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Determinants of the Psycho-social Outcome After Operation for Breast Cancer. Results of a Prospective Comparative Interview Study following Mastectomy and Breast Conservation

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In a prospective interview study, designed to compare the psycho-social outcome after a breast-conserving vs. a mastectomy operation, we analysed possible predictors of the psycho-social adjustment. 99 women with breast cancer histopathological TNM stages I and II were consecutively admitted to the study. Half-structured interviews, based on the Social Adjustment Scale and a scale by P. Maguire, were performed 4 and 13 months after the operation. Living together with the spouse seems to protect women from developing psycho-social problems postoperatively. Women who were gainfully employed or who were given radiotherapy had a higher risk of poor adjustment after 4 months. At 13 months, the scorings indicate that radiotherapy has a reassuring effect. Type of surgery was controlled for in the analysis and showed that, of the risk factors studied, the most consistent trend for an overall better outcome was in the breast-conserved group except for sexual disturbances. *Eur J Cancer*, Vol. 28A, No. 6/7, pp. 1062–1067, 1992.

INTRODUCTION

AMONG WOMEN with breast cancer, 20–30% express serious feelings of depression and/or anxiety after the primary surgical treatment [1–8]. This high rate of postoperative psycho-social disturbance has been seen in several reports during the last decade, despite increased awareness of the problem and attempts to improve the psycho-social care in surgical clinics [9–11]. It has been hoped that a breast-conserving procedure would reduce the number and/or severity of the problems in this regard *vis-à-vis* a mastectomy. Studies hitherto undertaken indicate a more

favourable psycho-social outcome [7, 12–14] and a better preserved body image after breast-conserving procedures [15–16], but none of the studies confirms that this type of operation is a major predictor of the psycho-social adjustment.

If individually-based surgical and nursing care are to be given to every breast cancer patient, it is important to investigate whether any factors can predict the psycho-social outcome of the treatment. Women at risk of developing psycho-social sequels might then be given support to increase their ability to cope with the disease. Some studies have tried to investigate the

possibilities of detecting high-risk patients pre-operatively. The findings concerning marital status, age at operation and level of education are contradictory as risk factors [16–19].

It has not been clearly documented to what extent radiotherapy influences the patient's feelings of well-being over a longer period [20–22], nor is it known how the psycho-social status varies with follow-up time [2, 18].

In this study, the information obtained in a prospective, controlled interview study, which compared psycho-social adjustment following breast-conserving surgery and mastectomy [7] was used. Our aim was to investigate whether marital status, employment, level of education and radiotherapy, as well as the type of surgical treatment, were predictors of psycho-social outcome after a primary operation for breast cancer. The dependent variables were measures of depression, anxiety, sleep disturbances and sexual functions, and a general assessment of the psycho-social adjustment.

PATIENTS AND METHODS

Patients

The investigation took place in Falun County Hospital, which also participated in a multicentre mammography screening project [23, 24]. Consecutive patients aged 40–80 years with a newly diagnosed invasive breast cancer, histopathological TNM stages I and II, were invited to participate in an interview study where the possible advantages of breast-conserving surgery over mastectomy were assessed [7]. The breast-conserving treatment consisted of a standardised sector resection and axillary dissection. Since the majority of women undergoing conservative treatment participated in a randomised clinical trial investigating the value of postoperative radiotherapy after surgery, only about half of them were irradiated. The mastectomy procedure entailed an ablation of the breast with an *en bloc* axillary clearance up to the axillary vein. Radiotherapy after mastectomy was given only when the axillary nodes were involved or when the tumour was localised in the medial part of the breast. Patients entered the study from September 1983 until August 1986.

During the period of study, around 75% of the breast cancer patients were treated with mastectomy. Since we aimed to recruit samples of approximately equal size, only half of the mastectomy patients were allocated to the study in a random fashion.

A sample size of 100 was chosen both on the basis of resource considerations in running a large interview study and on statistical calculations of power. We wanted to be able to detect a decrease in psychological problems to the level of 10% as compared with the hypothesised 30% in the mastectomy group ($P = 0.05$; power = 0.75).

