substitutes for such personal

experience. On this basis they considered immediate reconstruction beneficial over mastectomy alone or delayed reconstructive procedures.

Immediate reconstruction is now often assumed to be advantageous over delayed procedures on the basis of improved cost-effectiveness, speedier recovery and reduced inconvenience for the patient (Weiler-Mithoff, 2008). In contrast to the original grief theory, Noone et al. (1982) found that 89% of women who had undergone immediate reconstruction perceived this as enabling them to cope with the emotional impact of mastectomy. Hence immediate reconstruction is often considered indicative of positive adjustment to the diagnosis (Rowland et al., 1995) and is therefore thought to offer greater psychological benefits (Fischbacher, 2002; Al-Ghazal, Fallowfield, Sully & Blamey, 2000).

Recently, however, there has been controversy around immediate reconstruction in the UK (Greenall, 2006), and significant variations exist between NHS Trusts (Jeevan et al, 2009). The surgical advantages of a delayed procedure included greater healing of the mastectomy site, a shorter operation and completion of radiotherapy and/or chemotherapy prior to reconstruction (Sullivan, Fletcher, Isom & Isik, 2008). Hospital systems, individual surgeons' preferences and the push towards speedier diagnosis and treatment might also influence the timing of reconstructive surgery. The most recent NICE guidelines propose that "immediate breast reconstruction [should be discussed] with all patients who are being advised to have a mastectomy....all appropriate breast reconstruction options should be offered and discussed with patients, irrespective of whether they are all available locally" (NICE, 2009a). Yet there are potential disadvantages with immediate reconstruction, including the issue that women have less

time to make informed decisions regarding surgery and that these decisions must be made soon after a diagnosis of breast cancer. Many women find this stressful, particularly when the diagnosis has just been given and their capacity to process information, to think clearly and critically and to make important decisions is compromised (Fallowfield, 2008; Rosenquist, Sandelin & Wickman, 1996).

The role of body image in deciding to undergo breast reconstruction

Motivation for breast reconstruction includes the perceived need to restore feelings of femininity and wholeness, to avoid disfigurement and deformity, to improve self-confidence and to avoid having an external prosthesis (Truelsen, 2003; Elder et al, 2005). Reasons against reconstruction include not wanting implants within the body and wishing to avoid further surgery. Some women fear, inaccurately, that reconstruction may trigger or disguise any recurrence of the cancer, and some are concerned that other people will view the surgery as an act of self-indulgent vanity (Ananian et al, 2004; Harcourt & Rumsey, 2004). Many women who choose reconstruction show a strong preference for their decision based on individual personal needs (Reaby, 1999).

Women who undergo reconstruction are typically younger at the time of mastectomy than those who do not pursue restorative surgery. They are also likely to be of higher socio-economic status, more likely to be married and to have actively sought out information regarding reconstructive surgery (Rowland et al., 1995; Harcourt & Rumsey, 2004). Some research studies report that women were more likely to undergo a reconstruction if they experienced deterioration in their self-esteem following the mastectomy, or if they were more concerned about their appearance (Fobair et al, 2006; Fallbjork, Karlsson, Salander & Rasmussen, 2010). Research also suggests that women

who elect to have reconstruction are less concerned about possible complications of surgery, more confident about the outcome and less fearful about recurrence and cancer treatment (Harcourt & Rumsey, 2004; Morrow et al, 2005).

Compared to women undergoing delayed procedures, women electing to have immediate reconstructions have reported (retrospectively) more body image concerns about the mastectomy (Roth, Lowery, Davis & Wilkins, 2005), more knowledge about treatment and side-effects (Pusic et al, 1999; Stevens et al., 1984), less distress at the time of the mastectomy operation and less fear of cancer (Wellisch, Schain, Noone & Little, 1985). Hence body image, concerns about the future and health-related beliefs all play a role in the decision-making process.

The impact of breast reconstruction on body image

There is some empirical data to suggest that mastectomy with breast reconstruction has a positive effect on body image when compared to mastectomy alone. In a systematic review of quality of life studies examining breast reconstruction, Potter & Winters (2008) found that a limited number of studies showed that body image was improved in breast reconstruction patients (though still lower than patients undergoing breast conserving treatment).

Contant et al. (2004) collected data from 139 women who had immediate breast reconstruction following mastectomy (68 had treatment for cancer, 71 had prophylactic mastectomies). They completed questionnaires which included questions about demographics, advantages of immediate reconstruction, satisfaction with immediate reconstruction, quality of life, body image, and sexual functioning. A scale measuring

satisfaction with the breast's cosmetic results was also administered. Findings of this study showed that body image was significantly correlated with both better cosmetic results and lower rates of depression for the 68 women who had treatment for cancer (Contant et al., 2004). However, this study did not examine women who had not undergone breast reconstruction.

Nicholson, Leinster & Sassoon (2007) compared mastectomy patients with breast reconstruction patients and those who had undergone breast-conserving surgery. Reconstruction patients reported a better body image than those in other groups, and a more positive body image was significantly correlated with a better cosmetic outcome (as rated by the patient). They concluded that good perception of cosmetic outcome, regardless of surgery type, was associated with good psychological adjustment.

Nano et al (2005) reported similar findings with delayed reconstruction patients. In a large study of 310 women (109 breast conserving treatment; 123 delayed breast reconstruction; 78 mastectomy), they found post-operative body image scores to be lowest amongst women undergoing mastectomy. The researchers concluded that body image was improved by breast conservation and reconstruction when compared to mastectomy alone. However, Rowland, Holland, Chalgassian & Kinne (1993) conducted a prospective study of 117 women who had delayed reconstruction. A longer delay between mastectomy and reconstruction was associated with greater satisfaction with the outcome of surgery. They also found that women became more critical of the results of delayed procedures as the time since their reconstruction increased. This supports the idea that satisfaction with outcome changes over time, with women reporting greater satisfaction with delayed reconstruction procedures the longer they

wait for their reconstruction. However, initial satisfaction appears to then decrease. This could be mean that women who undergo delayed reconstructions have different surgical expectations to those undergoing immediate reconstructions, and that delayed procedures may not alleviate body image difficulties in the long-term. However, long term satisfaction may differ with type of reconstruction (eg. implant or autologous), so conclusions are limited (Alderman, Kuhn, Lowery & Wilkins, 2007).

When comparing immediate reconstruction with delayed reconstruction, the findings are somewhat inconclusive. In their retrospective study, Al Ghazal, Sully, Fallowfield & Blamey (2000) reported that women who had undergone mastectomy with immediate reconstruction reported significantly superior body image scores than those who underwent delayed reconstruction. However, no comparison was made with women who had undergone mastectomy without reconstruction. Furthermore the period between reconstructive surgery and assessment ranged from 6 months to 9 years. Since the final cosmetic results of any reconstructive surgery are not evident for some time, in addition to the time taken to adapt to a new body image, this wide variation in follow-up times is likely to have influenced the study's findings.

Mock (1993) conducted a retrospective postal survey of 257 women who had received surgical treatment for breast cancer. She compared women undergoing mastectomy alone (n=62), immediate breast reconstruction (n=58), delayed reconstruction (n=47), and breast conserving surgery (n=90). The conservative surgery group reported significantly more positive body image scores than women having mastectomy, whether they had undergone a reconstruction or not. The immediate and delayed reconstruction groups did not significantly differ from each other. Mock concluded that many women

were still adapting to their altered body image a year after surgery. These results highlight the fact that adjustment to a disturbed body image after the treatment and diagnosis of breast cancer can take some time.

However, some studies have suggested that women undergoing immediate reconstruction, compared to mastectomy alone and delayed reconstruction, tend to report fewer negative outcomes with regard to psychological morbidity, body image and overall quality of life (Roth, Lowery, Davis & Wilkins, 2005; Arora et al., 2001).

This suggests that breast reconstruction can improve body image post-mastectomy, and that immediate reconstruction may alleviate some of the psychological and adjustment problems that follow mastectomy for some women (Arora et al, 2001; Wellisch et al, 1985). However, other studies have also suggested that women showed significant improvements in body image in the first year regardless of surgical procedure, and that immediate reconstruction was not a buffer for body image disturbances (Dean, Chetty & Forrest, 1983; Harcourt et al, 2003) or feelings of loss (Hill & White, 2008).

Mental health outcomes and breast reconstruction

There is some evidence to support the idea that breast reconstruction can alleviate some emotional distress that women encounter. Dean, Chetty & Forrest (1983) undertook a randomised controlled trial and concluded that immediate reconstruction was beneficial, reporting more satisfaction with breast appearance and reduced psychiatric morbidity 3 and 12 months post-surgery amongst women who underwent immediate reconstruction compared with those who underwent mastectomy alone. This effect was particularly marked for women who had reported unsatisfactory marriages.

Gross, Burnett & Borelli (1996) found that women perceived the offer of reconstructive surgery as a positive indication that medical staff did not anticipate recurrence of their cancer to be a significant problem. The study used a cancer-specific measure to examine the coping strategies used by 36 women who had undergone mastectomy, with or without immediate reconstruction. Women who underwent immediate reconstruction reported a significant improvement in psychological well-being between two assessments, 2 and 30 days post-surgery. Gross, Burnett & Borelli (1996) concluded that women elect for reconstruction as a way of coping with the mastectomy and cancer diagnosis, in contrast to denial or avoidance of the diagnosis or mastectomy.

Supporting this finding, Schain, Wellisch, Pasnau, & Landsverk (1985) reported that women who had immediate reconstruction experienced significantly less recalled distress about mastectomy than those who did not. Furthermore, Stevens et al. (1984) found that women who had immediate reconstructions reported fewer depressive symptoms than the delayed reconstruction group, who in turn reported a reduction in their depressive symptoms following reconstructive surgery. Arora et al. (2001) even reported that although women who had immediate breast reconstruction had lower body image scores than women in the breast conserving group; they reported better emotional well-being 1 month post-surgery.

When comparing immediate vs. delayed reconstruction, some researchers have found lower rates of depression and anxiety in women with immediate reconstruction, coupled with better self-esteem and body image (Al-Ghazal, Sully, Fallowfield & Blamey, 2000). Additionally, the authors found that 63 of 83 (76%) women who had previously

undergone delayed reconstruction would, looking back, prefer to have undergone an immediate procedure. However, this is an inappropriate comparison since the experience of mastectomy and immediate reconstruction (including post-operative pain and speed of recovery) is fundamentally different to that of undergoing two separate procedures involving the inconvenience of two hospital admissions and periods of recovery. In addition, their decision may be influenced by biased and selective recall of their own experiences.

