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The Effects of Modern Health Worries and Psychological Distress on Complementary Medicine Use by Breast Cancer Patients

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Abstract

The current exploratory study looks at the relationship between modern health worries (MHWs), subjective health perception, depression, anxiety, self-esteem, body image as well as complementary and alternative medicine (CAM) in breast cancer patients. One hundred and one females (50 previously diagnosed with cancer) completed questionnaires measuring MHWs, health perceptions, psychological distress, self-esteem and body image. It was found that MHWs and health perceptions predicted CAM use whilst psychological distress did not. It was concluded that CAM use in breast cancer patients is not related to psychological distress, but may be related to a more physical health related function: patients engage with CAM use as a response to worries about health. Limitations of this small scale, cross-sectional study are also noted.

Introduction

The effects of Modern Health Worries and Psychological Distress on Complementary Medicine Use by Breast Cancer Patients.

Complementary medicine is defined as a "*diagnosis, treatment and/or prevention which complements mainstream medicine by contributing to a common whole, satisfying a demand not met by orthodoxy, or diversifying the conceptual framework of medicine*" [1] According to [2] over half of the healthy adult population turns to complementary and alternative medicine (CAM) on a yearly basis. CAM users tend to be female, young, well educated, and of higher than average social class [3].CAM are generally used for chronic conditions, such as arthritis, and sometimes for more serious conditions such as cancer [4].

The prevalence rates of CAM use in breast cancer patients are generally higher than those reported in the general population, ranging from 62% to 83% [5].The reason for this may be that CAM prevalence rates in the breast cancer group are inflated because of the higher use in women [6] and only 8% of those diagnosed with breast cancer are males (Cancer Statistics, 2006).

The fear that cancer patients will desert potentially curative orthodox therapies in favour of unproven therapies is often reported in the literature [7] However, cancer patients very rarely opt out of traditional therapies altogether [8] and in the majority of cases CAM is used to complement rather than replace traditional treatments [8,9] Another concern outlined in the literature includes toxicities associated with CAM for cancer. This is of concern as the safety of CAM use during the course of traditional medicine for breast cancer remains unknown [10]. It has been argued that certain CAMs may interfere with the functioning of radiotherapy and chemotherapy, leading to reduced efficacy in these proven therapies [11]. Further concerns regarding the use of CAM include the belief that the use of antecedent CAM in individuals with breast symptoms may lead to a delay in seeking medical attention [12].This may result in the development of the illness leading to a more advanced disease at the time of presentation. Perhaps the most worrying issue is the finding that most, if not all, breast cancer patients who choose to use CAM do not share this information with their medical staff [13]. The main reasons for not disclosing their use of CAM to medical practitioners are concerns about the belief that the practitioner does not need to know about their CAM use, concerns about a negative response by their practitioners, or the fact that the practitioner did not ask about the patient's use of CAM [14]. Therefore, improved understanding of the psychological factors motivating breast cancer patients to use CAM is essential.

Explanations for using CAM generally fall into two major categories: patients are either "pushed" toward CAM use due to negative experiences with traditional medicine, or patients are "pulled" toward CAM due the perceived attractiveness of CAM [15,16]. Factors contributing to this dissatisfaction include poor doctor and patient communication, experiences with, or concerns about, the negative or adverse effects of traditional medicine, and experiences where traditional medicine was seen as ineffective [15,17]. On the other hand, CAM is often offered in a positive, optimistic style by therapists who spend more time with the patient than an orthodox practitioner and provide more emotional support [18].

An interesting link between CAM use and modern health worries (MHWs) has been found in the healthy adult population [19]. MHWs are concerns related to modern or technological features of daily life [20]. The MHWs scale was developed by [21], who argued that many individuals believe their health is threatened by modernity. They argued that the media increases perceptions of vulnerability, decreases subjective feelings of health, and emphasizes toxic environmental causes of illness, all the while reducing an emphasis on controllable lifestyle factors. It was concluded in their second study that health worries are associated with the utilization of alternative health care [22].

When comparing the MHWs of Dutch and New Zealand medical students, [23] found a national and sex difference. Their results showed that female students were more concerned about their health than males, and the Dutch were less concerned than New Zealanders. They

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also found that MHWs scores contributed to perceptions of subjective health complaints and were also positively related to use of the health care services. [20] demonstrated that MHWs were positively correlated to the number of subjective health complaints and were negatively related to reports of present health and medication. They concluded that concerns over new technology appear to influence symptom reporting, perceptions of current health, medication use, and visits to health care providers.