A letter which provided information about the study was given to all of the patients. Informed consent was obtained by a telephone call from the interviewer. Altogether, 161 women were eligible for the study and 99 of them agreed to participate.

Interviews and rating scales

A semi-structured interview was conducted with each patient. Three different interview instruments were used—namely, the Social Adjustment Scale (SAS) [25–27], a scale developed by Maguire, *et al.* [1] (PM), and a scale constructed specifically for this study by the research team psychiatrist (TB).

The SAS [25–27] includes 76 items and assesses the patient's functioning in five areas of adjustment. Employment situation, social and leisure activities, family relations outside the home, marital relations and parental role. For each question there were well-fixed anchor points, where a higher score indicated more serious disturbances (1 = normal – 5 = severe disturbance). At the termination of the SAS instrument, the interviewer completed an assessment of the patient's total answer from respective areas of adjustment (scores from 1 to 7). This was done after the interview was ended.

The PM and TB scales covered symptoms of anxiety, depression, sexual problems and sleep disturbance. The ratings are on four different levels ranging from normal to persistent, severe symptoms causing the woman to seek help.

The study included data from two interviews, 4 and 13 months after the primary operation. The first 4-month interval was selected to ensure that patients were not currently undergoing radiotherapy and the 13-month interval was meant to yield a long-term follow-up that was not affected by 'anniversary reactions'.

After the interview at 4 months, all the patients completed the Eysenck Personality Inventory test, Form A (EPI) [28]. This test is constructed to measure two dimensions in the personality: extro- or introversion and neuroticism. The latter test permitted us to determine whether the distribution of these personality characteristics was different in the two treatment groups.

Statistical methods

The following dichotomised independent variables were used: type of operation (mastectomy vs. breast-conserving surgery); number of operations (one-stage vs. two-stage procedure); marital status (married vs. otherwise); educational level (elementary school vs. higher education); employment situation (employed vs. otherwise); and radiotherapy (postoperative adjuvant radiotherapy vs. no such treatment).

The dependent variables were dichotomized between having few, if any, problems on the one hand or having some larger problem on the other. This separation into two groups was made because it was found to be the most relevant clinical measure and our previous analysis [7] showed that the full four, five or seven-graded scales gave no extra information. A score on the SAS scale of less than two and on the TB or PM scales of less than one was considered normal and all other scores were seen as revealing a serious problem.

In both univariate and multivariate analyses the basic model used was the logistic regression model, which assumes that the logarithm of the odds of maladjustment is a function of the explanatory variables. From the estimated parameters of this model, the odds ratio (OR) associated with different factors was compared. The OR was the relative risk measure used.

RESULTS

1 woman died during the study period and 2 women declined to participate in the second interview. All 3 women belonged to the mastectomy group.

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Table 1. Distribution of demographic variables for women treated with mastectomy and breast-conserving surgery

Characteristic	Mastectomy n = 62	Breast- conserving n = 37
Mean age in years (range)	58.7 (42–79)	58.5 (44–78)
Mean number of days (S.D.) between operation and:		
1st interview	134 (38)	130 (19)
2nd interview	393 (61)	396 (32)
Mode of detection (%)		
Symptoms	33 (53.2)	15 (40.5)
Screening	29 (46.8)	22 (59.5)
Breast cancer stage II (%) (pTNM, UICC)	26 (41.9)	1 (2.7)
Recurrence(s) of breast cancer during study period (%)	9 (14.5)	2 (5.4)
Operation with two-stage procedure (%)	31 (50.0)	19 (51.4)
Postoperative radiotherapy (%)	29 (46.8)	17 (45.9)
Postoperative chemotherapy (%)	4 (6.5)	0
Marital status (%)		
Single	2 (3.2)	2 (5.4)
Married	44 (71.0)	25 (67.6)
Divorced	2 (3.2)	2 (5.4)
Widowed	14 (22.6)	8 (21.6)
Highest level of education (%)		
Elementary school	48 (77.4)	30 (81.1)
Upper secondary school	4 (6.5)	2 (5.4)
University	10 (16.1)	5 (13.5)
Work (%)		
Wage-earner	29 (46.8)	15 (40.5)
Housewife	3 (4.8)	2 (5.4)
Retired wage-earner	21 (33.9)	15 (40.5)
Retired housewife	8 (12.9)	5 (13.5)
Other	1 (1.6)	0
Child living at home (%)	22 (35.5)	12 (32.4)

