

## Effect of Mass Screening for Breast Cancer from the Aspect of Psychosocial Assessment of the Quality of Life

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To assess the quality of life (QOL) in patients with breast cancer receiving mass screening, a collaborative matched case-control study was conducted in nine hospitals throughout Japan. A total of 122 patients detected by mass screening (study group) and 226 patients found in out-patient clinics (control group) were assessed psychosocially on the basis of questionnaire information. The incidence of patients with early stage breast cancer was significantly higher in the study group than in the control group ( $P < 0.05$ ). Chest wall pain was observed in 35.2% of the study group and in 46.5% of the control group ( $P < 0.05$ ). Although control patients were more optimistic than study group patients, disturbed daily life and anxiety about recurrence were a little more frequent in the former group than in the latter. In particular, shoulder stiffness was frequently seen in the control group ( $P < 0.05$ ). Early detection and information do not create anxiety in mass screening patients ( $P < 0.01$ ). We should recommend mass screening to patients to detect early stage breast cancer and provide better QOL.

Key words: Breast cancer — Mass screening — Quality of life — Psychosocial assessment

The number of early breast cancer cases in Japan has been gradually increasing, largely because of nationwide mass screening.<sup>1)</sup> In our previous study,<sup>2)</sup> the incidence of early stage breast cancer was significantly higher in patients detected by mass screening than in those attending out-patient clinics. In the patients detected by mass screening, the 5-year survival rate was significantly higher ( $P < 0.01$ ), and the 10-year survival rate was slightly higher than in patients of out-patient clinics. Kuroishi *et al.*<sup>3)</sup> showed a life-prolonging effect of mass screening for breast cancer using the Cox regression model. The detection method, years of treatment and age at the initial treatment were important independent vari-

ables for survival when clinical stage was excluded from the independent variables. In a review of the psychosocial literature on breast cancer, 20 to 30% of women experienced a disruption in their quality of life through loss of roles, functional abilities, and problems with social relationships.<sup>4)</sup> The purpose of this study was to evaluate the effect of mass screening for breast cancer from the aspect of psychosocial assessment of the quality of life using a matched case-control study.

### SUBJECTS AND METHODS

The Research Group on the Study of Mass Screening for Breast Cancer was organized in 1987 with a Grant-in-Aid from the Ministry of Health and Welfare of Japan. A

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Table I. Number of Breast Cancers Detected by Mass Screening and in Out-patient Clinics in Nine Regions

Region	(Researcher)	No. of breast cancers	
		Mass screening	Out-patient clinic
Miyagi	(Yoshida)	13	25
Fukushima	(Abe)	5	6
Gunma	(Ishida)	18	34
Tochigi	(Sasakawa)	13	25
Gifu	(Kashiki)	4	7
Osaka	(Ota)	16	25
Tokushima	(Morimoto)	21	42
Kochi	(Itoh)	8	16
Fukuoka	(Tashiro)	24	46
Total		122	226

collaborative matched case-control study was conducted to investigate the quality of life in patients with breast cancer detected by mass screening. The primary screening was mostly carried out by interview, and inspection and palpation of the breast by physicians. Secondary examinations by mammography, ultrasonography and/or aspiration cytology were performed if necessary.

Patients detected by mass screening and treated from April 1987 until March 1989 in nine hospitals were selected for analysis (Table I). Two sets of controls were selected from among breast cancer patients who were found in out-patient clinics, using the following matching criteria: 1) patients treated in the same hospital, 2) patients having a similar date of birth,  $\pm 5$  years of age of the mass screening cases, 3) patients who underwent an operation on the date closest to the operation date of the mass screening cases (one treated before the mass screening case, and the other treated after the mass screening case).

The following 19 items were obtained from each hospital record: name of hospital, name of patient, date of birth, date of operation, awareness of symptoms, history of mass screening, means of detection, date diagnosis was confirmed, type of surgical procedure, type of adjuvant therapy, stage of disease according to the TNM classification of the Japanese Breast Cancer Society,<sup>5)</sup> histologic type, n-classification, recurrence and date confirmed, date treatment was started for recurrent disease, recurrent site and type of treatment.