Potter & Winters (2008) carried out a systematic review of quality of life studies that examined breast reconstruction. They found that the majority of studies found no differences between women who had undergone mastectomy alone when compared with breast reconstruction. This supports the findings of Harcourt et al. (2003), who compared women who had undergone mastectomy with women who had undergone immediate and delayed reconstructions. They found no difference between the three groups in anxiety, depression, or quality of life. Although patient numbers were small, patients chose their treatment and there was no significant difference between groups in patient satisfaction. This may support the idea that when patients are well matched to their chosen treatment they have better psychological outcomes.

Overall, there is some evidence to suggest that patients undergoing mastectomy with breast reconstruction have similar levels of psychological comorbidity and quality of life to those undergoing breast conserving treatment. Furthermore, there is some evidence to suggest that immediate reconstruction improves quality of life and reduces psychological comorbidity (Fischbacher, 2002; Wilkins et al, 2000). However it is worth noting that breast reconstruction represents a significantly more complex surgery

with more complications than mastectomy alone, and these are also likely to play a role in subsequent psychological distress for patients with breast cancer (Collins et al, 2011).

METHODOLOGICAL ISSUES AND LIMITATIONS IN THE RESEARCH

The literature, however, is not clear about the psychological benefits of reconstruction over mastectomy alone. The lack of consensus evidence is due to both the variety of research designs employed and also to major methodological problems. Firstly, the majority of studies employ a retrospective design, ie. assessing women's experiences only after they have made their decision and after the surgery has taken place. The amount of time between the surgery and research is often varied, and can differ from a few months to several years, even within the same study (Al Ghazal, Sully, Fallowfield & Blamey, 2000; Pockaj, 2009). This is problematic as respondents may describe their current feelings and concerns rather than portray their actual past experience, so that both positive and negative experiences may be misrepresented.

Retrospective analysis makes it more difficult to identify fluctuations in women's experiences and feelings. It is also likely that, with hindsight after surgery, women adjust their pre-operative view of themselves in order to cope with their current situation (Reaby, Hort & Vandervoord, 1994; Winters, Benson & Pusic, 2010). Cognitive dissonance may occur in this situation, as women attempt to reconcile their previous and present situations. This is likely to impact upon findings from retrospective studies.

Cross-sectional retrospective surveys of patients at a single time point fails to consider that the length of time since surgery may influence research findings. For example, participants in Al-Ghazal, Sully, Fallowfield & Blamey's (2000) study had undergone reconstructive surgery between 6 months and 18 years previously. These women are likely to be at differing stages of physical and emotional recovery from their surgery

and will have had a greater or lesser period of time in which to seek effective coping strategies and adjust to their altered body image. In addition, the nature and quality of reconstructive techniques are likely to have improved over the ten year period incorporated into this study. No consideration is given to the natural effects of ageing that have taken place since the time of surgery and how this may affect women's reports of appearance-related and body image issues. Few prospective studies have been carried out and the need for more prospective research has been acknowledged (Harcourt et al, 2003; Atisha et al, 2008).

A large proportion of studies do not use recognised measures of psychological well-being and few used the same assessment tools. This is particularly true in studies focussing on body image where a lack of cancer-specific assessment tools has led to many researchers creating new measures (which may or may not be theoretically driven). These include the Body Image Scale (BIS; Hopwood, Fletcher, Lee & Al-Ghazal, 2001), the Body Image Instrument (BII; Kopel, Eiser, Cool, Grimer & Carter, 1998) and the Measure of Body Apperception (MBA, Carver et al, 1998). This makes it difficult to compare studies, prevents meta-analysis being carried out and precludes firm conclusions being drawn. A further methodological problem is that many studies failed to obtain control or comparison groups of women who did not undergo reconstruction, and many include small sample sizes. Recruiting women into this area of research can be problematic due to the relatively small numbers of women electing to have reconstruction and the high stress levels at time of diagnosis and surgery. However, limited study size can be a particular problem for quantitative studies and can limit analyses and any conclusions made. However, the "gold standard" of the randomised controlled trial (RCT) in medical research is not always the most appropriate

methodology for psychosocial research (Bottomley, 1997; Harcourt et al, 2003). RCTs, by definition, impede patient choice and render them inappropriate in assessing the implications of mastectomy and breast reconstruction, where individual differences and preferences will impact on women's decisions and outcomes (Reaby, 1999; Rosenquist, Sandelin, & Wickman, 1996). Equally there is evidence to suggest that women who are involved in the decision-making process have better psychological outcomes (Fallowfield, 2008; Kraus, 1999).

Conclusions that can be drawn from previous research in this area are limited by developments in the provision of care for women with breast cancer. The introduction of specialist nurses, developments in reconstructive techniques and procedures and new drugs have all changed the information and options available to women. It is important to acknowledge that past research may not be easily applicable to current practice. Equally, surgeons do not always provide a choice of all possible procedures and in several studies it is not clear if the women have had any choice about the type of reconstruction undertaken (Rowland et al 2000; Dean, Chetty & Forrest, 1983). Each type of procedure has unique benefits and disadvantages and the psychosocial consequences of each particular option need to be known if a woman is to be assisted in making the decision that is most appropriate for her as an individual. Since the attitudes and preferences of health professionals is known to influence patient's decisions in other health contexts (Edwards, Elwyn, Covey, Matthews & Pill, 2001) it is likely that the surgeon's attitude and preferences will, amongst other factors, determine whether or not a woman is offered or elects to have breast reconstruction (Alderman et al, 2008).

This is a particular difficulty given that much of the literature surrounding breast reconstruction originates from the USA where the availability, acceptability and provision of plastic surgery is considerably different from the UK (Morrow et al, 2005; Alderman, Hawley, Waljee, Morrow & Katz, 2007). It is likely that the financial aspects of medical care also influence the accessibility of reconstructive surgery in the USA. The inconsistent provision of breast reconstruction across the NHS is a current topic of debate, though more women are undergoing reconstruction procedures than ever before (Jeevan et al, 2011). Given this, it is unclear to what the extent research findings from the USA are applicable to the UK. However, increasing numbers of studies are taking place in countries which have a nationally-subsidised health service and involving women from various ethnic and cultural backgrounds (Fung et al., 2001; Ananian et al, 2004; Alderman & Katz, 2009). This will help to address these issues.

CLINICAL IMPLICATIONS AND FUTURE RESEARCH

The literature examining women with breast cancer and their adjustment to bodily changes highlights many inconsistencies. The review highlights that the comparative impact of mastectomy and breast conserving surgery is well known, and for some women breast reconstruction may offer some improvements to body image following disfiguring surgery. However, the inconsistencies demonstrate that medical developments and surgical options are not a panacea for the psychosocial distress associated with breast cancer. In a gap analysis of breast cancer research, Thompson et al. (2008) highlighted a need for specific interventions for body image distress and sexual problems and a way to appropriately select the patients at risk of such problems. They found that research narrowly defined "psychosocial distress" as anxiety and depression, rather than exploring other areas of psychological functioning.

These gaps in research are partly due to a lack of theory-research links between theoretical models and assessment of body image. The lack of sensitivity in body image measures in cancer has been noted (White, 2000). However, there is a need to link mainstream body image research and models with body image models in oncology. This will help to establish models and develop assessments and interventions that specifically support women with body image difficulties following breast cancer surgery.

Given the inconsistencies in the literature and the need for conceptually-driven research, the role of body image investment as a moderating variable should be considered. Some researchers have examined investment in body image in other cancers and found that the greater importance placed on body image and appearance, the more likely women are to experience difficulty adjusting to the physical changes that accompany cancer and

cancer treatments (Lichenthal, Cruess, Clark & Ming, 2005). Investment in body image may be a risk factor for emotional disturbance in women with breast cancer (Helms, O'Hea & Corso, 2008). The potential for identifying these women before treatment has important clinical implications for health professionals working with cancer patients.

Recently, some studies have reported that initial levels of body image investment in women with breast cancer predicted some dimensions of post-surgical body image, levels of depression, and social and psychological quality of life (Moreira, Silva & Canavarro, 2009; Moreira & Canavarro 2010). The studies also reported that women who were more motivated to manage their appearance pre-surgery were more resilient to body image problems afterwards. So, relying on appearance for definition and self-worth may make women more vulnerable to body image problems, but making efforts to maintain or improve appearance may make a woman more resilient to such distress. This effect was also found in Carver et el.'s (1998) study who concluded that that these women had a stable sense of their own ability to control their appearance and so felt capable of managing their post-surgical appearance in the same way. This suggests that elements of body image investment could also be a protective factor for some women though more research is needed.

CONCLUSION

As highlighted in this review, there are many inconsistencies in the literature which make it difficult to draw firm conclusions. However, there is an overall consensus that mastectomy can have a significantly damaging effect on body image and general mental health for a proportion of women when compared to breast conserving surgery. Some research shows that some women experience more cancer-related fears following breast conserving surgery, which suggests that for some women, mastectomy remains a preferred alternative. Despite the negative effects of mastectomy, many women appear to adapt to an altered appearance and show improvements when assessed in the first year after surgery (Harcourt et al, 2003; Parker et al., 2007).

There have been shown to be some psychological benefits in breast reconstruction for women with breast cancer; however, this is less clear. Many studies show that women undergoing breast reconstruction have increased self-esteem and body image outcomes when compared to mastectomy alone, though these are still significantly lower than women receiving breast conserving surgery. There is, however, little evidence to support lower levels of psychological distress in patients undergoing breast conserving surgery rather than mastectomy with reconstruction (Arora et al., 2001; Al-Ghazal, Fallowfield & Blamey, 2000). This suggests that breast reconstruction can be beneficial to some women (despite the increased risk of surgical complication), though it is not a panacea for body image disturbances and psychological difficulties following surgery.

Many studies have taken place recently to compare immediate and delayed reconstruction. There are clearly advantages and disadvantages for each procedure, and women choosing either type of reconstruction show differences in body image concerns

and health-related beliefs. Some studies have shown no significant differences between immediate or delayed reconstruction in terms of psychological outcomes (Mock, 1993; Harcourt et al., 2003), whereas others show reduced psychological distress in women undergoing immediate reconstruction (Arora et al., 2001; Al-Ghazal, Sully, Fallowfield & Blamey, 2000).

The inconsistencies in the literature highlight the need to adapt mainstream body image models to an oncology setting to ensure a theory-research link is maintained. Cash, Melnyk & Hrabosky (2004) describe body image as an a construct made up of not only how we evaluate ourselves but also how much investment we place on our body image in determining our satisfaction, happiness or well-being. Recent oncology models of body image have suggested that investment in body image might moderate the psychological impact of physical changes caused by breast cancer treatment. Some recent studies support this idea, however the majority of cancer research neglects this aspect of body image.

Whilst research suggests that body image is not a primary concern when a woman is first diagnosed with breast cancer, it is clearly an important factor in treatment decisions and outcomes. Once the fear of having a life-threatening illness has receded, a woman often has the same appearance concerns she had pre-cancer. It is important that these issues are highlighted and that women who are struggling with their body image are identified and supported before, during and after treatment. As breast cancer survival rates continue to improve it is important that a life-threatening illness does not become a quality of life-threatening illness.