In regards to the affect of the media on MHWs, Furnham (2007) pointed out that in addition to the media, other new technologies such as the internet have been accompanied by new complaints, fears, and illness. Furnham found that MHWs were related to CAM use, beliefs about CAM, and beliefs about conventional medicine. Specifically, individuals with higher levels of MHWs were more likely to use CAM and more likely to stress psychological (rather than physical) factors in health maintenance. Furnham argued that '*it is possible that concerns with ill-health drive individuals to be consumers of health products, both conventional and complementary*' [15]. Furnham further argued that CAM practitioners and products may augment issues that increase the patient's MHWs or that exposure to CAM therapies and theories alert individuals to the possibilities of additional MHWs. He concluded that a more likely possibility is that there is a reciprocal relationship, where those with MHWs read materials and interact with practitioners who augment those worries.

This small, exploratory study looks at MHWs in breast cancer patients; individuals who are arguably already concerned with ill health. Today's cancer patients want to become informed about their illness [24] and the internet is one of the most popular ways of accessing medical information. It has been reported that an estimated 10% to 43% of breast cancer patients turn to the internet for medical information (Schmidt & Ernst, 2004). Among these information websites lie sites offering alternative theories and treatments for breast cancer. The most popular websites on CAM for breast cancer offer information of extremely variable quality, and many endorse unproven therapies [25]. Therefore, if Furnham's predictions that the internet provides a new source of complaints and fears, then this should be visible in breast cancer patients – with patients who demonstrate high levels of MHWs engaging in more consumption of CAM. As of yet it appears that no studies of MHWs have been conducted on breast cancer patients.

In line with health related worries and possible anxiety arising from this, the role of psychological distress in motivating breast cancer patients to use CAM is commonly acknowledged in the literature (Burstein et al., 1999). There is a traditional view that complementary medicine is used by desperate patients or "hopeless cases", however, this view has been shown to be untrue [26]. It is commonly suggested that use of CAM in breast cancer patients may fulfill an important psychological need [27]. Nevertheless, the relationship between psychological distress and CAM use has proven to be complex.

Several studies have reported that sufferers of breast cancer who choose to use CAM score higher on psychological distress scales [9], showing lower quality of life, higher depression scores, fear of recurrence of cancer, lower scores for mental health and sexual function, more physical symptoms and more intense symptoms in these patients. Furthermore, reports of depression have also been associated with early-stage breast cancer sufferers who turn to CAM, particularly for women who are new users of CAM following diagnosis of breast cancer [28].

Although the literature outlines a relationship between psychological distress and CAM, it is unclear why this relationship exists. One possible explanation was proposed by [29], who argued that CAM users may be more sensitive to reporting their emotional needs, patients with lower emotional functioning may perceive a stronger need for additional care, or alternatively, CAM users' high expectations were unmet and affected the patients' emotional status accordingly. It can be argued that the issues proposed by Maskarinec et al. [29] reflect the personality traits of individuals high in trait neuroticism. Furnham (2007) [19], however, showed that CAM use is not associated with personality traits; therefore, this explanation may be unlikely. An alternative explanation could be linked to rumination, a well-established factor in maintaining depression and anxiety [30]. CAM rituals, such as preparing CAM cocktails or visiting CAM practitioners, may provide an opportunity for patients to ruminate about their illness, which would fuel their depression and anxiety. This increased psychological distress would in turn encourage patients to seek treatment, thus creating a self-perpetuating cycle. Rather than psychological distress, many studies have suggested that CAM use is related to greater positive affect [31]. CAM use by breast cancer patients has been associated with a belief in increased chances of survival, being proactive in an attempt to prevent further illness, a belief that the patient had nothing to lose by trying CAM [32]. Therefore, the relationship between CAM use and psychological distress remains unclear.

The relationship between depression, anxiety, self-esteem, and body dissatisfaction and the influences of these factors on CAM use by breast cancer patients remains under researched. Many studies have documented a strong negative relationship between self-esteem and depression (e.g. Brockner & Guare, 1983). It has been shown that diagnosis and treatment of breast cancer often results in depression, poor body image, and decreases in self-esteem that persist long after the treatments have ended [33]. Evidence suggests that self-esteem is a primary indicant of health and quality of life in breast cancer patients. In addition to decreases in self-esteem, breast cancer treatments have been associated with poor body image in patients [34]. Those particularly affected by the negative symptoms of cancer treatment are patients who have undergone mastectomy [35]. In addition, this group also suffers from lower self-esteem compared to other treatment groups [35].

As self-esteem is a primary indicant of health and quality of life, breast cancer patients suffering from low self-esteem may seek to improve their health and quality of life by turning to CAM. In addition, as body image is an important component of self-esteem [35] and self-esteem plays a role in depression [36] these individual factors and their relationship may play a role in CAM uptake in breast cancer patients. Investigation of this may shed light on the effects of psychological distress on CAM use. Therefore, the current exploratory research aimed to investigate the effects of depression, anxiety, self-esteem, and body image on the decision to use CAM among breast cancer patients. In particular it aimed to introduce the relationship between depression, self-esteem and body image and examine the effects of this relationship on CAM use. Additionally, as there appears to be no studies on subjective feelings of health, MHWs, and their influence on CAM use by breast cancer patients, the current study aimed to investigate this relationship. It was predicted, based on previous research, that: (HI) breast cancer patients would demonstrate higher CAM use than a healthy matched control group; (H2) MHWs would be a positively correlated with CAM. Furthermore, based on previous psychological distress findings, it was hypothesized that (H3) mental health scores, measured by depression (H_{3A}) and anxiety (H_{3B}) would be negatively correlated with CAM use; (H4) measures of depression, low self-esteem, and poor body image would be positively correlated

with one another; (H5) self-esteem would be negatively correlated with CAM use; and finally (H6) body image would be negative correlated with CAM use.

