PERGAMON

European Journal of Cancer 37 (2001) 463–469

European Journal of Cancer

www.ejconline.com

Short- and long-term anxiety and depression in women recalled after breast cancer screening

C. Lampic [a,*], E. Thurfjell [b], J. Bergh [c,1], P.-O. Sjödén [a]

[a] *Department of Public Health and Caring Sciences, Section of Caring Sciences, Uppsala University, Uppsala University, Uppsala Science Park, S-751 83 Uppsala, Sweden*

[b] *Department of Oncology, Radiology and Clinical Immunology, Section of Radiology, Akademiska Hospital, 75185, Uppsala, Sweden*

[c] *Department of Oncology, Radiology and Clinical Immunology, Section of Oncology, Akademiska Hospital, 75185, Uppsala, Sweden*

Received 20 April 2000; received in revised form 8 September 2000; accepted 21 November 2000

Abstract

The aim was to investigate the psychological consequences of further investigation after breast cancer screening. Study participants include 509 women (61%) recalled due to suspicious findings on screening mammograms, and a matched control group of 285 women (68%) with normal mammograms. Psychological distress was prospectively assessed with the Hospital Anxiety and Depression Scale (HADS). 46% of the women reported borderline or clinically significant anxiety prior to the recall visit. A few days after the visit, anxiety and depression had decreased significantly ($P < 0.01$) in women informed about normal or benign results at the recall clinic, while reported distress remained at relatively high levels in women referred to surgical biopsy. The results demonstrate the adverse short-term effect of a delay in receiving false-positive results, but do not indicate that the recall experience results in long-term anxiety or depression for a majority of women.

Keywords: Breast neoplasms; Mass screening; Anxiety; Depression

1. Introduction

In parallel to the ongoing debate regarding the medical value of mammographic screening [1,2], the psychological consequences of participation in breast cancer screening have attracted increasing interest. There is no indication of increased anxiety in those women who receive normal results after a basic mammogram [3–7]. However, being recalled for further investigation has been reported to be a stressful experience for many women [3,5,8]. Further investigations of a suspicious screening result may vary considerably with regard to the nature and extent of performed medical examinations as well as the duration of the period before arriving at a clear result. However, only a few studies have investigated psychological consequences in subgroups of recalled women [9–11], and none of these concerns short-term effects on women's distress. Among recalled women with false-positive mammograms, general anxiety has been shown to subside within a few months after the recall visit [5,8], but some studies indicate prolonged adverse psychological consequences related to thoughts or feelings about breast cancer [3,9,11,12].

The overall aim of the present prospective study was to investigate the short- as well as long-term psychological consequences of being recalled for further examination following mammographic screening in a population-based cohort. The following specific research questions were posed: (1) How much anxiety and depression do women report in connection to a recall for further examination following mammographic screening? (2) What is the course of anxiety and depression over time in subgroups of recalled women? (3) Are there differences in anxiety and depression levels among recalled women depending on the medical examinations performed and the delay in receiving information of medical results? (4) Are there differences between women with normal versus false-positive screening mammograms

* Corresponding author. Tel.: +46-18-471-3492; fax: +46-18-471-3490.

E-mail address: claudia.lampic@ccs.uu.se (C. Lampic).

[1] Current address: Department of Oncology, Radiumhemmet, Karolinska Institute & Hospital, Stockholm, Sweden.

0959-8049/01/$ - see front matter
PII: S0959-8049(00)00426-3

with regard to anxiety and depression 3 and 12 months after screening participation?

2. Patients and methods

2.1. Subjects

All subjects were invited in connection with their participation in a population-based mammographic screening programme in Uppsala county, Sweden [13]. During the inclusion period (1996–1997), 80% of invited women participated in the screening. All participants were informed of their test results by mail, and 3.5% of women were recalled for further investigations. The recall visit occurred within approximately 2 weeks after screening. The flow of participants throughout the study is illustrated in Fig. 1. Descriptive data on participating subjects are shown in Table 1.