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Empirical Paper

The role of body image investment in the adjustment of women with breast cancer

Helen Le Vesconte

The British Journal of Health Psychology was used as a guide in determining the preparation of this paper (see Appendix 1 for notes to contributors)

ABSTRACT

Objectives. Body image comprises not only by how we evaluate ourselves but also our body image investment (the amount of significance we place on our appearance). This study was conducted to examine the psychosocial outcomes of two groups of women: those undergoing mastectomy alone and those undergoing mastectomy with immediate breast reconstruction. It also examined whether investment in body image acts as a moderating variable between surgery type and subsequent psychological distress.

Design. This prospective study used a 2x2 mixed model design to compare two groups of women at two time points. The method proposed by Baron and Kenny (1986) was used to examine body image investment as a moderating variable.

Method. A total of 66 breast cancer patients completed measures assessing body image, body image investment, quality of life and symptoms of anxiety and depression. Data were collected prior to surgery and 8 weeks after surgery.

Results. Both groups reported a significant deterioration in their body image following surgery. Higher initial investment in appearance was significantly associated with a poorer body image and greater emotional distress both before and after surgery. Appearance investment moderated the relationship between surgery type and emotional distress. Hence mastectomy was only associated with more emotional distress among women who reported higher levels of appearance investment.

Conclusions. Higher appearance investment may be a vulnerability factor for women facing surgery, particularly mastectomy alone. Women with higher investment in their appearance appear to have poorer outcomes in terms of body image and emotional distress, which in turn impacts on their quality of life following surgery.

INTRODUCTION

Breast cancer is now the most common cancer in the UK despite the fact it is rare in men (Office for National Statistics, 2010). It accounts for around one third of all cancer diagnosed in women, with around 100 women being diagnosed every day across the UK. Each individual's risk varies depending on many factors, including family history and lifestyle factors. However, nearly half (48%) of cases of breast cancer are diagnosed in the 50-69 age group alone (Cancer Research UK, 2009). Breast cancer survival rates have significantly improved in the last 40 years, with more than three-quarters of women surviving for at least 10 years or more (Cancer Research UK, 2009). The quality of life for women who are living with or beyond breast cancer has therefore become increasingly important.

There is a wealth of research that has repeatedly identified persistent and serious levels of psychological distress amongst women diagnosed with breast cancer. Reactions to the threat, diagnosis and treatment of the disease are generally reported to include an impact upon quality of life, altered mood, elevated levels of anxiety and depression, impaired cognitive functioning and concerns about life-expectancy (Hartl et al, 2010; Cordova, Cunningham, Carlson & Andrykowski, 2001). Although a certain degree of anxiety and concern should be seen as a natural reaction to being diagnosed with cancer, approximately 20-30% of newly diagnosed patients will experience long-term psychological problems, especially if they have had previous psychological disorders (Griffen & Fentiman, 2002). These negative effects can be present a year post-diagnosis, regardless of improved physical functioning (Pinto, Clark, Maruyame & Feder, 2003).

Concerns about changes in appearance and negative body image, reduced self-esteem, relationship and sexual difficulties are also prevalent in women with breast cancer (Nano et al., 2005; Helms, O'Hea & Corso, 2008). Many women worry about the impact that treatment can have on their appearance and the way they feel about their body. Indeed, appearance-related side effects, such as hair loss, are often reported as more severe than side-effects such as nausea and fatigue (White, 2000). Undergoing any surgical procedure for breast cancer can be an emotional and distressing experience, and often the decision to undergo such surgery must be made soon after diagnosis. However, undergoing a mastectomy can be especially difficult since women face the distress and disfigurement caused by the loss of the breast in addition to the fear of a potentially life-threatening disease.

Researchers have consistently reported greater body image distress associated with more disfiguring surgery, with greater body image problems for women undergoing mastectomy (surgical removal of the entire breast) than breast conserving surgery (Fobair et al, 2006; Yurek, Farrar & Andersen, 2000). Mastectomy can influence various areas of functioning, including identity, confidence, mood, self-esteem, sexuality, and quality of life (Helms, O'Hea & Corso, 2008). Up to 50% of women undergoing mastectomy surgery suffer clinically high levels of anxiety or depression prior to surgery and almost one-third still report psychological problems one year later (Yurek, Farrar & Andersen, 2000; Harcourt, 2008). In contrast to this, many women who have undergone mastectomy report high levels of satisfaction with their treatment and do not show significant deteriorations in mood or body image (Nissen et al, 2001; Harcourt et al, 2003).

Some research suggests that appearance-related issues and body image distress may, to some extent, be dependent upon age. Regardless of surgery or treatment type, younger women diagnosed with breast cancer report increased distress compared with older women (King, Kenny, Shiell, Hall, and Boyages (2000); Avis, Crawford, & Manuel, 2005). Younger women report lowered overall quality of life ratings linked to concerns about body image, partner relationships, sexual functioning, as well as less adaptive coping styles than their older counterparts (Avis, Crawford & Manuel, 2005; Broeckel, Thors, Jacobson, Small & Cox, 2002). These studies suggest that younger women with breast cancer may have more concerns around body image, sexuality and fertility than older women with the same disease.

However, it should not be assumed that older women will not have appearance-related concerns. One study found that body image was an important factor in treatment decisions for a nearly a third of women aged 67 or older, and that receiving treatment consistent with preferences about appearance was important in predicting long-term psychological adjustment (Figueiredo, Cullen, Hwang, Rowland & Mandelblatt, 2004).

However there are other factors that impact on body image outcomes. Women with a poor body image at the start of treatment have also been shown to report considerably more distress and body image difficulties during and after treatment (Harcourt et al., 2003; Falk Dahl, Reinertsen, Nesvold, Fossa & Dahl, 2010; Figueiredo et al., 2004). Researchers have consistently found that the better the cosmetic outcome of the surgery (whether objectively or subjectively rated), the better the psychological outcome for the patient in terms of body image and mood (Fallowfield, 2008; Waljee et al, 2010).

It is likely that body image issues are probably not the main source of concern in the initial stages of breast cancer and women are likely to be focussing more on their disease and ways of survival, only to concentrate on this once the fear of cancer has receded (Harcourt & Rumsey, 2004). However, for some women, concern about breast disfigurement and post-surgical appearance is more prominent and can play a role in the initial decision making process about cancer treatment (Mock, 1993; Figueiredo, Cullen, Hwang, Rowland & Mandelblatt, 2004). Several studies have found that concerns about body image disturbance and anticipated disfigurement were significantly related to choice of treatment among women with breast cancer (Molenaar et al, 2004).

Whilst there has been a move towards breast conserving surgery in recent years (ie. lumpectomy or wide local excision) mastectomy rates in the UK remain around 40% (NICE, 2009). Breast reconstruction is intended to offer to psychological benefits to women, and immediate reconstruction (in which the reconstruction takes place in the same operation as the mastectomy) has become more popular. It has been suggested that breast reconstruction, particularly immediate reconstruction, acts to prevent the psychological and adjustment problems that follow mastectomy (Arora et al, 2001; Wellisch et al, 1985). Some retrospective studies have shown women with immediate reconstruction, compared to mastectomy alone and delayed reconstruction, tend to report fewer negative outcomes with regard to psychological morbidity, body image and overall quality of life (Roth, Lowery, Davis & Wilkins, 2005; Al Ghazal, Sully, Fallowfield & Blamey, 2000). However, prospective studies have suggested that women undergoing either procedure all showed significant improvements in the first year, and that immediate reconstruction was not a buffer for body image disturbances (Dean, Chetty & Forrest, 1983; Harcourt et al, 2003).

Therefore the research highlights the variation in women's adjustment to breast cancer. There is no single, predictable psychological response to being diagnosed with the disease, and viewing women with breast cancer as a homogenous group is unhelpful. For some women, adjusting to the physical changes caused by breast cancer treatment (eg. breast-related changes, hair loss, and weight gain) can represent a loss of self and identity that adds to the distress caused by a cancer diagnosis.

In recent years, there has been a drive to integrate mainstream theoretical models of body image with cancer literature (White, 2000). Cognitive-behavioural models highlight that body image is linked to feelings about the self, but that people differ in the amount of significance they place on their appearance or the extent of importance on appearance as a criterion for defining one's sense of self. Hence some women have a pronounced sense of body image, whereas others may regard their physical self as an insignificant part of their identity.

Investment in body image may be a risk factor for emotional disturbance among patients with breast cancer (Petronis, Carver, Antoni, & Weiss, 2003). Researchers have suggested that the greater importance placed on body image and appearance, the more likely women are to experience difficulty adjusting to breast cancer and all the bodily changes that go along with it and its treatment (Lichtenthal, Cruess, Clark, & Ming, 2005). Hence investment in body image may be a moderating factor in psychological outcomes, and may account for some inconsistencies in the literature.

Few studies have explored investment in body image as a factor in the psychological and adjustment difficulties among patients with breast cancer (Petronis, Carver, Antoni & Weiss, 2003; Figueiredo, Cullen, Hwang, Rowland & Mandelblatt, 2004). However, many studies tend to be retrospective and use non-standardised questionnaires for the assessment of body image and body image investment (Carver et al., 1998). Many of the studies assess women's experiences only after they have made their decision and the surgery has taken place, often years earlier. This is problematic because the length of time since the operation may influence the recall and reporting of both positive and negative experiences. It also fails to consider the effect of women's pre-surgical functioning and body image on post-surgical outcomes.

This study sought to address this by using a prospective design, to accurately compare body image and investment in body image before and after surgery for women undergoing mastectomy with or without immediate reconstruction. This study set out to investigate the relationship between investment in body image and the impact of breast cancer surgery, both in the decision-making process and for patient outcomes. Given the suggested importance of body image investment, important clinical implications could arise from identifying the relationship between investment in body image and the impact of breast cancer surgery, both in the decision-making process and for patient outcomes.

The first goal of this study was to examine the effect of mastectomy alone and mastectomy with immediate reconstruction on anxiety, depression, body image and quality of life as measured before and after surgery. Although literature concerning this subject is inconsistent, there is some evidence to suggest that women undergoing

mastectomy alone may have a poorer outcome than women undergoing immediate reconstruction. Appearance investment is considered to be a trait level construct (Cash, 2002) and therefore should not change significantly.

The second goal was to examine whether patients choosing mastectomy alone have a lower investment in their appearance than patients who choose reconstruction. A lower appearance investment could be a factor in the decision-making process for some women when opting for mastectomy alone over other surgical choices.

Finally, this study also aimed to investigate whether investment in body image moderates the relationship between surgery type and emotional distress following surgery. Based on previous research and theoretical models having higher levels of body image investment could be associated with poorer adjustment outcomes for patients (Moreira & Canavarro, 2010; Helms, O'Hea & Corso, 2008). This could also help to resolve the apparent contradictions in previous research.