Method

Participants

One hundred and one female participants completed the questionnaire. The age ranged from 24 to 78, with a mean age of 52 years (*SD* = 10.79). The majority of participants were White (88%), Christian (42%), had attained an undergraduate degree as their highest level of education (41%), were married (73%), worked full-time (38%), and earned between £20-40,000 (23%). On a 9 point religious scale (0 = *not at all*; 9 = *very*) the mean score was 4.9 (*SD* = 2.64). On a 9 point political scale (0 = *strongly left wing*; 9 = *strongly right wing*) the mean score was 4.8 (*SD* = 1.85). Of the one hundred and one participants, 50 (49%) had been diagnosed with breast cancer. Around 50% of women had been diagnosed with Estrogen-Receptor (ER) Positive cancer and 30% were diagnosed around a year before. For most women the cancer had either been diagnosed at the early stage (40%) or locally advanced (40%), with the remainder being diagnosed when the cancer was at secondary stage (20%). For most women the tumour at the time of diagnosis was at stage T2 (44%), with the remainder of patients being diagnosed when the tumour was at stages TX, T1, T3, or T4 (4%, 20%, 18% and 20%). Twelve percent did not know the stage of their tumour at time of diagnosis. All patients were undergoing treatment at the time of the study

Materials

Demographics: Standard questionnaire collecting socio-demographic data including gender, ethnic background, age, education, marital status, occupation, socio economic status, religious and political orientations .

Breast Cancer history: Questionnaire compiled by the authors investigating cancer diagnosis and treatment. The questionnaire is completed by the patient and prompts the patient for information on cancer diagnosis, treatment and family history. Questions for diagnosis include what type of cancer they have been diagnosed with, age at diagnosis, how long ago the cancer has been diagnosed, what stage the cancer was t when diagnosed, at what stage the tumour was when diagnosed, if the patient had been diagnosed with cancer, leukaemia, or a malignant tumour prior to the current diagnosis. Questions for treatment include what treatments they have had (surgery, radiotherapy, chemotherapy, hormone therapy, biological therapy), if the patient had had surgery they are asked what kind (lumpectomy, quadrantectomy, mastectomy, lymph nodal removal). Patients were also asked if anyone in their family had been diagnosed with breast cancer and if so, who. Finally, patients were asked whether they had used CAM or alternative medicine at any point after being diagnosed with breast cancer, how soon after the diagnosis they began using CAM and how long for.

Use and Perception of CAM: [15] Questionnaire measuring CAM use and perceptions of CAM efficacy (an additional 4 complementary therapies commonly used by breast cancer patients were added to the original questionnaire including essiac tea, flax seed oil, Manatech Ambrotose and Slippery Elm).

Modern Health Worries: [19] This extended questionnaire assesses concerns about issues related to modern life (e.g. genetically modified food), and their effects on personal health. The original scale compiled by Petrie et al. (2001) was shown to have an interpretable factor structure, good internal validity (α = .94), and was correlated with other measures [22].

Health Perceptions Questionnaire: [37] This questionnaire measures subjective perceptions of past, present and future health, resistance to illness, and attitudes towards sickness. This questionnaire has been shown to have good reliability (α = .89) and good validity [38].

Zung Self-Rating Depression: [39] This scale was developed to common characteristics of depression. The questionnaire has been shown to have good reliability with α ranging from .75 to .95 [40,41] and moderate validity [42].

State–Trait Anxiety Inventory (STAI): [43] This questionnaire measures the intensity of feelings of anxiety in adults; it distinguishes between state anxiety (temporary condition) and trait anxiety (general). It has been shown to have good reliability with the state scale α ranging from .73 to .86 and the trait scale α ranging from .16 to .54 [43]. It has been shown to have good validity [44].

The Rosenberg Self-Esteem Scale: [45] This scale presents statements indicating high self-esteem. It has been shown to have good validity [46] and reliability (α= .74; [47].

Body Image Scale: [48] This scale measures body image and body satisfaction in breast cancer patients after cancer treatment. The scale has been shown to have high reliability (α = .93) and good clinical validity [48].

Procedure

Questionnaires were presented to participants in the same order as outlined above. Data were collected by the researcher in two different mediums. A hard copy of the questionnaires was sent to several private breast cancer clinics. Questionnaires were completed anonymously and kept in accordance with the Data Protection Act (1998).