Additional psychosocial information was obtained from a mailed or interview questionnaire, dealing with 29 items including 9 major sets of variables: physiological changes (disability and limitation), surgical procedure, anxiety about recurrence, reconstruction of the breast, periodic screening for recurrence, psychosocial anxiety, changes in daily life, and attitude to daily life. According to Craig *et al.*,<sup>6)</sup> several items were subdivided into 2 or 3 categories such as: 1) changed, 2) unchanged; or 1)

Table II. Characteristics of Study Group Patients and Control Group Patients

	Study group		Control group	
	No.	(%)	No.	(%)
Total	122	100.0	226	100.0
Awareness of the tumor				
None	59	48.4	7	3.1**
Aware	63	51.6	218	96.5**
Not stated	0	0.0	1	0.4
How noticed				
Self-examined	16	25.4	42	19.3
Accidental	46	73.0	170	78.0
Not stated	1	1.6	6	2.8
Total	63		218	
History of mass screening				
None	63	51.6	186	82.3**
Visited	56	45.9	28	12.4**
Not stated	3	2.5	12	5.3
Interval between mass screenings				
Within 12 mo.	37	66.1	16	57.1
13-24 mo.	9	16.1	6	21.4
Over 25 mo.	8	14.3	6	21.4
Not stated	2	3.6	0	0.0
Total	56		28	
How detected				
Inspection and palpation	99	81.1	183	81.0
Ultrasonography	34	27.9	74	32.7
X-ray	45	36.9	79	35.0
Cytology	28	23.0	63	27.9
Others	7	5.7	10	4.4
Not stated	0	0.0	4	1.8
Age at operation				
0-39	19	15.6	34	15.0
40-49	46	37.7	92	40.7
50-59	36	29.5	62	27.4
60-69	17	13.9	29	12.8
70-79	4	3.3	9	4.0
Height				
0-145 cm	9	7.4	10	4.4
146-150	35	28.7	56	24.8
151-155	40	32.8	74	32.7
156-160	36	29.5	58	25.7
161-	1	0.8	23	10.2**
Not stated	1	0.8	5	2.2
Mean height	152.3		154.0	
Weight				
0-40 kg	2	1.6	5	2.2
41-45	18	14.8	23	10.2
46-50	27	22.1	39	17.3
51-55	27	22.1	67	29.6
56-60	29	23.8	50	22.1
61-65	12	9.8	22	9.7
66-	7	5.7	14	6.2
Not stated	0	0.0	6	2.7
Mean weight	53.4		54.0	

\*\* :  $P < 0.01$

Table III. Clinical Background of Study Group Patients and Control Group Patients

	Study group		Control group	
	No.	(%)	No.	(%)
Total	122	100.0	226	100.0
Operation				
Total mastectomy	114	93.4	222	98.2*
Partial mastectomy	2	1.6	2	0.9
Total glandectomy	4	3.3	2	0.9
Partial glandectomy	2	1.6	0	0.0
T				
Tis, T0	10	8.2	4	1.8
T1a, T1b	46	37.7	78	34.5
T2a, T2b	58	47.5	126	55.8
T3a, T3b	7	5.7	12	5.3
T4a, T4b, T4c	1	0.8	5	2.2
Not stated	0	0.0	1	0.4
N				
N0	51	41.8	79	35.0
N1a, N1b	68	55.7	133	58.8
N2	2	1.6	12	5.3
N3	1	0.8	2	0.9
M				
M0	121	99.2	222	98.2
M1	1	0.8	4	1.8
Stage				
Tis, 0	10	8.2	4	1.8**
I	42	34.4	70	31.0
II	59	48.4	129	57.1
IIIa, IIIb	10	8.2	18	8.0
IV	1	0.8	4	1.8
Not stated	0	0.0	1	0.4
Histologic type				
Papillotubular ca.	48	39.3	63	27.9*
Solid-tubular ca.	25	20.5	62	27.4
Scirrhus ca.	33	27.0	84	37.2
Lobular ca.	3	2.5	4	1.8
Others	13	10.7	9	4.0*
Not stated	0	0.0	4	1.8
Lymph node metastasis				
n0	74	60.7	133	58.8
n1 $\alpha$	26	21.3	48	21.2
n1 $\beta$	9	7.4	26	11.5
n2	8	6.6	9	4.0
n3	0	0.0	5	2.2
Not operated	3	2.5	4	1.8
Not stated	2	1.6	1	0.4
Recurrence				
None	121	99.2	219	96.9
Occurred	1	0.8	7	3.1

\*:  $P < 0.05$ . \*\*:  $P < 0.01$ .

absent, 2) mild, 3) severe. The other items included daily life disturbances.