Demographic variables

The reasons given for not taking part in the study are presented in seven different categories, with the number from each respective treatment group in parenthesis (the breast-conserved group is presented first): work (3/7), disease or advanced age (8/12), inconvenient journey to the interview (3/3), cancelled interview for unclear reasons (3/3), difficulties with the language (0/1), felt "alright" (2/0), low mental energy (6/1) and no wish to

participate (6/4). The distribution of demographic variables for women participating in the study is shown in Table 1. In the mastectomy group, there was a higher proportion of women who had breast cancer in stage II and a slightly higher proportion who received postoperative chemotherapy and had a recurrence of breast cancer. Otherwise, there were no major differences between the groups with respect to characteristics that might be related to psycho-social adjustment following the primary treatment (Table 1).

Eysenck Personality Inventory (EPI)

10 patients did not complete the test. The reasons included bad vision, an incomplete test or refusal to do the test. There were no significant differences on either scale between the two treatment groups. In the breast-conserving group the average for extroversion was 18 (S.D. 2.1); for the mastectomy group the corresponding value was 20 (S.D. 1.8). In the scale of neuroticism both groups had an average of 23 (S.D. 0.5/0.6).

Overall reporting of symptoms of psycho-social distress

The proportion of women reporting symptoms indicating psycho-social distress according to type of operation, marital status, employment and administered radiotherapy is shown in Table 2. The reported frequency of disturbances was high, with only six of the total 64 cells having a rating of less than 30% and a total 40 of the cells having a rating of 40% or higher. Looking at these crude data, only women in employment tended to have a better rating at the 13-month interview as compared to the 4-month occasion.

Univariate analysis

The results of the univariate analysis of the interview ratings at 4 and 13 months are presented in Table 3. The analysis revealed a clear trend to a more favourable assessment for women undergoing breast-conserving operation in all dependent variables except sexual functioning on the PM scale. At the 13-month interview there was a significantly higher rating for depression on the PM-scale (odds ratio = 3.39; 95% confidence interval 1.2–9.4) for women undergoing mastectomy. A poorer adjustment in the general assessment on the SAS rating was also seen with an odds ratio (OR) of 4.95 (95% confidence interval 1.1–23.4) among mastectomised patients.

Half of the patients in both groups underwent a two-stage procedure. There was a slight trend for these patients to experience more serious distress, but the differences were not statistically significant.

The majority of the patients were married. In the 4-month

Table 2. Frequency of symptoms of psycho-social maladjustment in percentage; ratings more than two on SAS and more than one on PM scale at 4 and 13 months

Months after operation	Type of operation				Marital status				Employment				Radiotherapy			
	Mastectomy		Breast-conserving		Married		Unmarried		Work		Other		Yes		No	
	4	13	4	13	4	13	4	13	4	13	4	13	4	13	4	13
No. of women in each group	62	59	37	37	69	66	30	30	29	29	70	67	46	44	53	52
General assessment (SAS) (%)	32	40	27	35	31	37	26	40	58	51	18	32	34	39	26	35
Anxiety (PM) (%)	46	45	37	40	42	39	46	53	86	65	25	34	47	43	39	44
Depression (PM) (%)	45	49	40	43	42	42	46	56	82	72	27	35	52	45	37	48
Sleep disturbance (PM) (%)	41	47	40	40	34	39	56	56	65	51	31	41	50	50	33	40