METHOD

Design

This study uses a quasi-experimental design with one between groups factor (surgery type, ie. mastectomy alone or mastectomy with immediate reconstruction) and one within group factor (time). The questionnaire measures were the dependent variables. Participants would be an opportunity sample recruited after they had made their choice about treatment and type of surgery.

G*power (Faul, Erdfelder, Lang & Buchner, 2007) was used to calculate a sample size for a 2x2 mixed model ANOVA with two groups and two within-subject repetitions (pre and post-treatment) with an effect size of 0.25, alpha of 0.05 and power of 0.8. This resulted in a total sample size of 34 needed (with 17 in each group).

Participants

Breast cancer patients were recruited through a variety of sources. Participants were recruited at pre-operative assessment appointments from two NHS hospitals. All participants that met the inclusion criteria were identified and approached by Breast Care Nurses or their plastic surgeon and invited to participate. Those who expressed an interest took home a questionnaire pack, which contained more information and a consent form. Participants were also recruited from private plastic surgery practices around the UK in a similar way. Participants who met the inclusion criteria were identified and invited to participate by their surgeon. Those who expressed an interest took home an information sheet. Those participants who contacted the researcher were then sent a questionnaire pack or a link to electronic versions of the questionnaires depending on their preference.

Participants were also recruited through a number of charity organisations and voluntary cancer support groups. The organisations agreed to advertise the study in relevant ways, eg. on websites or newsletters/bulletin boards. Those participants who contacted the researcher were then sent a questionnaire pack or completed electronic versions of the questionnaires.

The inclusion criteria for recruitment were that participants were women about to undergo a mastectomy alone or a mastectomy with an immediate breast reconstruction. They had to be aged over 18, though no upper age limit was given. For consent purposes, they had to be able to read and understand the information provided on the participant information sheet and consent form (see Appendix 2). All participants had to agree to sign a consent form in order to participate in the study.

Of the 64 questionnaire packs provided to patients at the NHS hospitals, 30 (46.9%) were returned completed. From other sources, a total of 39 women met the criteria, consented and completed questionnaire packs. A total of 69 women participated in the study, of which 37 were due to have a mastectomy, and 32 were due to undergo immediate breast reconstruction. Within the mastectomy group, 19 (51.4%) number of women opted for a mastectomy alone, whereas 18 (48.6%) were considering reconstruction in the future.

Procedure

The study was granted ethical approval by the Department of Psychology at Southampton University (see Appendix 3). Salisbury District Hospital and the Royal Hampshire County Hospital were approached as both hospitals routinely use standardised questionnaires and interviews to screen their patients in terms of quality of life, psychological distress and body image as part of current practice. Permission to conduct the study was obtained from the Research & Development (R&D) Departments at Salisbury District Hospital, Royal Hampshire County Hospital and Breast Cancer Care (see Appendix 3).

The specialist breast care nurses or surgeons introduced the study to women at their pre-operative assessment or follow-up assessment. Questionnaire packs, further information and a consent form were offered to participants who met the inclusion criteria for the study. Participants recruited through charities or voluntary organisations were signposted to an online participant information sheet and contacted the researcher if they were willing to take part and met the relevant criteria. The questionnaire pack, consent form and a participant information sheet were then sent to each participant. Participants were then sent another pack of questionnaires 8 weeks after their surgery date.

All participants were given a phone number, email and postal address in order to contact the researcher. All participants were given the opportunity to ask questions about the study or to ask for support if they became upset during completion of the questionnaires. In the event of their questionnaire scores indicating they could benefit from support, they were encouraged to speak to their Breast Care Team or relevant healthcare professional. In the case of the NHS hospitals involved, they were offered further support from relevant members of the hospital team.

After consent was obtained, participants provided demographic information and then completed the four questionnaires. All packs contained pre-paid enveloped in which to return the completed questionnaires. Eight weeks after their surgery date, participants were contacted and asked to complete the questionnaires again. All potential participants were offered the opportunity to receive a summary of the results of the study.

Measures

Participants were asked to provide demographic information on age, marital status, employment status, surgery type and previous treatment (Appendix 4). The following measures were then completed:

Hospital Anxiety and Depression Scale (HADS)

The HADS (Zigmond & Snaith, 1983) is widely used in cancer literature as a screening measure of psychological well-being, and is sensitive to changes over time and provides clinical meaningful results (Harcourt et al, 2003; Lampic, 2009). Patients are asked to rate the severity of a number of symptoms of depression and anxiety, for example "I feel tense or wound up". A score of 11 or more (ranging from 0 to 21) on the anxiety or depression subscale is indicative of "caseness", ie. that the individual may benefit from psychological support. It was designed to be used in both general hospital and out-patient settings, and has excellent reliability (Lindsey & Powell, 2007).

Body Image Scale (BIS; Appendix 4)

The BIS (Hopwood, Fletcher, Lee & Al-Ghazal, 2001) has been developed specifically for cancer patients, and has been used in other breast cancer literature (Harcourt et al, 2003; Al-Ghazal, Sully, Fallowfield & Blamey, 2000). Patients are asked to rate ten questions regarding their feelings towards their body and on a four-point Likert scale. Potential scores range from 0 to 30, with a higher score suggestive of a poorer body image. It shows excellent consistency (0.93) and good clinical validity in terms of discriminant validity, sensitivity to change and test-retest reliability.

Assessment of Body Image Investment-Revised (ASI-R)

This 20-item inventory measure was developed specifically for use in non-clinical and clinical populations (Cash, Melnyk & Hrabosky, 2004). Each statement ranges from one (strongly disagree) to five (strongly agree), with higher scores indicating higher levels of body image investment. Investment in body image is assessed in terms of an individual's beliefs about how their appearance influences their worth and sense of self, as well as how motivated someone is to manage their appearance. Hence the scale produces a total score and two subscale scores which encompass two separate facets of body image investment: self-evaluative salience (SES; the importance an individual places on physical appearance for their definition of self-worth and self-concept) and motivational salience (MS; the individual's efforts to engage in appearance management behaviours in order to maintain or improve their attractiveness). It has good internal consistency (Cash, Melnyk & Hrabosky, 2004), and has been used for assessment purposes in both body image work and cancer settings (Cash & Hrabosky, 2003; Moreira & Canavarro, 2010).

European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-30)

This quality-of-life questionnaire comprises five function scales (physical, cognitive, emotional, social and role functioning) as well as a global health status/quality of life scale, that apply to anyone with cancer (Aaronson et al, 1993). Scores on each scale range from zero to 100 with higher scores denoting higher levels of functioning, quality of life or symptoms. A breast cancer-specific module (BR23) was used in conjunction with the QLQ-30. This includes a subscale of body image, sexual functioning and concern for the future. The QLQ-30 is widely used in research and clinical settings, and

shows excellent clinical validity, reliability and consistency (Sprangers, 1996, Montazeri et al., 2008).

In this study, the reliability of the measures was tested by calculating Cronbach's alpha. For all scales, Cronbach's alpha scores were calculated and found to be acceptable (greater than 0.70), which suggests that the measures were suitable for use in the study (Field, 2009).

Statistical analysis

All statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 17.0. All data were checked for normality prior to any statistical analysis. All data were normal except for some of the quality of life scores measured by the EORTC QLQ-30, namely physical functioning, role functioning, cognitive functioning and social functioning. Scores for these scales indicated a ceiling effect had occurred, with many women showing little to no impairment in their functioning prior to surgery. This was particularly true for women undergoing immediate reconstruction surgery. This was to be expected given that many women have few symptoms prior to surgery and surgery is frequently the first treatment undertaken, often a few weeks after diagnosis. Furthermore, women undergoing immediate reconstruction are also likely to have less invasive cancer than women who have mastectomies and so may have fewer symptoms.

Descriptive statistics were computed for all variables. Differences between participants were analysed using chi-square tests, univariate analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA). Given the equal sample sizes and

homogeneity of variance, the ANOVA/MANOVA tests were considered robust enough to perform accurately on all data, despite the skew observed in some scores (Howell, 2006; Field, 2009).

The data used for hierarchical linear regression analyses were checked for potential problems. Analysis of the residuals revealed no violations of the assumptions of normally distributed errors (equal variability across the residuals) (Field, 2009). Multicollinearity was analysed through Tolerance and Variance Inflation Factor (VIF) statistics and was considered to be present when tolerance was less than 0.1 and VIF was greater than 10 (Meyers, Gamst & Guarino, 2006). All of the VIF and tolerance values were within these limits, suggesting there were no problems with multicollinearity.

RESULTS

Demographic and clinical characteristics

Of the 69 women who completed questionnaires prior to their surgery, 66 (95.7%) completed the questionnaires at the eight week follow-up period. Three women in the mastectomy group did not complete the follow-up questionnaires and chose not to continue with the research. Baseline measures obtained from the women who dropped out were compared with those of women who completed questionnaires at both time points. These two groups did not differ significantly on any measure or variable collected. Only complete data sets were included in the main analysis. The average time between surgery date and follow-up data was 9 weeks.

The age range of the total sample (n=66) ranged from 26 to 85 years, with a mean of 50.6 years. 42 (63.6%) of the sample was either full- or part-time employed, with the remaining 24 (36.4%) unemployed, retired or full-time mothers. Within the sample, 44 (66.7%) women had current partners, ten (15.2%) were single, and 12 (18.2%) were divorced or widowed. Overall, 50 (66.7%) women had children.

As the study compared the experiences of two naturally occurring groups, the incidence of chemotherapy and radiotherapy (adjuvant therapy) varied between the surgical groups. 36 (54.5%) women reported having no previous treatment, and the remaining women reported one or more of the following: chemotherapy, radiotherapy, hormone treatment and prior surgery (such as a lumpectomy).

There was a significant association between surgery type and source of recruitment (χ^2=6.82; df=2; p=0.03) with more women from private and charity settings having

immediate reconstructions than those recruited from NHS settings. There was also a significant difference between women recruited from charities and the NHS in terms of age ($F=5.58$; $df=2$; $p=0.006$), with women recruited from charities (predominantly via the Breast Cancer Care website) tending to be younger. However, there was no difference in terms of any other questionnaire data collected.

Demographic information for each surgical group is shown in Table 1.