The second method of collecting data was via an online survey website, where an identical copy of the hard questionnaire was presented but presented digitally. This could be completed anonymously online. A link to the research was placed on cancer support websites such as Cancer McMillan support. A link to the research was also emailed to a variety of cancer support groups across England. Participants without breast cancer were recruited in a similar fashion. Links to the research were placed on social-networking websites, and were often forwarded by the breast cancer patients to friends and family.

Results

Statistical Analysis Strategy

Analysis was conducted in three main areas. Firstly, ANOVAs and correlations were conducted on the whole sample to examine overall differences in CAM users and non-users as well as to examine correlations between the usage of CAM and the different independent variables (demographics, MHWs, depression, anxiety, health perceptions, self esteem and body image). Secondly, analyses were carried out on breast cancer patients alone. In particular ANOVAs were used to examine group differences in cancer patients and correlations between CAM usage the independent variables, and cancer specific variables such as tumour size at diagnosis will be carried out. The third section focused on MHWs. A factor analysis was conducted in order to replicate previous studies and in order to use potential facets of MHWs

to further understand the relationship between MHWs and CAM use. In addition, a discriminant analysis was performed in order to examine whether facets of MHWs, health perception, self esteem and body image could discriminate between different levels of CAM users (e.g. High, medium or low). Finally, given the different procedures used for data collection an ANOVA was carried out the examine differences between patients who completed the questionnaire in clinics and those who completed it online.

Of the original 101 cases, 8 were removed from analysis because of missing data. The missing data appeared to be randomly distributed across groups and predictors. Analysis demonstrated no outliers. For the remaining 93 cases, evaluation of assumptions of linearity, normality, and homogeneity of variance revealed no threat to analysis. See table 1 for a summary of socio-demographic findings.

Breast cancer group

Of the 93 participants 49 (53%) had been diagnosed with breast cancer. The mean age of this group was 53.9 (*SD* = 9.95), and mean age at diagnosis was 48.22 (*SD* = 9.23) ranging from 28 to 71. See Table 2 for frequencies and percentages of cancer type, time since diagnosis, cancer stage at diagnosis, tumor stage at diagnosis, and cancer treatments used.

Of the breast cancer patients 29 (59%) had used complementary medicine in addition to orthodox therapies during the course of their cancer treatment. Around 40% of patients had either already used complementary medicine or began using complementary medicine immediately after their diagnosis, and several continued until present (38%).

Breast cancer and control analysis

An ANOVA was carried out comparing differences in socio-demographic factors and CAM use in the breast cancer group and healthy population. No significant differences were found in socio-economic factors or in CAM use between the two groups.

An ANOVA was also carried out measuring differences between breast cancer women and the healthy population in MHWs, Health Perceptions, Health Concern, Anxiety, Depression and Self-esteem. No significant differences were found for MHWs, Health Perceptions, Anxiety, and Self-Esteem. There was a significant difference in depression between the two groups $F(1,76)$ 3.98, $p < .05$ (Mean Breast cancer group = 40, *SD* = 7.85; Mean Control group = 36, *SD* = 8.29). There was also a significant difference in Health Concern between the two groups $F(1,85)$ 10.45, $p < .005$ [Mean Breast cancer group = 2.1, *SD* = 1.19; Mean Control group = 2.82, *SD* =. 94. (Note: smaller mean indicates greater concern)].

CAM Frequency

When CAM frequency (number of CAMs tried by each participant) was analysed using a collapsed breast cancer and control group, no significant correlations were found between CAM use and ethnicity, age, education, marital status, occupation, income, religion, and political views. A significant correlation between CAM frequency and MHWs was found $r = .33$, $p < .005$ in the combined breast cancer and control group. CAM frequency was not significantly correlated with Health perception, Health concern, Anxiety, Depression, or Self-esteem.

CAMs were classified into two categories: healing therapies, which required exposure of the body or physical action (e.g. megavitamins) and psychological therapies, which involved primarily mental processes (e.g. relaxation). Correlations between these two categories and MHWs, Health perceptions, Anxiety, Depression, Self-esteem, and Body image were analysed. Psychological therapies were only significantly correlated with MHWs $r = .22$, $p < .05$ (Psychological therapies N = 8). Healing therapies were also significantly correlated with MHWs $r = -.35$, $p < .005$ (Healing therapies N = 40). In addition, Healing therapies were significantly correlated with Health Perception $r = -.22$, $p < .05$. Therapies, regardless of whether psychological or healing, were not significantly correlated with any other factors.