Table 3. Risk estimates for developing psycho-social maladjustment as measured with univariate logistic analysis of the scorings in the PM, SAS and TB scales. Results are displayed as odds ratios

	Mastectomy vs. breast-conservation	1- vs. 2-stage operation	Married vs. unmarried	Elementary school vs. higher	Employed vs. unemployed	Radiotherapy vs. none
Univariate analysis 4 months						
Depression (PM)	1.69	1.16	0.65	0.61	1.88	1.78
Anxiety (PM)	1.37	1.69	0.70	0.65	2.74*	1.52
Sexual function (PM)	0.32	1.37	0.49	2.54	—	1.53
Sleep disturbance (PM)	1.19	0.70	0.25*	0.79	0.86	3.97*
General assessment (SAS)	4.58	1.82	1.70	1.97	1.28	1.17
Depression (TB)	1.89	1.06	0.76	0.86	2.07	1.85
Anxiety (TB)	1.83	0.98	0.61	1.48	1.55	1.14
Univariate analysis 13 months						
Depression (PM)	3.39*	1.61	0.71	0.92	1.19	0.80
Anxiety (PM)	1.28	0.91	0.45	0.54	1.49	0.77
Sexual function (PM)	0.48	2.75	2.00	1.39	—	0.48
Sleep disturbance (PM)	1.81	1.32	0.52	1.61	0.40	1.62
General assessment (SAS)	4.95*	1.17	0.67	4.90	0.79	1.43
Depression (TB)	1.99	1.10	0.71	0.78	1.27	0.99
Anxiety (TB)	1.24	1.20	0.81	0.74	0.96	0.42*

OP; * = $P < 0.05$.

interview, sleep disturbances developed significantly more often among those not married. The married women generally had better scores, although few of the items were statistically significant.

Only 21% of the patients had a higher educational level in our study and there was no clear overall trend regarding the educational level as a risk factor for unsatisfactory adjustment. Women with higher education seemed to have worse ratings for sexual functioning and in the general assessment on the SAS scale, both at 4 and 13 months.

According to the PM scale, anxiety occurs significantly more often ($OR = 2.74$, 95% confidence interval 1.03–7.3) among employed women at the 4-month interview. Apart from sleep disturbances, there was a tendency in the 4-month interview for employed women to have less favourable scores than those who were unemployed or retired, but this tendency diminished in the interview at 13 months.

When radiotherapy was analysed as the determinant of the psycho-social outcome, there was a marked difference between the results at the 4- and 13-month interviews. At the first interview there was an overall tendency for patients receiving radiotherapy to have a higher incidence of signs of psycho-social distress. The level for sleep disturbance was statistically significant ($OR = 3.97$; 95% confidence interval 1.01–15.7). However, at the second interview the levels of poor adjustment, except for sleep disturbance and the general assessment, were all below 1.0, and for anxiety they reached a nearly statistically significant value of 0.42 (95% confidence interval 0.18–1.01).

We also investigated whether a subdivision of the patients into 10-year age groups, into stage I or II disease or according to the mode of diagnosis (detected by screening or clinical findings) was related to the levels of scoring on the three scales. However, no significant differences or clear trends were seen (data not shown) and these covariates were henceforth not used in the multivariate analyses.

Multivariate analysis

The results of the multivariate analysis are shown in Table 4 and with a graphical illustration in Fig. 1. The patterns in the ratings of the dependent variables were generally the same in the multivariate analysis for the type of operation as in the univariate analysis. The values were of slightly higher statistical significance using the multivariate analysis. With the very clear and constant exception of sexual disturbances, women with a preserved breast tended to do better in all ratings, and the global assessment after 13 months reached an odds ratio of 5.52. The tendency for women who had a one-stage procedure to have less favourable scores increased slightly in the multivariate analysis. However, none of the values were statistically significant.