Table 1: Demographic information according to surgical group

	Mastectomy (n=34)	Immediate reconstruction (n=32)
Age at assessment (yrs)		
Mean (SD)	53.26 (15.51)	47.88 (9.71)
Range	26-85	30-77
Marital status		
Married or equivalent	22 (64.7%)	22 (68.8%)
Children	25 (73.5%)	25 (78.1%)
Employment status		
Full- or part-time employed	18 (52.9%)	24 (75.0%)
Unemployed (including retired women & full-time mothers)	16 (47.1%)	8 (25.0%)
Treatment prior to surgery		
None	19 (55.9%)	17 (53.1%)
Chemotherapy alone	6 (17.6%)	8 (25.0%)
Hormone treatment alone	2 (5.9%)	1 (3.1%)
Other/combination of treatments	7 (20.6%)	6 (18.8%)
Total number of women having chemotherapy prior to surgery	9 (26.5%)	11 (34.4%)

Differences between the groups in terms of demographic information were explored using the Pearson chi-square test and independent t-tests where appropriate. In terms of

age, the groups did not differ significantly (t=1.70, df=55.9, p=0.09). There was no significant association between surgery type and marital status (χ^2= 6.66, df=4, p=0.16); employment status (χ^2=3.97, df=2, p=0.14) or whether or not people had children (χ^2=0.19, df=1, p=0.66). Similarly, there was no significant association between surgery type and treatment prior to surgery (χ^2=0.75, df=3, p=0.86). Hence in terms of demographic information, the two groups were not significantly different.

What effect does the choice of immediate reconstruction or mastectomy alone have on anxiety, depression, body image and quality of life as measured before and after surgery?

Measures of body image and psychosocial adjustment were explored for patterns of change over time. Table 2 presents mean scores and standard deviations on questionnaire scores on body image and psychosocial adjustment at times 1 and 2.

Table 2: Mean scores and standard deviations of scores of body image, emotional distress and quality of life scales

	Mastectomy (n=34)		Immediate reconstruction (n=32)	
	Before surgery	**Follow-up**	**Before surgery**	**Follow-up**
Body image				
Body image (BIS)[1]	11.65 (8.15)	13.94 (8.19)	9.50 (7.91)	10.60 (8.04)
Body image (EORTC QLQ-30)[2]	56.37 (33.53)	53.19 (30.84)	60.94 (32.06)	59.37 (28.06)
Appearance investment[3]				
Total score	3.39 (0.64)	3.48 (0.61)	3.42 (0.51)	3.35 (0.59)
Self-evaluative salience (SES)	3.20 (0.73)	3.27 (0.71)	3.17 (0.63)	3.11 (0.71)
Motivational salience (MS)	3.68 (0.70)	3.82 (0.71)	3.81 (0.58)	3.71 (0.66)
Emotional distress (HADS)[4]	14.29 (6.83)	12.41 (8.14)	12.94 (7.10)	9.81 (6.64)
EORTC QLQ-30 subscales[1]				
Physical functioning	80.78 (22.7)	79.80 (20.79)	90.00 (19.52)	82.29 (18.51)
Role functioning	60.88 (31.72)	64.71 (31.45)	79.48 (32.61)	66.67 (26.20)
Emotional functioning	55.64 (22.16)	62.99 (25.22)	60.67 (26.20)	72.40 (21.00)
Cognitive functioning	70.10 (25.22)	73.52 (22.88)	73.43 (28.35)	80.73 (22.04)
Social functioning	60.29 (33.08)	65.20 (30.25)	64.58 (33.80)	65.62 (26.07)

[1] Possible score range is from 0 to 30; lower scores is preferable and denotes lower levels of body image distress.
[2] Possible score range is from 0 to 100; higher score is preferable and denotes higher level of body image/functioning/quality of life.
[3] Possible score range is from 1 to 5; higher scores denote a higher investment in appearance.
[4] Possible score range is from 0 to 42; lower score is preferable and denotes lower levels of anxiety/depression.

Body image

Younger age was significantly associated with increased body image distress after surgery (r=-0.36, p=0.003). Women who received chemotherapy prior to surgery also had significantly poorer pre-surgical body image than those who did not (t=-2.88, df=64, p=0.005).

A 2x2 mixed model analysis of variance (ANOVA) was carried out on both measures of body image. Body image as measured by the EORTC QLQ-30 proved to be less sensitive to changes in body image then the longer Body Image Scale (BIS). Body image as measured by the EORTC QLQ-30 showed no significant main effects and no significant interactions over time according to surgical group. However, the Body Image Scale (BIS) showed a significant main effect of time ($F(1,64)=6.83$; $p=0.01$), with an increase in body image distress after surgery for all respondents. There was no significant main effect for surgery type.

The mastectomy group was also examined with the aim of comparing those with or without a choice of surgery. As before there was a significant main effect of time ($F(1,32)=4.88$; $p=0.03$), with an increase in body image distress following surgery. However, there was also a significant main effect of choice ($F(1,32)=12.07$; $p=0.001$) with those opting for mastectomy showing significantly less body image distress than women who had not been given a surgical choice. There was no significant interaction.

Body image investment

Higher appearance investment was significantly associated with younger age ($r=-0.26$, $p=0.03$). Higher initial investment in appearance was also significantly associated with a poorer body image prior to surgery ($r=0.43$, $p<0.001$) and at follow-up ($r=0.62$, $p<0.001$). Furthermore, a higher body image investment was significantly associated with greater emotional distress before ($r=0.36$, $p=0.003$) and after surgery ($r=0.39$, $p=0.001$).

The pattern of change for both facets of appearance investment were analysed in a repeated-measures MANOVA. The multivariate effect of time was not significant (Pillai's Trace=0.002, $F(2,63)=0.07$, $p=0.94$); therefore the mean scores on MS and SES facets did not differ significantly over time. Similarly, there was no main effect for surgery type.

Quality of life

With respect to quality of life subscales (functioning in physical, role, emotional, cognitive and social domains), a repeated–measures MANOVA yielded a significant multivariate effect for time (Pillai's Trace=0.20, $F(5,60)=2.90$; $p=0.02$). The subsequent univariate analysis revealed a significant effect for emotional functioning ($F(1,64)=9.71$, $p=0.003$) and physical functioning ($F(1,64)=4.64$; $p=0.03$). Both groups presented with reduced physical functioning and significant improvements in emotional functioning post-surgery. There was no significant multivariate effect for surgery type. There was no significant interaction between surgery type and quality of life domains. It is worth noting that considering the sample size, post-hoc power calculations demonstrated that

the power was sufficient to detect large effects only in each repeated-measures MANOVA (Faul, Erdfelder, Lang & Buchner, 2007).

Emotional distress

Before the operation, just over 30% women reported case levels of anxiety according to the HADS. Specifically, caseness (a score of 11 or more) was reported by 35.3% of women undergoing mastectomy and 34.4% of women in the immediate reconstruction group; hence there was no significant difference between the groups. Case levels of depression were reported by 10.6% of the study group as a whole at this time. The mastectomy group reported the highest incidence of depression caseness (11.8%) compared to the immediate reconstruction group (9.4%), though this difference was not statistically significant (χ^2=0.09; df=1; p=0.75).

After the operation 19.7% of the study group reported case levels of anxiety. Specifically, caseness was reported by 26.5% of women undergoing mastectomy and 12.5% of women in the immediate reconstruction group, though this difference was not significant (χ^2=2.03, df=1, p=0.15). Only three respondents (4.5% of total respondents) reported case levels of depression post-surgery. Table 3 shows the incidence of HADS caseness according to each surgical group at times 1 and 2.

Table 3: Incidence of HADS caseness before and after surgery according to surgical group.

	Mastectomy (n=34)	**Immediate reconstruction (n=32)**	**Overall (n=66)**
Anxiety			
Before surgery	35.3% (n=12)	34.4% (n=11)	34.8%(n=23)
Follow-up	26.5% (n=9)	12.5% (n=4)	19.7% (n=13)
Depression			
Before surgery	11.8% (n=4)	9.4% (n=3)	10.6% (n=7)
Follow-up	5.9% (n=2)	3.1% (n=1)	4.5% (n=3)

Emotional distress was measured using the total HADS score (see Table 2). Greater emotional distress prior to surgery was significantly associated with a poorer body image at follow-up ($r=0.48$, $p<0.001$) and poorer quality of life 8 weeks after surgery, in terms of physical functioning ($r=-0.40$, $p=0.001$), role functioning ($r=-0.42$, $p=0.001$), emotional functioning ($r=-0.51$, $p<0.001$) cognitive functioning ($r=-0.42$, $p<0.001$) and social functioning ($r=-0.46$, $p<0.001$). A 2x2 mixed model ANOVA revealed a significant main effect of time ($F(1,64)=9.85$, $p=0.003$), with emotional distress significantly decreasing by follow-up for all respondents. There was no significant main effect for surgery type.

Do the patients choosing mastectomy alone have a lower investment in their appearance?

Prior to surgery, respondents were asked if they had had a choice in their surgery to determine whether they had elected for a mastectomy operation over other options or not. 49 of the 66 (74.2%) women stated that they had chosen immediate reconstruction or mastectomy alone, despite other options, including six women who had opted for a mastectomy but were considering reconstruction at a later date. However, only 17 (50%) of the mastectomy patients reported that they had been given a choice of surgery. Respondents who had not been given a choice of surgery and those considering reconstruction at a later date were excluded from the following analysis.

An independent t-test compared pre-surgery scores for body image for women choosing mastectomy alone and immediate reconstruction. There was no significant difference between the groups in terms of body image distress prior to surgery ($t=-1.46$, $df=41$, $p=0.15$).

Table 4: Means and standard deviations for body images and appearance investment for patients choosing mastectomy alone and mastectomy with immediate reconstruction

	Mastectomy (n=11)	Immediate reconstruction (n=32)
Body image distress (BIS)	5.82 (4.42)	9.50 (7.91)
Appearance investment (total score)	2.89 (0.50)	3.42 (0.51)
Self-evaluative salience (SES)	2.68 (0.62)	3.17 (0.63)
Motivational salience (MS)	3.21 (0.64)	3.81 (0.58)

An independent t-test compared pre-surgery scores for appearance investment scores for women in the two surgical groups. There was a significant difference between the groups in terms of overall appearance investment (t=-3.00, df=41, p=0.005), with women in the immediate reconstruction group reporting significantly more appearance investment.

Further independent t-tests revealed a significant difference between the groups in terms of self-evaluative salience scores (t=-2.22, df=41, p=0.03) and motivational salience scores (t=-2.88, df=41, p=0.006). Women in the mastectomy group had significantly lower self-evaluative salience and motivational salience scores than women who chose immediate reconstruction.

Does investment in body image moderate the relationship between surgical intervention and emotional distress following surgery?

Moderators are often explored when there are inconsistent relations between a predictor and an outcome variable (Frazier, Barron & Tix, 2004). A moderator is a variable that alters the direction or strength or the relationship between a predictor and an outcome. Hence a moderator effect is an interaction whereby the effect of one variable depends on the level of another. Frazier, Barron & Tix (2004) describe three patterns of interactions: enhancing interactions (in which both the predictor and moderator affect the outcome variable in the same direction and together have a stronger than additive effect), buffering interactions (in which the moderator variable weakens the effect of the predictor variable on the outcome) and antagonistic interactions (in which the predictor and moderator have the same effect on the outcome but the interaction is in the opposite direction).