A total of 122 patients (study group) and 226 control patients (control group) were entered into this study.

Statistical analysis was done by chi-square test.

Table IV. Physical Symptoms of Study Group Patients and Control Group Patients

	Study group		Control group	
	No.	(%)	No.	(%)
Total	122	100.0	226	100.0
Stature				
Obese	53	43.4	97	42.9
Moderate	59	48.4	105	46.5
Thin	9	7.4	23	10.2
Not stated	1	0.8	1	0.4
Edema of arm				
Absent	80	65.6	155	68.6
Mild	37	30.3	60	26.5
Severe	1	0.8	6	2.7
Not stated	4	3.3	5	2.2
Movement of arm				
Free	105	86.1	187	82.7
Disturbed	15	12.3	35	15.5
Not stated	2	1.6	4	1.8
Disturbed direction of movement				
Flexion	1	6.7	2	5.7
Abduction	3	20.0	9	25.7
External rotation	11	73.3	23	65.7
Not stated	0	0.0	1	2.9
Total	15		35	
Chest appearance				
No bad feeling	14	11.5	27	11.9
Mild	64	52.5	113	50.0
Bad feeling	41	33.6	83	36.7
Not stated	3	2.5	3	1.3
Chest wall pain				
Absent	79	64.8	121	53.5*
Wound pain	41	33.6	95	42.0
Not stated	2	1.6	10	4.4
Occurrence of pain				
At palpation	12	29.3	19	20.0
Sometimes	27	65.9	71	74.7
Always	1	2.4	4	4.2
Not stated	1	2.4	1	1.1
Total	41		95	
Posture				
Unchanged	104	85.2	186	82.3
Worse	14	11.5	32	14.2
Not stated	4	3.3	8	3.5

\*:  $P < 0.05$ .

## RESULTS

**Clinical characteristics of the subjects** Patients with breast cancer in any of nine regions were included in this matched case-control study. Table II shows the clinical characteristics of patients such as awareness of breast tumor, how noticed, previous history of mass screening, interval between mass screenings, how detected, age at operation, height and weight. Awareness of tumor and no history of mass screening were significantly more frequent ( $P < 0.01$ ) in control group patients than in study group patients. Height taller than 161 cm was found in

Table V. Disability and Limitation of Study Group Patients and Control Group Patients

	Study group		Control group	
	No.	(%)	No.	(%)
Total	122	100.0	226	100.0
Daily life				
Not disturbed	66	54.1	111	49.1
Disturbed	51	41.8	107	47.3
Not stated	5	4.1	8	3.5
Type of disability				
Can't reach high position	6	11.8	16	15.0
Can't lift heavy packages	19	37.3	53	49.5
Can't go to the beach	23	45.1	44	41.1
Reduced arm power	6	11.8	11	10.3
Reduced grasp power	2	3.9	3	2.8
Bad appearance	4	7.8	2	1.9
Sensitive to cold	1	2.0	2	1.9
Won't wear low-cut dress	8	15.7	5	4.7*
Total	51		107	
Fatigue				
None/slight	76	62.3	146	64.6
Moderately severe	39	32.0	72	31.9
Severe	4	3.3	5	2.2
Not stated	3	2.5	3	1.3
Shoulder stiffness				
None/slight	56	45.9	79	35.0*
Moderately severe	45	36.9	104	46.0
Severe	20	16.4	39	17.3
Not stated	1	0.8	4	1.8
Quality of sleep				
Good	49	40.2	84	37.2
Moderate	62	50.8	118	52.2
Bad	9	7.4	20	8.8
Not stated	2	1.6	4	1.8

\*:  $P < 0.05$ .

23 patients (10.2%) of the control group, compared to only one patient (0.8%) of the study group.