In the multivariate analysis, married women still had generally

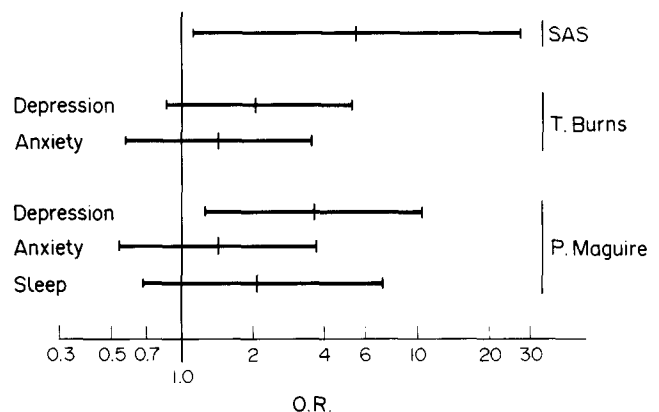


Fig. 1. Odds ratios (vertical lines) and 95% confidence intervals (horizontal bars) at 13 months (Table 4). Odds ratios are plotted logarithmically. Odds ratio > 1.0 denotes that mastectomized group are at risk of having less favourable scores than conservatively treated women.

Table 4. Risk estimates for developing psycho-social maladjustment as measured with multivariate logistic analysis of the scores on the PM, SAS and TB scales. Results are displayed as odds ratios. All risk factors were included in the multivariate model simultaneously

	Mastectomy vs. breast-conservation	1- vs. 2-stage operation	Married vs. unmarried	Elementary school vs. higher	Employed vs. unemployed	Radiotherapy vs. none
Multivariate analysis 4 months						
Depression (PM)	1.64	1.46	0.54	0.97	2.13	1.81
Anxiety (PM)	1.30	2.64	0.51	1.55	4.28*	1.80
Sexual function (PM)	0.38	13.92	0.55	10.18*	—	2.51
Sleep disturbance (PM)	1.17	0.77	0.25*	0.74	0.96	3.64
General assessment (SAS)	4.96	2.96	0.63	4.42	2.30	1.68
Depression (TB)	1.91	1.50	0.64	1.67	2.79	2.05
Anxiety (TB)	1.90	1.31	0.52	2.48	2.35	1.20
Multivariate analysis at 13 months						
Depression (PM)	3.65*	1.62	0.61	0.96	1.18*	0.76
Anxiety (PM)	1.42	0.79	0.38	0.43	1.30	0.61
Sexual function (PM)	0.35	3.04	1.14	1.63	—	0.51
Sleep disturbance (PM)	2.20	1.46	0.60	1.13	0.43	1.64
General assessment (SAS)	5.52*	1.97	0.70	8.12	1.35	2.04
Depression (TB)	2.11	1.06	0.66	0.76	1.17	0.89
Anxiety (TB)	1.43	0.89	0.81	0.46	0.69	0.34*

OP; * = $P < 0.05$.

better scores than unmarried, widowed or divorced women. The only difference in the multivariate analysis as compared with the univariate, was that the levels of anxiety now were close to statistically significantly lowered among married women in the 13-month interview, with an odds ratio of 0.38 (95% confidence interval 0.14–1.0).

In the multivariate analysis, women with a higher education were at greater risk of having more problems, especially with sexual disturbances, at the first interview than in the univariate analysis. The odds ratios, however, were considerably lower at the 13-month interview with an exception of a high odds ratio in the general assessment, but the differences were not statistically significant.

As regards adjuvant radiotherapy as a risk factor for distress, generally the same pattern in both analyses with a tendency to a qualitative difference between the results in the 4- and the 13-month interview was seen.

DISCUSSION

One of the main findings was that women undergoing mastectomy had a higher risk of psycho-social disturbance following primary treatment for breast cancer than the women who were treated conservatively. This pattern emerged consistently when several different dependent variables were used for the assessment. However, there was one exception, i.e. sexual disturbances, which occurred more frequently among women treated with breast conservation. Being married and living together with a spouse seems to protect the woman from developing various psychological problems as compared with being single, divorced or widowed. Women who were gainfully employed or who were given radiotherapy postoperatively seemed to have a higher risk for poor adjustment after 4 months than those not working outside their home or not being given radiotherapy. These tendencies were weaker at 13 months and, as regards radiotherapy, the data indicate that this therapy tends to have a reassuring effect later on.