The Baron and Kenny (1986) procedure was followed for the moderation analysis which uses multiple regression. Surgical intervention (mastectomy or immediate reconstruction) was treated as the independent variable or predictor. The overall investment in body image score (ASI-R) was used as the moderator variable. Finally, the outcome variable was emotional distress following surgery as measured by the total HADS score.

The categorical variable (surgery type) was represented as a coded variable. The next step in formulating the regression equation involves centring predictor and/or moderator variables that are measured on a continuous scale. It is recommended that variables be

centred (ie. subtracting their sample means to produce revised sample means of zero) to reduce problems associated with multicollinearity (Frazier, Barron & Tix, 2004). Hence investment in body image was centred in this way to produce a mean of zero. Once these variables were coded or centred, a product term was created by multiplying together the predictor and moderator variables using the newly coded and centred variables. This product term represents the interaction between the predictor and moderator. Finally the terms were entered into a regression equation, with the product term being entered after the predictor and moderator variables as recommended (Aiken & West, 1991). Table 5 shows the results of the regression.

Table 5: Testing moderator effects using multiple regression.

Step and variable	**B**	**SE B**	**β**	**R^2**
Step 1				
Surgery type	-1.95	1.72	-.13	
Investment in body image	4.68	1.44	0.38**	0.17*
Step 2				
Surgery type	-2.00	1.66	-.13	
Investment in body image	7.69	1.91	0.62**	
Surgery type x investment in body image	-6.47	2.79	-0.35*	0.24**

*p<0.05, **p<0.001

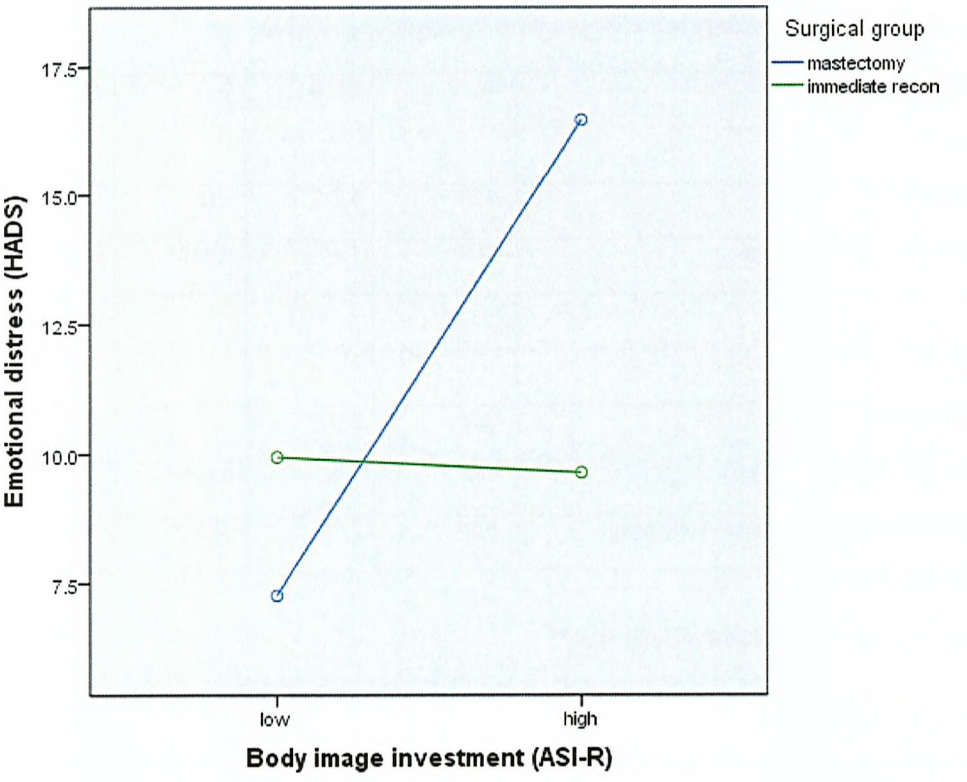
Step 1: F(2,63)=6.44*; Step 2: F(3,62)=6.38**

There was not a significant relationship between surgery type and emotional distress following surgery. The unstandardized regression coefficient for the interaction term was -6.47 (p=0.02). The R^2 change associated with the interaction terms was 0.07, ie. the interaction between surgery type and body image investment explained an additional

7% of the variance in emotional distress scores, over and above the 17% explained by the effects of body image investment and surgery type alone.

To understand the form of the interaction, it was necessary to explore it further by plotting predicted values for the outcome variable for representative groups (see Figure 1). Body image investment scores were grouped as low (the mean and below) and high (above the mean) as recommended by Cohen, Cohen, West & Aiken (2003).

Figure 1: Plot of significant surgery type x investment of body image interaction.



Mastectomy patients with low body image investment reported the lowest emotional distress (y=7.27). Women in the immediate reconstruction group with low body image investment also reported minimal distress, and at similar levels to the mastectomy group

(y=9.94). Women with high body image investment who underwent immediate reconstruction showed similar levels of emotional distress (y=9.64). However, women with a high body image investment who underwent mastectomy reported the highest level of emotional distress (y=16.47).

Frazier, Barron & Tix (2004) suggest that a single degree of freedom F test is appropriate to test the significance of the moderator effect with one continuous variable and a categorical variable with 2 levels. As Figure 1 demonstrates, there was a significant difference between scores for the women in the mastectomy group ($F=14.1$; $p<0.001$), but not in the immediate reconstruction group ($F=0.02$; $p=0.90$). Hence there is a significant interaction between body image investment and surgery type in predicting emotional distress.

DISCUSSION

This prospective, multicentre study examined 66 women's experiences of either mastectomy alone or mastectomy with immediate reconstruction in terms of psychological well-being, quality of life, body image and appearance investment.

The effect of immediate reconstruction or mastectomy alone on anxiety, depression, body image and quality of life as measured before and after surgery

Prior to surgery, high levels of anxiety were evident across the study groups, regardless of the type of surgical procedure elected. Around a third of women reported significant levels of anxiety, which is similar to previous research studies (Harcourt & Rumsey, 2001; Al-Ghazal, Fallowfield & Blamey, 2000). Although not statistically significant,

the highest levels of distress, poorest body image and poorest overall quality of life at this stage were reported by women in the mastectomy group.

Significant improvements were reported in terms of in anxiety and depression after the operation by all respondents. However, it is worth noting that 19% of women still reported significant levels of anxiety at follow-up. Whilst it is likely that their recent surgery had caused high levels of anxiety related to the success of this procedure, for many women the fact that treatment is ongoing and protracted continues to confront them with the reality of their disease and treatment. Previous research has found that most breast cancer patients show improved psychological and emotional functioning over the first year after diagnosis and operation (Schwarz, Krauss, Hockel, Meyer & Zenger, 2008; Vahdaninia, Omidvari & Montezeri, 2010).

The current results found that investment in appearance did not change over time, which supports the idea that this represents a trait-level construct (Cash, 2002). A younger age and receiving chemotherapy prior to surgery was significantly associated with poorer body image after surgery. This supports previous research (Avis, Crawford, & Manuel, 2005; Fobair et al, 2006; Rowland et al, 2000). A younger age was also associated with a higher investment in appearance. This suggests that younger respondents placed more importance on physical appearance for their definition of self-worth and self-concept than older women. Consistent with other studies, higher initial investment in appearance was significantly associated with more body image distress and greater emotional distress before and after surgery (Moreira & Canavarro, 2010; Figueirdo, Cullen, Hwang, Rowland, & Mandelblatt, 2004).

In terms of psychosocial adjustment, no differences were found between the two groups in the various domains of quality of life, with the exception of emotional functioning which significantly improved for all respondents after surgery and physical functioning which significantly deteriorated over the same time period. However, it is worth noting that considering the sample size, post-hoc power calculations demonstrated that the power was sufficient to detect large effects only in each repeated-measures MANOVA (Faul, Erdfelder, Lang & Buchner, 2007). This result was, however, supported by the overall HADS scores.

More emotional distress prior to surgery was significantly associated with poorer quality of life at follow-up. This suggests that women who exhibit higher levels of depression and anxiety prior to surgery have more negative outcomes in terms of physical recovery and psychosocial functioning post-surgery. Greater emotional distress before surgery was also associated with a poorer post-surgical body image, regardless of surgery type.

Contrary to much of the previous research (eg. Arora et al, 2001; Nano et al., 2005), there was a significant deterioration in body image over time for all respondents, regardless of surgery type. However some studies have also failed to find that surgery type had an effect on body image (Harcourt et al, 2003; Holly, Kennedy, Taylor & Beedie, 2003). Several reasons for the lack of differences between the two groups are considered. Breast reconstruction may well confer specific advantages, but this may be at certain stages in the recovery process, which may not have been detected with a cross-sectional design covering such a short time span. Another possibility is that aesthetic advantages that breast reconstruction confers may be offset by other changes,

such as the lengthier recovery process and reduced physical functioning. It may also have been that the mastectomy group represented two distinct groups: those who had actively chosen mastectomy alone and those who had no choice due to the nature of their cancer. Consequently these two groups would differ in their levels of acceptance and distress following surgery. In fact, the mastectomy patients who perceived that they had not been given a choice of surgical intervention reported significantly more body image distress than those who felt they had a choice. Women who chose a mastectomy alone with no intention for reconstruction also had a significantly lower investment in their body image than women who chose immediate or delayed reconstruction.

Patients declining immediate reconstruction have a lower investment in their appearance

Whilst there was no difference in pre-surgical body image between those choosing mastectomy alone and immediate reconstruction, there was a significant difference in their appearance investment. Women in the mastectomy alone group were found to have significantly lower motivational salience and self-evaluative salience scores. This suggests that women who actively choose mastectomy without reconstruction place significantly less importance on physical appearance for their definition of self-worth. It also suggests that they make significantly less effort to engage in appearance management behaviours (in order to maintain or improve their attractiveness).

Investment in body image moderates the relationship between surgical intervention and emotional distress following surgery

The regression analysis demonstrated the investment in body image explained a significant amount of the variance in emotional distress reported at follow-up. The

interaction between surgery type and body image investment was also significant. This suggests that investment in body image moderates the relationship between surgery type and emotional distress following surgery, though only for women with a higher investment in their body image. As long as their investment in their body image was low, women with mastectomies reported similar levels of emotional distress as women receiving immediate reconstruction. Hence, emotional distress was not associated with surgery type among those women who reported lower levels of appearance investment. Women who placed higher importance on their physical appearance reported greater emotional distress after mastectomy than women who had undergone immediate reconstruction.

This suggests that immediate reconstruction may act as a "buffer" in terms of emotional distress for women with high levels of body image investment when compared with mastectomy. This supports the current cognitive-behavioural models of body image in oncology (White, 2000) and supports other research findings (Helms, O'Hea & Corso, 2008; Figueirdo, Cullen, Hwang, Rowland, & Mandelblatt, 2004). Given the association between age and appearance investment, this could account for the increased distress reported by younger women with breast cancer, and may also account for some of inconsistencies in the literature, though more research is needed.