Socio-demographic feature	Frequency (%)*	Socio-demographic feature	Frequency (%)*
Ethnicity: White Asian Mixed	 84 (90%) 6 (7%) 1 (1%)	Occupation: Full time Part time Unemployed Student Retired	 37 (40%) 29 (31%) 8 (9%) 6 (6%) 11 (12%)
Education: GCSE A Level Undergraduate Postgraduate	 11 (12%) 21 (23%) 34 (37%) 25 (27%)	Income: £3-5,000 £5-8,000 £8-10,000 £10-15,000 £15-20,000 £20-40,000 £40-50,000 £50,000+	 13 (14%) 6 (7%) 4 (4%) 7 (8%) 11 (12%) 21 (23%) 11 (12%) 16 (17%)
Marital Status: Single Married Divorced Widowed	 15 (16%) 71 (76%) 4 (4%) 3 (3%)		

*Numbers do not add up to the total as there was some missing data

Table 1: Socio-demographic data of the sample

Features	Frequency (%)	Features	Frequency (%)
Cancer Type: ER Positive ER Negative Unsure	 25 (51%) 6 (12%) 18 (36%)	Tumor Stage: TX T1 T2 T3 T4 Unsure	 2 (4%) 9 (18%) 22 (45%) 9 (18%) 1 (2%) 6 (12%)
Time since diagnosis: 1 month 3 months 6 months 9 months 1 year 5 years Over 5 years	 2 (4%) 6 (12%) 5 (10%) 3 (6%) 14 (29%) 13 (27%) 5 (10%)	Treatment: Surgery Radiotherapy Chemotherapy Hormone Therapy Biological Therapy	 44 (90%) 38 (78%) 33 (67%) 16 (32%) 1 (2%)
Cancer Stage: Early Locally Advanced Secondary Unsure	 19 (39%) 20 (40%) 6 (12%) 4 (8%)	Surgery: Lumpectomy Quadrantectomy Mastectomy Lymph Nodal	 21(43%) 1 (2%) 28 (57%) 25 (51%)

*Numbers do not add up to the total as there was some missing data

Table 2: Frequencies of cancer features and treatments

Psychological Distress

Correlations of measures of depression, self-esteem and body image for both groups combined were analysed. The measure of depression was significantly correlated with both high self-esteem measures $r = -.52$, $p < .001$, and positive body image $r = -.40$, $p < .01$.

In addition, (high) self-esteem and (positive) body image were, as expected, significantly correlated $r = .66$, $p < .001$.

CAM Analysis Breast Cancer Group

An ANOVA showed no significant differences in MHWs, health perceptions, depression, anxiety, self-esteem and body image in breast cancer groups based on the time of their diagnosis, age at diagnosis, stage of cancer, and tumor size at the time of diagnosis. Therefore, the data from breast cancer patients were collapsed to perform further analysis. When analysing CAM frequency correlates within the breast cancer group only, MHWs was also the only variable significantly correlated with CAM frequency $r = .38$, $p < .05$. CAM frequency was not significantly correlated with Health perception, Health concern, Anxiety, Depression, Self-esteem or Body image.

CAM frequency was also not significantly correlated with cancer type, age at diagnosis, cancer and tumor stage at diagnosis, nor with surgery and chemotherapy. CAM frequency was marginally correlated with Radiotherapy $r = .30$, $p < .05$. CAM frequency was significantly correlated with having undergone Lumpectomy $r = -.32$, $p < .05$. However, it was not significantly correlated with Quadrantectomy, Mastectomy, or Lymph Nodal removal. In addition, CAM start period was only significantly correlated with age at diagnosis $r = .39$, $p < .05$. Finally, length of time which CAM was used was not significantly correlated with any cancer factor measured.

CAM start period was not significantly correlated with MHWs, health perceptions, anxiety, depression, self-esteem, or body image. In addition, the length of time CAM was used was not significantly correlated with MHWs, Health perceptions, Anxiety, Depression, Self-esteem, or Body image. The breast cancer patients were divided into users or non-users of CAM. A MANOVA found no significant differences in MHWs, Health Perceptions, Health Concerns, Anxiety, Depression, Self-esteem or body image between CAM users and non-users. In addition, there was no affect of an interaction between mastectomy and CAM use on body image.

Modern Health Worries

Correlates between MHWs scores and scores of health perceptions and health concerns were analysed. MHWs were significantly correlated with health perception $r = -.25$, $p < .05$, however, MHWs were not significantly correlated with health concerns.

Table 3 shows the factor analytic results from the VARIMAX rotated procedure of the MHWs scale. In all, 7 factors were identified which accounted for 79% of the variance. The majority of factors seem coherent and easily labeled. The first factor referred to Contamination, the second to Food Contamination, and the third to Pollution. The fourth factor seemed to refer to Doctors Playing God, Epidemics, and Urban Worries. The fifth seemed concerned with Harmful rays. The final two factors referred to Work Stress and Drug Resistant Bacteria.

The seven factors were then correlated with CAM frequency. Factor two (Food Contamination) was significantly correlated with CAM frequency r = .38, p < .005. Factor six (Work Stress) was also significantly correlated with CAM use $r = .25$ $p < .05$.