Our other main finding was overall high ratings for psycho-

social distress. This shows that psycho-social problems after breast cancer operation are still a major problem in Sweden. It is not evident how broadly these results can be generalised, but even if they are valid only for the Nordic countries, a large group of patients are affected every year.

For two reasons we did not make a baseline-value measure before surgery. Firstly, we found it unethical to interfere with the patient's autonomy before the distress created by the diagnostic workup. Secondly, we were in doubt as to what kind of value the measurement would give in a situation where most women experience psychological crises.

Our study was population-based and prospective and included consecutive patients. There was just one interviewer and fixed points in time for the interviewers. The number of non-responders was relatively high, but, unlike many other investigators, we were able to record the number of non-participants and their reason for not taking part in the interview. It is possible that 25 of the non-responders constitute a group with more problems than the average patient.

The study was originally planned to compare women undergoing mastectomy with those undergoing a breast-conserving procedure [7]. Relatively, many exploratory analyses were done and some relationships may have been a result of chance alone. However, when analysing the type of operation, marital status, employment and adjuvant radiotherapy as risk factors, we noted clear and consistent trends in both the uni- and the multivariate analyses. Because of the sample size we may have overlooked clinically important differences. For the same reason, only a few of the women had a sexual relationship and therefore the results concerning sexual disturbances are difficult to interpret.

The strongest and most consistent trend was seen for mastectomy as a risk factor. The literature contains ample evidence that breast-conserving therapy does less harm to the body image and postoperative self-esteem than a mastectomy does [2, 13–16]. There is, however, only weak evidence that the overall psycho-social adjustment is better when the breast has been preserved [7, 13–14, 30–33].

In the clinical setting of this study, a one-stage procedure meant that the definitive operation was carried out in one stage because the diagnosis had been cytologically proven pre-operatively. Perioperative diagnosis with frozen section was rarely used. A two-stage procedure here means two operations performed one to two weeks apart and it was carried out when a cytological diagnosis could not be obtained beforehand; this happened often because the lesion was small or even non-palpable. These lesions were nearly all detected by screening. We feared that the two-stage procedure, with the psychologically stressful period when the women were awaiting a definitive histopathological report after the first operation, might entail a higher risk of psycho-social problems. This hypothesis is not supported by the present results.

Our findings concerning radiotherapy indicate that the treatment in itself may be stressful. However, we also found that it could be reassuring in a long-term perspective since less anxiety was seen after 13 months and both depression and sleep disturbances tended to decrease. It is not known whether the patients in general view the treatment as a prognostic indicator or as a curative part of the treatment. Peck and Boland reported that patients tended to regard radiotherapy as a confirmation of a bad prognosis [20].

The importance of gaining a social identity through employment has not been investigated in women with breast cancer. Our findings show that employed women had higher ratings for anxiety at the 4-month interview. Most women who were employed had not been able to go back to work at that point in time. After 13 months, there were still maladjustment in this group in the form of depression. One explanation of this finding could be that the consequences of the treatment were a strain on the social network, in which the work-mates were important for most patients employed outside the home.

Our study indicates that poor psycho-social adjustment after breast cancer treatment still is a major clinical problem. Current research and literature provide no self-evident solutions to the problem and further research and trials with new supportive methods both in surgical and nursing care are greatly needed. Furthermore, apart from the consequences of the radiotherapy, we found no definite evidence that the psycho-social problems disappeared soon after the primary treatment. This study with concomitant, internal controls shows that the type of surgery has an impact on the psycho-social outcome. The magnitude of beneficial effects of breast conserving therapy is, however, modest concerning the aspects we measured. There is probably a complicated network of interacting determinants of the psycho-social outcome, which might have different impacts, both quantitatively and qualitatively, after different follow-up times.

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