Clinical implications

The findings suggest that cognitive-behavioural models of body image may be useful in understanding the development of body image distress and psychological morbidity following breast cancer surgery. Furthermore, this suggests that cognitive behavioural therapies, which have been shown to be effective for body image disturbance in other

contexts, may be useful for supporting breast cancer patients (Rosen, Reiter, & Orosan, 1995; Veale et al., 1996). Cognitive-behavioural interventions could include strategies such as reducing avoidance or modifying an individual's investment in their appearance (or an aspect of their appearance).

Health care professionals who work with cancer patients, especially specialist breast care nurses, should carefully consider body image issues during the course of the disease. Body image issues were not always discussed prior to surgery, though many valued the opportunity to do so. One woman commented that *"being able to discuss body image and forthcoming changes with my breast specialist nurse has been invaluable."* Many women were surprised at their own response to surgery and treatment One women commented that: *"I was surprised by how much my appearance means to me, if you'd asked me before I would have said that I didn't care what people thought of me but it turns out I really do"*, whereas another commented that *"I was dreading being "flat", but it's nowhere near as awful as I had feared."* The findings also suggest that younger women experience more body image distress and may require more support around psychological adjustment than older women. This highlights the need for younger breast cancer patients to be closely monitored and carefully assessed.

This study suggests that relevant health care professionals should also take into consideration a patient's appearance investment, since it may have an important role in subsequent levels of psychological morbidity and body image, which may in turn impact on overall quality of life. Relying on appearance for definition of self-worth and self-esteem may be a vulnerability factor for women facing surgery. As such, it may be

important to normalise the difficulties that patients may face and encourage women to find alternative ways of boosting their self-worth over the course of treatment.

The study also suggests that health care professionals should not assume that immediate reconstruction prevents the body image distress more commonly associated with mastectomy. Whilst reconstructive surgery may offer psychological benefits to some women, it is not a panacea for all. Indeed, some women who actively choose a mastectomy alone over other options may have a lower appearance investment which may be reflected in a better outcome in terms of body image.

Limitations and suggestions for future research

This study tried to overcome several limitations that characterise the research in the field of body image in breast cancer patients. Its prospective nature, the use of standardised, cancer-specific measures and the emphasis on appearance investment in the conceptualisation of body image are strengths of the study. However, some limitations should be noted. The small size of the sample determined that only medium to large effects could be detected which means that smaller effects may have been overlooked. It is worth noting that post-hoc power calculations demonstrated that the power was sufficient to detect large effects only for the moderation analysis (Frazier, Barron & Tix, 2004).

The self-selection process for this sample may have limited the study. A review of the literature in the area suggests that a randomised, controlled trial may not be an appropriate way of assessing the psychological implications of situations in which women need to make informed, controlled decisions (Bottomley, 1997). However,

patients selected themselves into their particular surgical group, which resulted in groups of unequal sizes and a variety of systemic treatment options. There is also some evidence to suggest that participants recruited via the internet may be more distressed than those recruited via hospitals and charities (Reed, Simmonds & Corner, 2009), which might have biased the results. Furthermore, the analysis has not examined the possibility that the stage of cancer might differ between the various surgical groups.

Whilst the design was useful to establish a relationship between surgical intervention, body image and emotional distress, it does limit the conclusions that can be drawn about the nature of these relationships over time. Whilst an 8 week follow-up period has been used in previous studies (Mock, 1993), it is acknowledged that this is still early on in a patient's journey through treatment for breast cancer. The design also does not make any conclusions about causation. Further research is needed to examine the role of body image investment over time, not only among women with breast cancer but also other cancer patients.

Future research on the relationship between appearance investment and body image distress would benefit from a longitudinal design, which would provide further information about the impact of appearance investment over time. It would also be useful to undertake another prospective study that included women undergoing breast conserving surgery and delayed reconstruction. Given the importance that appearance investment may have on psychosocial outcomes, it may be useful to explore the role of appearance investment in other areas of health psychology. This could include other cancers (such as head and neck cancers) and other illnesses and treatments which may affect appearance (such as diabetes or skin conditions).

CONCLUSIONS

Similar to previous studies, younger age and receiving chemotherapy prior to surgery were found to be significantly associated with increased body image distress after surgery. Women in both surgical groups reported a significant deterioration in their body image following surgery. Despite this, significant improvements in emotional distress were reported for all of the women following surgery.

With the exception of emotional functioning, there were no differences between the groups in terms of quality of life. However, women who exhibited higher levels of depression and anxiety prior to surgery had more negative outcomes in terms of physical recovery and psychosocial functioning post-surgery. Greater emotional distress before surgery was also associated with a poorer body image following surgery, regardless of surgery type.

This study has also demonstrated that appearance investment is associated with poorer outcomes in terms of psychological morbidity and body image following breast cancer surgery. It also appears to be a factor in the decision-making process for some women. The findings suggest that women who actively choose mastectomy without reconstruction have significantly lower levels of appearance investment compared to those choosing immediate reconstruction.

Current cognitive-behavioural models of body image may be useful in understanding the development of body image distress and psychological morbidity following breast cancer surgery. Appearance investment was found to moderate the relationship between

surgery type and emotional distress. Furthermore, for women with low levels of appearance investment, surgery type did not appear to effect emotional distress. Surgery type was only associated with emotional distress among women who reported higher levels of appearance investment. Depending on the extent to which an individual's identity is linked to their physical state, the greater the physical change (eg. mastectomy), the greater the psychological impact for that individual.

The findings suggest that appearance investment may be among the factors that differentiate between women who cope well with breast cancer from those who have significant adjustment difficulties. Higher appearance investment may be a vulnerability factor for women facing surgery, particularly those facing mastectomy. Women with higher investment in their appearance appear to have poorer outcomes in terms of body image and emotional distress, which in turn impacts on their quality of life following surgery.

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APPENDICES

APPENDIX 1: NOTES FOR CONTRIBUTORS

Psychological Bulletin

Psychological Bulletin® publishes evaluative and integrative research reviews and interpretations of issues in scientific psychology. Both qualitative (narrative) and quantitative (meta-analytic) reviews will be considered, depending on the nature of the database under consideration for review.

Integrative reviews or research syntheses focus on empirical studies and seek to summarize past research by drawing overall conclusions from many separate investigations that address related or identical hypotheses. A research synthesis typically presents the authors' assessments of

- the state of knowledge concerning the relations of interest;
- critical assessments of the strengths and weaknesses in past research; and
- important issues that research has left unresolved, thereby directing future research so it can yield a maximum amount of new information.

Both cumulative and historical approaches (i.e., ones that organize a research literature by highlighting temporally unfolding developments in a field) can be used. Integrative research reviews that develop connections between areas of research are particularly valuable.

Manuscripts dealing with topics at the interface of psychological sciences and society are welcome, as are evaluations of applied psychological therapies, programs, and interventions. Expository articles may be published if they are deemed accurate, broad, clear, and pertinent.

Manuscript preparation. Prepare manuscripts according to the *Publication Manual of the American Psychological Association* (6th edition). Manuscripts may be copyedited for bias-free language (see Chapter 3 of the *Publication Manual*). Double-space all copy. Other formatting instructions, as well as instructions on preparing tables, figures, references, metrics, and abstracts, appear in the *Manual*. APA can now place supplementary materials online, available via the published article in the PsycARTICLES® database. Please see "Supplementing Your Article With Online Material" for more details.

Abstracts and keywords. All manuscripts must include an abstract containing a maximum of 250 words typed on a separate page. After the abstract, please supply up to five keywords or brief phrases.

References. List references in alphabetical order. Each listed reference should be cited in text, and each text citation should be listed in the References section. Examples of basic reference formats:

Journal Article:

Herbst-Damm, K. L., & Kulik, J. A. (2005). Volunteer support, marital status, and the survival times of terminally ill patients. *Health Psychology*, *24*, 225–229. doi: 10.1037/0278-6133.24.2.225

Authored Book:

Mitchell, T. R., & Larson, J. R., Jr. (1987). *People in organizations: An introduction to organizational behavior* (3rd ed.). New York, NY: McGraw-Hill.

Chapter in an Edited Book:

Bjork, R. A. (1989). Retrieval inhibition as an adaptive mechanism in human

memory. In H. L. Roediger III & F. I. M. Craik (Eds.), *Varieties of memory & consciousness* (pp. 309–330). Hillsdale, NJ: Erlbaum.

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Submission. All efforts should be undertaken to submit manuscripts electronically to the editor. Files can be sent in Microsoft Word, or as a PDF file. The version sent should be consistent with the complete APA-style printed version. Authors without Internet access should submit a disk copy of the manuscript to the Editor.

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Every effort should be made to ensure that the manuscript itself contains no clues to the authors' identities, including deletion of easily identified self-references from the reference list. If an author feels that revealing his or her identity is critical to receiving a fair review, such a request along with its justification should be made in the cover letter accompanying the manuscript.

British Journal of Health Psychology

The aim of the British Journal of Health Psychology is to provide a forum for high quality research relating to health and illness. The scope of the journal includes all areas of health psychology across the life span, ranging from experimental and clinical research on aetiology and the management of acute and chronic illness, responses to ill-health, screening and medical procedures, to research on health behaviour and psychological aspects of prevention. Research carried out at the individual, group and community levels is welcome, and submissions concerning clinical applications and interventions are particularly encouraged.

The types of paper invited are:

• papers reporting original empirical investigations;

• theoretical papers which may be analyses or commentaries on established theories in health psychology, or presentations of theoretical innovations;

• review papers, which should aim to provide systematic overviews, evaluations and interpretations of research in a given field of health psychology; and

• methodological papers dealing with methodological issues of particular relevance to health psychology.

Circulation. The circulation of the Journal is worldwide. Papers are invited and encouraged from authors throughout the world.

Length. Papers should normally be no more than 5000 words (excluding the abstract, reference list, tables and figures), although the Editor retains discretion to publish

papers beyond this length in cases where the clear and concise expression of the scientific content requires greater length.

Editorial policy. The Journal receives a large volume of papers to review each year, and in order to make the process as efficient as possible for authors and editors alike, all papers are initially examined by the Editors to ascertain whether the article is suitable for full peer review. In order to qualify for full review, papers must meet the following criteria:

- the content of the paper falls within the scope of the Journal
- the methods and/or sample size are appropriate for the questions being addressed
- research with student populations is appropriately justified
- the word count is within the stated limit for the Journal (i.e. 5000 words)

Submission and reviewing. All manuscripts must be submitted via the website. The Journal operates a policy of anonymous peer review. Authors must suggest three reviewers when submitting their manuscript, who may or may not be approached by the Associate Editor dealing with the paper. Before submitting, please read the terms and conditions of submission and the declaration of competing interests.