Discriminant Analysis

All participants were divided into high, medium or low frequency CAM users. A direct discriminant function analysis was performed using seven MHWs factors as predictors of membership in three groups (High, medium, or low CAM frequency). Of the 93 cases, 23 were dropped from analysis because of missing data. Missing data appeared to be randomly scattered throughout groups and predictors.

	Factor						
	1	2	3	4	5	6	7
Mad Cow Disease	.732						
Bacteria in air conditioning	.722						
Leakage from microwave ovens	.714						
Amalgam and dental x-rays	.669						
Drugs	.668						
Contamination of water supply	.642						
Bio-Terrorism	.614						
Fluoridation of water supply	.602						
Poor building ventilation							
Plane crash							
Vaccination programmes							
Medical side effects							
Antibiotic in food		.904					
Hormones in Food		.900					
Pesticide in food		.873					
Additives in food		.809					
Genetically modified food		.759					
Pesticide spray		.596					
Antibiotic Overuse		.558					
Toxic chemicals in household products							

Note: Table continued on the following page

Table 3a: Factor analytic results of MHW scale.

	Factor						
	1	2	3	4	5	6	7
Depletion of the ozone layer			.841				
Traffic fumes			.806				
Other environmental pollution			.770				
Air pollution			.768				
Noise pollution			.619				
Nuclear radiation							
Euthanasia				.846			
Human Cloning				.817			
Terrorist attack on urban populations				.657			
Overpopulation				.640			
Gene therapy				.635			
AIDS				.611			
Passive smoking							
Radio or cell phones towers					.853		
Cell phones					.824		
High tension power lines					.776		
Work stress						.710	
Drug resistant Bacteria							.680
Eigenvalue	17.66	3.48	2.29	2.04	1.75	1.67	1.11
Variance (%)	46.46	9.16	6.02	5.37	4.61	3.07	2.92

Table 3b: Factor analytic results of MHW scale continued.

Two discriminate functions were calculated, with a combined $\chi^2(14) = 31.72$, $p < .005$. After removal of the first function, there was no association between groups and predictors $\chi^2(6) = 9.25$, $p > .05$. The two discriminant functions accounted for 73% and 27%, respectively, of the between-group variability. As shown in figure 1 the first discriminate function maximally separates high CAM users from the other two groups, with medium CAM users falling between the two groups.

The loading matrix of correlations between predictors and discriminant function, as seen in Table 4, suggests that the best

predictors for distinguishing between high CAM users and the other two groups are concerns about Food Contamination (factor 2), Work Stress (factor 6), and Contamination (factor 1). High CAM users have more worries about Food Contamination (Mean = .62, SD = .97) than medium users (Mean = .34, SD = .77) and low users (Mean = −.36, SD = 1.02). High CAM users also have more concerns about Work Stress (Mean = .66, SD = .71) than medium users (Mean = −.12, SD = .95) and low users (Mean = −.25, SD = 1.11). Finally, High CAM users also have more concern about Contamination (Mean = .44, SD = .88) than medium users (Mean = −.02, SD = 1.44) and low users (Mean = −.12, SD = .81). Loadings less than .50 are not interpreted.

Although not significant, one predictor, Drug resistant bacteria, has a loading in excess of .50 on the second discriminant function, which separates medium users from the two other groups. Medium users have more concern for Drug resistant bacteria (Mean = .43, SD = .94) than high users (Mean = −.37, SD = 1.21) and low users (Mean = −.07, SD = 1.13).

A second direct discriminant function analysis was performed using the subscales of the Health Perception questionnaire as predictors of membership in the CAM frequency groups outlined above. Of the 93 cases, 12 were removed due to missing data. Missing data appeared to be randomly distributed across predictors and groups.

Two discriminant functions were calculated with combined $\chi^2(12) = 14.13$, $p > .05$. The association between groups and predictors was also not significant after the removal of the first function $\chi^2(5) = 3.793$, $p > .05$. The two discriminant functions accounted for 74% and 26%, respectively, of the between group variability.

Another direct discriminant function analysis was performed using Anxiety and Depression as predictors of membership in the CAM frequency groups outlined above. Of the 93 cases, 15 were dropped due to missing data. Missing data appeared to be randomly distributed across predictors and groups. Two discriminant functions were calculated, with combined χ^2 (4) = 5.69, $p > .05$. After removal of the first function, the association between groups and predictors was also not significant $\chi^2(1) = .89$, $p > .05$. The two discriminant functions accounted for 85% and 15%, respectively, of the between group variability.