Concerning clinical and histological status (Table III), control group patients received total mastectomy more frequently than study group patients. Tis (non-invasive or intraductal carcinoma) and T0 according to the T classification were found in 8.2% of study group patients and in 1.8% of control group patients, with statistical significance ( $P < 0.01$ ). The same relationship was found in the clinical staging. Histologically, papillotubular carcinoma was more frequent in study group patients. The frequency of lymph node metastasis and recurrence was almost the same in the two groups.

**Disability and limitation** Both groups of patients had similar complaints except for chest wall pain (Table IV). More than half (64.8%) of the study group patients felt no chest wall pain, while 53.5% of control group patients felt no pain ( $P < 0.05$ ). Daily life disturbances were considered to be related to surgical procedures. Daily life disturbance was felt slightly more often in control group

Table VI. Anxiety of Study Group Patients and Control Group Patients

	Study group		Control group	
	No.	(%)	No.	(%)
Total	122	100.0	226	100.0
Anxiety about recurrence				
None/slight	68	55.7	116	51.3
Moderately severe	45	36.9	91	40.3
Severe	8	6.6	15	6.6
Not stated	1	0.8	4	1.8
Reason for no anxiety				
Early detection	47	69.1	52	44.8**
Well informed	10	14.7	18	15.5
Optimistic character	9	13.2	34	29.3*
Not stated	2	2.9	12	10.3
Total	68		116	
Reconstruction of the breast				
Not desired	103	84.4	189	83.6
Desired	16	13.1	32	14.2
Received	1	0.8	0	0.0
Not stated	2	1.6	5	2.2
Periodic examination				
Receive actively	115	94.3	205	90.7
Afraid of recurrence	2	1.6	6	2.7
Don't wish to have body examined	1	0.8	0	0.0
Don't want to receive exam	1	0.8	5	2.2
Others	2	1.6	7	3.1
Not stated	1	0.8	3	1.3
Anxiety concerning				
Disease	78	63.9	136	60.2
Cosmetics	11	9.0	22	9.7
Relationship with husband	9	7.4	9	4.0
Children	28	23.0	44	19.5
Other family members	8	6.6	11	4.9
Friends	3	2.5	5	2.2
Work	15	12.3	29	12.8
Money	16	13.1	19	8.4
Sports, Interests	12	9.8	25	11.1
Others	7	5.7	10	4.4

\*:  $P < 0.05$ . \*\*:  $P < 0.01$ .

patients than in study group patients (Table V). For both groups, the most serious problems were that they could not lift heavy packages or go to the beach. Shoulder stiffness was less frequent in study group patients than in control group patients ( $P < 0.05$ ).

**Anxiety** Almost half of the patients in both groups felt no anxiety about recurrence because of the early detection, especially in the study group ( $P < 0.01$ ) (Table VI). An optimistic character was more common in control group patients than in study group patients. The major anxieties were the disease itself and patients' relationships with their children. Anxieties about cosmetics, work and sports were equal in the two groups.

**Psychosocial changes in daily life** Current employment status and the extent of social activity were considered to

Table VII. Psychosocial Changes in Daily Life of Study Group Patients and Control Group Patients

	Study group		Control group	
	No.	(%)	No.	(%)
Total	122	100.0	226	100.0
Occupation				
Housewife	63	51.6	104	46.0
Agriculture or forestry	9	7.4	6	2.7*
Fishery	0	0.0	1	0.4
Merchant	5	4.1	17	7.5
Full-time worker	16	13.1	39	17.3
Part-time worker	13	10.7	18	8.0
Others	8	6.6	16	7.1
Not stated	8	6.6	25	11.1
Employment				
Employed	2	1.6	7	3.1
No change	100	82.0	180	79.6
Left employment	14	11.5	25	11.1
Not stated	6	4.9	14	6.2
Housework				
Decrease	31	25.4	61	27.0
No change	81	66.4	154	68.1
Increase	6	4.9	7	3.1
Not stated	4	3.3	4	1.8
Relationship between patient and husband or family				
Better	22	18.0	35	15.5
No change	77	63.1	149	65.9
Worse	3	2.5	3	1.3
Not married	17	13.9	31	13.7
Not stated	3	2.5	8	3.5
Psychological change				
More stable	11	9.0	28	12.4
No change	88	72.1	151	66.8
More irritable	21	17.2	37	16.4
Not stated	2	1.6	10	4.4
Entertainment				
Participate actively	14	11.5	16	7.1
No change	79	64.8	165	73.0
Don't participate	25	20.5	34	15.0
Not stated	4	3.3	11	4.9
Sports				
Participate actively	10	8.2	8	3.5
No change	66	54.1	146	64.6
Don't participate	40	32.8	60	26.5
Not stated	6	4.9	12	5.3
Other interests				
Participate actively	13	10.7	24	10.6
No change	83	68.0	165	73.0
Don't participate	19	15.6	27	11.9
Not stated	7	5.7	10	4.4