Manuscript requirement. Contributions must be typed in double spacing with wide margins. All sheets must be numbered. Manuscripts should be preceded by a title page which includes a full list of authors and their affiliations, as well as the corresponding author's contact details. A template can be downloaded. Tables should be typed in double spacing, each on a separate page with a self-explanatory title. Tables should be comprehensible without reference to the text. They should be placed at the end of the

manuscript with their approximate locations indicated in the text. Figures can be included at the end of the document or attached as separate files, carefully labelled in initial capital/lower case lettering with symbols in a form consistent with text use. Unnecessary background patterns, lines and shading should be avoided. Captions should be listed on a separate sheet. The resolution of digital images must be at least 300 dpi. For articles containing original scientific research, a structured abstract of up to 250 words should be included with the headings: Objectives, Design, Methods, Results, Conclusions. Review articles should use these headings: Purpose, Methods, Results, Conclusions. For reference citations, please use APA style. Particular care should be taken to ensure that references are accurate and complete. Give all journal titles in full. SI units must be used for all measurements, rounded off to practical values if appropriate, with the imperial equivalent in parentheses. In normal circumstances, effect size should be incorporated. Authors are requested to avoid the use of sexist language. Authors are responsible for acquiring written permission to publish lengthy quotations, illustrations, etc. for which they do not own copyright. For guidelines on editorial style, please consult the APA Publication Manual published by the American Psychological Association.

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APPENDIX 2: PARTICIPANT INFORMATION SHEET AND CONSENT FORM

The role of body image and body image investment in mastectomy and breast reconstruction

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information and take time to decide whether or not you would like to take part. Thank you for reading this.

What is the purpose of the study?
One of the many factors that relate to the psychological distress in coping with breast cancer may be body image. Both cancer and treatment (surgery, chemotherapy, radiotherapy, etc) is invasive and both can have a major impact on self-image and appearance.

Some research studies suggest that the greater significance someone places on their appearance and body image (their "investment" in their body image), the more likely they are to experience adjustment difficulties following cancer surgery. However, there have been limited studies that have explored investment in body image as a risk factor for psychological and adjustment difficulties following breast cancer surgery.

This study aims to explore the importance of body image and body image investment in women before and after their surgery. It aims to identify whether body image plays a part in the decision process (ie. whether someone decides to have a mastectomy alone or an immediate reconstruction) and how it affects individual outcomes (ie. whether some women are more at risk of depression, anxiety and body-related issues post-surgery). This could have important implications for women going through breast cancer surgery in the future.

Why have I been chosen?
All women undergoing mastectomy with or without immediate reconstruction will be asked if they want to take part.

Do I have to take part?
It is up to you to decide whether or not to take part in the study. Your treatment will not be affected either way. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason.

What will happen to me if I take part?
You will be asked to complete 4 questionnaires before your surgery and again 8 weeks afterwards. The questionnaires are brief and should take about 30-40 minutes to complete. You will also be asked some demographic questions (eg. your age, marital

status etc) and questions about your breast cancer treatment (eg. if you have had any treatment prior to surgery, if you were given a choice of surgical treatment).

What risks are involved?
The questionnaires ask about your current feelings, your body image and your quality of life. Many of the questions are cancer-specific and some people may find this distressing when dealing with breast cancer. Following completion of the questionnaires, you will be given the opportunity to debrief with the researcher if required. If anyone reveals active thoughts of suicide, your GP will be informed. If necessary, individuals can always request to be referred on to GPs or appropriate mental health teams for ongoing support.

What to do in case of concern or complaint?
If you have any concerns about the way in which this study has been conducted, you can contact Dr Kate Jenkins (Clinical Psychologist) at Salisbury District Hospital or Dr Catherine Brignell (Research Supervisor) at the Department of Psychology, University of Southampton.

Will my taking part in this study be kept confidential?
All information collected about you during the course of the study will be kept strictly confidential. Any information about you that leaves will have your name and address removed so that you cannot be recognised from it. All information will be stored on a password-protected computer, in compliance with Data Protection Policy.

What will happen to the results of the research study?
The results of the study will be used by Helen Le Vesconte, Trainee Clinical Psychologist, as part of the Clinical Doctorate in Psychology programme. You will not be identified in any report or publication. The results will also be used to inform clinical staff working in breast cancer care and will help to identify areas for improvements in care. You are welcome to request a copy of the full research study once completed, or your individual results alone if you prefer.

Contact for further information
If you would like to take part in the study, or would like any further information please contact Helen Le Vesconte on [redacted] (or email helen@bodyimageresearch.org.uk). Further information can also be obtained from Dr Kate Jenkins (tel: [redacted]).

Thank you for taking part in this study.

CONSENT FORM

Title of Study: The role of body image and body image investment in mastectomy and breast reconstruction

Name of Researcher: Helen Le Vesconte

Please initial box

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. ☐

3. I agree to take part in the above study. ☐

Name of Participant	Date	Signature
Name of Person taking consent (if different from researcher)	Date	Signature
Researcher	Date	Signature

One copy should be held by the researcher and one copy given to the participant.

APPENDIX 3: RELEVANT ETHICS APPROVALS

University of Southampton Ethics Committee Approval

Your Ethics Form approval

Psychology.Ethics.Forms@ps2.psy.soton.ac.uk [Psychology.Ethics.Forms@ps2.psy.soton.ac.uk]

You forwarded this message on 11/09/2010 09:58.

Sent: 09 June 2010 16:13

To: [redacted]

This email is to confirm that your ethics form submission for "The role of body image and body image investment in mastectomy and breast reconstruction" has been approved by the ethics committee

Project Title: The role of body image and body image investment in mastectomy and breast reconstruction
Study ID : 1176
Approved Date : 2010-06-09 16:13:27

If you haven't already submitted the Research Governance form for indemnity insurance and research sponsorship along with your ethics application please be aware that you are now required to fill in this form which can be found online at the link below.
Research Governance Form:
http://www.psychology.soton.ac.uk/psyweb/psychobook/admin/ethics/research_governance.doc
This will need to be returned to the address provided on the form.

Please note that you cannot begin your research before you have had positive approval from the University of Southampton Research Governance Office (RGO). You should receive this by email in a maximum of two working weeks. If you experience any delay beyond this period please contact Barbara Seiter.

More information about Research Governance can be found at the link below. (You will be prompted to log into sussed.)
http://www.soton.ac.uk/corporateservices/rgo/index.html

Salisbury District Hospital R&D approval

RE: study proposal

Stef Scott [Stef.Scott@salisbury.nhs.uk]

Sent: 29 September 2010 11:40

To: [redacted]

Dear Helen

Thank you for your study proposal (version 2, dated 17 September 2010). I have reviewed your proposal, and am pleased to inform you that you do NOT require formal research management and governance approval NOR NHS research ethics approval in order to conduct your project within Salisbury NHS foundation Trust.

I wish you every success with your project.

With best wishes

Stef

Dr Stef Scott
RM&G Manager, Western Comprehensive Research Network,
R&D Manager, South Wiltshire R&D Consortium,
RDS (SW) Consultant
R&D Office
Salisbury District Hospital
Salisbury
Wiltshire
SP2 8BJ
Tel: ext 2027 or [redacted]

Breast Cancer Care R&D Approval

Research Approval
Karen Scanlon [Karen.Scanlon@breastcancercare.org.uk]

Sent: 02 February 2011 15:09
To: Leah Williams [Leah.Williams@breastcancercare.org.uk]
Cc: [redacted]

HI Helen,

I am pleased to confirm that we will approve support for your research.

However, we do have concerns about the sample size. You may find the feedback useful. However, I understand you are working to a tight deadline and may not be able to increase sample size. Therefore you may want to consider that your proposed study is an exploratory investigation and you hope will inform future research in this area.

Many Thanks
Karen

Karen Scanlon
Head of Research & Evaluation
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London SE1 ONS
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karen.scanlon@breastcancercare.org.uk

Royal Hampshire County Hospital R&D Approval

Winchester and Eastleigh NHS
Healthcare NHS Trust

Royal Hampshire County Hospital
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Romsey Road
Winchester
Hampshire SO22 5DG

Tel: [redacted] or 4685
Email: Barry.Mulholland@wehct.nhs.uk

Dear Helen

Project title: The role of body image and body image investment in mastecomy and breast reconstruction

Thank you for your study proposal. I have reviewed your proposal, and am pleased to inform you that you do NOT require formal research management and governance approval NOR NHS research ethics approval in order to conduct your project within Winchester and Eastleigh NHS Trust.

I wish you every success with your project.

With best wishes

[redacted]

APPENDIX 4: QUESTIONNAIRE MEASURES

DEMOGRAPHIC INFORMATION

Please circle or tick the response that is most appropriate.

1. **Name:** .....
2. **Date of birth:** .....
3. **Date of surgery:** .....
4. **Marital status:**

Single without current partner	☐	Married	☐
Single with current partner	☐	Divorced or separated	☐
Co-habiting with partner	☐	Widowed	☐

5. **Do you have any children?** Yes / No
6. **Employment status:** Full-time employed / Part-time employed / Unemployed
7. **Have you undergone any treatment prior to surgery for your breast cancer?** Yes / No

   If yes, what was it? Chemotherapy / radiotherapy / hormone treatment / other
8. **What surgical treatment are you undergoing?**

Mastectomy alone	☐
Mastectomy with immediate reconstruction (using implant)	☐
Mastectomy with immediate reconstruction (using own tissue)	☐
Mastectomy, though considering reconstruction in future	☐

9. **Did the surgeons give you a choice of surgical procedure?*** Yes / No

   *Not everyone will be given a choice of surgical procedure. This will depend on the type of breast cancer and any further treatment you are due to have.

   If yes, did they discuss the following options?

Mastectomy alone	☐
Mastectomy with immediate reconstruction	☐
Mastectomy with breast reconstruction in the future	☐

BODY IMAGE SCALE

In this questionnaire you will be asked how you feel about your appearance, and about any changes that may have resulted from your disease or treatment. Please read each item carefully, and tick the reply which comes closest to the way you have been feeling about yourself, during the past week.

Name: ..... Date:.....

	Not at all	A little	Quite a bit	Very much
1. Have you been feeling self-conscious about your appearance?				
2. Have you felt less physically attractive as a result of your disease or your treatment?				
3. Have you been dissatisfied with your appearance when dressed?				
4. Have you been feeling less feminine as a result of your disease or treatment?				
5. Did you find it difficult to look at yourself naked?				
6. Have you been feeling less sexually attractive as a result of your disease or treatment?				
7. Did you avoid people because of the way you felt about your appearance?				
8. Have you been feeling the treatment has left your body less whole?				
9. Have you felt dissatisfied with your body?				
10. Have you been dissatisfied with the appearance of your scar?				