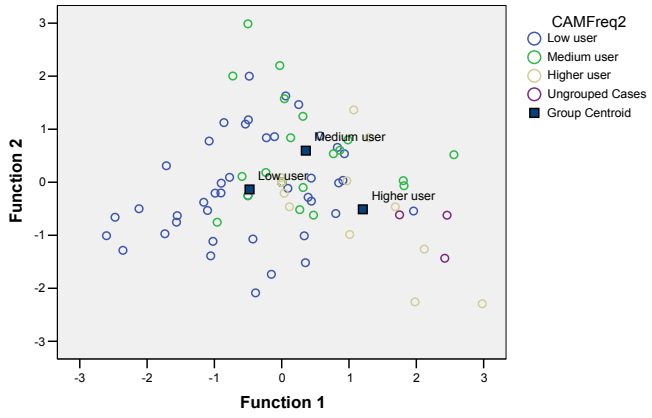

Figure 1: Canonical discriminant functions

	Function	
	1	2
F2	.665*	.253
F6	.453*	-.344
F1	.282*	-.193
F7	-.024	.641*
F4	.088	.436*
F3	.096	.354*
F5	.001	-.120*

Table 4: Structure Matrix MHW Factors

Finally, a direct discriminant function analysis was performed using self-esteem and body image as predictors of membership in the CAM frequency groups. Of the 49 breast cancer cases, 2 cases were dropped due to missing data. Missing data appeared to be randomly scattered throughout groups and predictors. Two discriminant functions were calculated, with combined $\chi^2(4) = 3.52$, $p > .05$. The association between groups and predictors was also not significant ($\chi^2[1] = .12$, $p > .05$) after removal of the first function. The two discriminate functions accounted for 96% and 3%, respectively, of the between group variability.

Method of Questionnaire Completion

Due to the different methods of questionnaire collection ANOVAS were carried comparing differences between those who completed the questionnaires in clinics and those who completed it online. Out of all variables collected five were found to have significant differences between the two groups. Firstly there were significant differences in religious affiliations (F(46) 10.979, $p<.005$). Secondly, there was a significant difference in the time they diagnosed (F(48) 4.639, $p <.05$) with those who filled the questionnaires in a clinic having a more recent diagnosis than those who completed the questionnaire online. Thirdly, there was a significant difference in radiotherapy treatment (F(48) 6.881, $p<.05$) with women who completed the questionnaire in a clinic having received more radiotherapy than those who completed the questionnaire online. Fourthly, there was a significant difference in CAM use between the two groups (F(49) 6.503, $p<.05$) with more women who completed the questionnaire using CAM than those who completed the questionnaire online. Finally, there was a significant difference in health perception (F(44) 4.386, $p<.05$) with those who completed the questionnaire online having greater perception of health than those who completed the questionnaire in clinics.

Discussion

This small exploratory study found that over half of breast cancer patients used CAM since their diagnosis. Prevalence rates were somewhat lower than those reported in previous research [5]. The majority of patients were either already using CAM or began using CAM immediately after their diagnosis and continued CAM use until present. The current study found no socio-demographic factors associated with CAM use, despite previous research demonstrating that younger, well-educated, and higher than average social class individuals are more likely to use CAM [3]. This may be due to the fact that two out of the three clinics where data was collected strongly recommended CAM use to their patients. Whilst it would be interesting to examine differences in patients from the different clinics the sample size was too small and uneven to do a reliable statistical analysis.

In this study CAM use was also not associated with cancer type, age at diagnosis, nor disease stage despite previous research demonstrating that advanced illness was a predictor of CAM use [49]. CAM use was not associated with surgery or chemotherapy, although findings did show that those who have undergone radiotherapy and lumpectomy are more likely to use CAM. This result needs replication in a bigger sample.

Previous research has shown that in breast cancer patients, the prevalence of depression, anxiety or both is around twice that of the general female population [50], although it may 'resort' to a 'natural level' two or three years after the diagnosis. No differences in MHWs, health perceptions, anxiety, and self-esteem were found between breast cancer patients and the healthy adult population in the current study. However, cancer patients did show slightly elevated levels of depression and moderately higher levels of health concern than the healthy population, which may be explained by their disease status, though this causal inference requires empirical ratification. Therefore, in general, breast cancer patients were not more psychologically distressed than the healthy population and appeared to be coping well emotionally and psychologically with their disease. This may be true only of this small sample and does require replication

In addition, there was no difference in levels of CAM usage by breast cancer patients and the control group despite previous research demonstrating that cancer patients utilize more CAM [5]. Therefore, there was no statistical support for H1. This may have been due to issues with sampling, as many of the control participants were family members of breast cancer patients and may, therefore, not be representative of the general population. In addition, it may have attracted those who are interested in and already use CAM from social networking websites, thus inflating CAM usage in the control population.

An association between MHWs and CAM use was found in both the control population and breast cancer patients. In specific, women who used more CAM demonstrated greater levels of MHWs. This finding provides evidence for H2. In addition to the association with CAM use, these MHWs were related to subjective feelings of health as suggested by Petrie et al. (2001) [21], therefore supporting the findings by [20]. However, health perceptions themselves were not associated with CAM use. Furnham (2007) noted that concerns with ill health may drive individuals to be consumers of health products, both conventional and complementary. In addition, Furnham argued that CAM practitioners may emphasize issues that increase MHWs, which may in turn increase CAM use. These arguments are useful in explaining the link between CAM and MHWs. However, the current research demonstrates that although breast cancer patients were more concerned with ill health than the control group, this in itself was not predictive of CAM use.