\*:  $P < 0.05$ .

be important indices of quality of life (QOL) since the ability and motivation to hold a job and see friends were determined to some extent by the physical and psychological status of the individual. No overall difference in occupation was seen between the two groups (Table VII). Almost half of the patients were housewives.

Among formerly employed women, no significant difference in the proportion of the patients who had left their jobs was found. Although there was no significant difference between the two groups, 11.5% of the study group patients joined in entertainment actively, while 7.1% of the control group patients did so. The same relationship was observed in sports activities.

## DISCUSSION

Assessment of the QOL of patients with surgical treatment for breast cancer is difficult, because of the wide range of variables that make up QOL. Many authors have used the term without a precise definition. As parameters for assessing QOL, the following categories have been proposed<sup>7)</sup>: 1) symptoms of cancer and side effects of therapy, 2) physical activity (performance status), 3) psychological disability (depression, anxiety, etc.), 4) social relationships (of family or friends), 5) cosmetics and sexual function. There are many methods for assessing QOL: 1) Linear Analogue Self-Assessment (LASA) scale,<sup>8)</sup> 2) Functional Living Index-Cancer (FLIC) scale,<sup>9)</sup> 3) Rotterdam Symptom Checklist,<sup>10)</sup> 4) Hospital Anxiety and Depression (HAD) scale,<sup>11)</sup> 5) QL (Quality of Life) Index,<sup>12)</sup> 6) EORTC (European Organization for Research on Treatment of Cancer) method,<sup>13)</sup> etc. Although the LASA scale and the FLIC scale are linear analogue scales, in fact patients sometimes check the end of one side instead of marking on the line. It seems easier for patients to check a categorized scale.<sup>14)</sup> Thus we used the categorized questionnaire including a variety of variables to assess QOL.

The clinical stage of patients detected by mass screening was significantly earlier than that of out-patients. Therefore, a modified or conservative surgery was more frequently performed for patients detected by mass screening. However, does surgery alone yield a higher QOL? In the report by Maguire *et al.*,<sup>15)</sup> 39% of 75 patients with mastectomy had anxiety, depressive state and sexual problems, and this rate was significantly higher than the rate of patients with biopsy for benign diseases. Kemeny *et al.*<sup>16)</sup> suggested that conservative surgery for breast cancer was superior to mastectomy in almost all QOL items. Sanger and Reznikoff<sup>17)</sup> also reported that conservative surgery was superior to mastectomy in terms of body image.

Meanwhile, Craig *et al.*<sup>6)</sup> showed that the slight increase in disability among patients with breast cancer was related to surgical treatment, compared with population controls or neighborhood controls. However, conservative surgery for breast cancer is not yet common in Japan (Table III). Although the proportion of patients with an optimistic character was higher in the control group than that in the study group, the latter group of patients had

less anxiety about recurrence compared to the former (Table VI), because of the early detection of the disease. This mass screening system may contribute to the reduction of mortality rates and lead to a better QOL for breast cancer patients.

A gradual increase in repeat examinees has brought about a low rate of breast cancer detection in mass screening. Greater efforts must be made to educate people on mass screening and to detect early stage breast cancer for better QOL of patients.

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## ACKNOWLEDGMENTS

We are grateful to all the members of the Research Group on the Study of Mass Screening for Breast Cancer, for their advice and helpful discussions about this work. We also thank Prof. Yasuo Morishita for his revision of the manuscript. The present study was supported in part by Grants-in-Aid for Cancer Research (No. 62-34, No. 1-13) from the Ministry of Health and Welfare of Japan.

(Received October 2, 1992/Accepted January 19, 1993)