Concerns with ill health may not necessarily be the driver behind MHWs or CAM use. There may be a qualitative difference between concerns about one's present health and concerns of possible illness due to modern factors. The looming possibility of the adverse effects on health due to these modern factors may drive individuals to consume health products in a preventative manner, regardless of their current health status. A previous study has demonstrated that over estimation of risks may lead to over estimation of the potential benefits of interventions [51]. Therefore, the elevated health worries observed in CAM users may demonstrate perceived risk and may lead women who use CAM to exaggerate their beliefs about the potential benefits of these therapies. This may in turn lead to greater usage of CAM.

Similar factors arose from the MHWs scale as previous studies (issues around pollution, food and radiation). There was an association between worries about food contamination and CAM use. In specific, those who use greater quantities of CAM were more likely to show elevated levels of worry about food contamination. In addition, there was also an association between work stress and CAM use, with women who used more CAM worrying more about work stress. It was shown that food contamination was the factor that most strongly predicted whether women would be high, medium or low users of CAM. This predictor was followed by work stress and general contamination. As worries about one's health and the effects of contamination on one's body increases, CAM use increases. It is possible that as food provides the fuel for one's body and the most popular CAMs used are ingested, high CAM users could be hyper vigilant to food contamination and worry about this more than low users.

In addition to MHWs, this research set out to examine psychological distress as it has been shown to be associated with CAM use: those who use CAM suffering from greater psychological distress [9], however, this study failed to reflect this. There was no association between CAM use and depression and anxiety, nor were depression and anxiety predictive of CAM use in the healthy population and breast cancer patients. Therefore, there was no evidence for hypotheses H_{3A} and H_{3B}.

This study also set out to examine the relationship between depression, self-esteem, and body image. The current study did demonstrate a significant and logical associations between measures of depression, self-esteem and body image, providing evidence for hypothesis H4. The more depressed people were the lower their self-esteem and the more negative their body image which makes sense. However, despite the significant associations between measures, self-esteem and body image were not associated with CAM use. There was no difference in levels of self-esteem and body image between CAM users and non-users. In addition, self-esteem and body image were not predictive of frequency of CAM use in breast cancer patients. Therefore, although there is a strong relationship between depression, self-esteem and body image, this is not related to CAM use, thus there was no statistical evidence for hypotheses H5 and H6. Taken with the findings above it can be concluded that there is no association between CAM use and psychological distress.

When CAMs were divided into 'Healing therapies' and 'Psychological therapies', an association between MHWs and 'Healing therapies' were found, as well as an association between health perceptions and 'Healing therapies'. 'Psychological' and 'Healing' therapies were not associated with anxiety, depression, self esteem or body image. This finding may suggest that CAM does not serve a psychological function, but rather it is associated with a more physical health related function, where patients engage with CAM use as a response to worries about health related issues or perceptions of poor health.

This was in many ways an exploratory study. The generalisability of these results may be limited due to a relatively small sample as well as a selection bias, as the sampling technique did not focus on a random sample of CAM users and nonusers. Due to the nature of the questionnaire, breast cancer patients suffering from greater psychological distress may have chosen to not take part in the study, resulting in a disproportionate group of high emotionally and psychologically functioning individuals and an underrepresentation of psychologically distressed participants. Therefore, the group in this study may not be representative of all women with breast cancer or all women taking CAM.

A further limitation of the current study was that some of the patients had been diagnosed and treated over 5 years ago. It is possible that there were errors in recall when naming CAM types used since diagnosis. On the other hand, by surveying participants well after diagnosis a more complete picture of the number of CAMs used may have been captured, as cancer patients tend to use more CAM over time [52].

This was also a cross-sectional study and therefore causation could not be inferred from correlational results though they did throw up a number of interesting and testable hypotheses which maybe only tested in longitudinal research studies.

A central question that this study could not answer however is whether the recommendation of medical staff in various clinics had a direct impact of the behavioural choices and responses of patients. The reasons used by breast cancer patients with for seeking CAM and their choices of CAM can provide information to health care providers in several areas. First, CAM use may alert medical staff about patients' health related worries, such as drug side effects. Such knowledge could assist medical staff in guiding patients with breast cancer to responsible treatment decision making. Second, as CAM may cause harm due to its interaction with conventional medicine, physicians, breast cancer advocates, and awareness programs should explain that the toxicities and benefits of CAM are unknown. As new information about CAM becomes available, it is important to pass this knowledge on to medical staff, who are responsible for the ongoing needs of their patient population.

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