2.1.1. Recalled group

A total of 517 women agreed to participate and were asked to complete four questionnaires. There were no significant differences between participants and non-participants with regard to age, history of breast cancer, or previous recall after screening, or their own report at this screening of feeling a lump in their breasts or not (data not shown). In order to investigate possible anxiety differences between participants and non-participants, all women attending the recall clinic over 7 consecutive weeks ($N=100$) were asked to assess their anxiety level in the waiting room, using a numerical 0–10 anxiety scale [14,15]. Among the 95 women who agreed to do so, there was no significant difference in anxiety levels between those who agreed to participate in the present study (mean = 5.4, S.D. = 2.8, $n=63$) and non-participants (mean = 5.2, S.D. = 3.1, $n=32$) ($t(93)=0.23$; $P=0.82$).

Table 1
Descriptive characteristics of participants

Background variables	Recalled group ($n=509$)	Normal screening group ($n=285$)
Age		
Mean±S.D. (range)	54±9.3 (40–74)	56±10.2 (40–74)
Work	(%)	(%)
Work	60	56
Retired	27	34
Other (e.g. student)	13	10
Family		
Married/cohabitant	75	69
Have children	88	91
Have children ⩽18 years	31	26
Illness at inclusion		
History of breast cancer	2	1
History of other cancer	6	8
Illness other than cancer	29	31

Using the information in the medical files, participants were categorised into five groups (Fig. 1), based on performed medical examinations, received information at their recall visit and final screening outcome. All groups received complete mammographic examination with or without ultrasound. Two groups of women were excluded from analyses due to small numbers ($n=8$).

Participants' short-term reactions to the recall visit were assessed in the second questionnaire, which was completed within 4 days after the visit by most women (77%). Questionnaires completed more than 16 days after the visit ($n=15$) were excluded from analyses. In general, women in groups FNAB/CYTO, SURG/BEN and SURG/MAL did not have definitive results of their breast status at this assessment. However, 11 women in the FNAB/CYTO group completed this questionnaire after having received their cytological results, and data from these questionnaires were therefore excluded from analyses. At the 3- and 12-month assessments, all women had received information of normal, benign or malignant results.

2.1.2. Normal screening group

The 'normal' screening group included women who were not recalled after their mammographic screening. In order to investigate a separate research question (data to be reported elsewhere) we matched controls out of this group to each of the recalled women who were referred for surgical biopsy. In the total recalled group invited to the study ($n=838$, excluding those recalled by telephone), 139 women were surgical referrals. For every referred woman, we invited three women in the same five-year age segment who had participated in mammographic screening during the same month but with normal screening results ($n=417$; Fig. 1). Participants ($n=285$) and non-participants ($n=132$) did not differ significantly with regard to age or history of breast cancer (data not shown).

2.2. Procedure

2.2.1. Recalled group

Women recalled for further investigation received an invitation to the present study and the first questionnaire with their recall letter. This questionnaire was to be completed prior to the recall visit and returned by mail or to the mammography staff. Participating women completed three follow-up assessments. One was received at the mammographic work-up centre, to be completed shortly after the recall visit at home and returned by mail. Three and 12 months after the recall visit, all participants were mailed additional questionnaires, which were followed by a mailed reminder to non-responders 2 weeks later.

2.2.2. Normal screening group

This group was asked to complete two questionnaires, one 3 months and one 12 months after screening participation. The women were invited by a letter mailed with the first questionnaire, and they received their questionnaires and reminders at approximately the same points in time as their matched women in the recalled group. All questionnaires were to be completed at home and returned by mail.

All eligible women were informed about the study by an information letter that was mailed to them together with a questionnaire. This information letter abided by the requirements of the local research ethics committee, including information about the purpose of the study, how potential participants were selected, that participation was voluntary and could be terminated at any time. Women who completed and returned the first questionnaire were regarded as having given their 'informed consent' to participation in the study.

2.3. Instruments

2.3.1. The Hospital Anxiety and Depression Scale (HADS)

The HADS [16] comprises two subscales concerning anxiety (seven items) and depression (seven items), respectively. Subscale scores range from 0 to 21, and a cut-off point at score 8 or more has been recommended for identifying persons with potentially clinical anxiety or depression [16]. The HADS has been found to have sufficient reliability and validity for detecting anxiety and depression in somatically ill patients [17]. The time

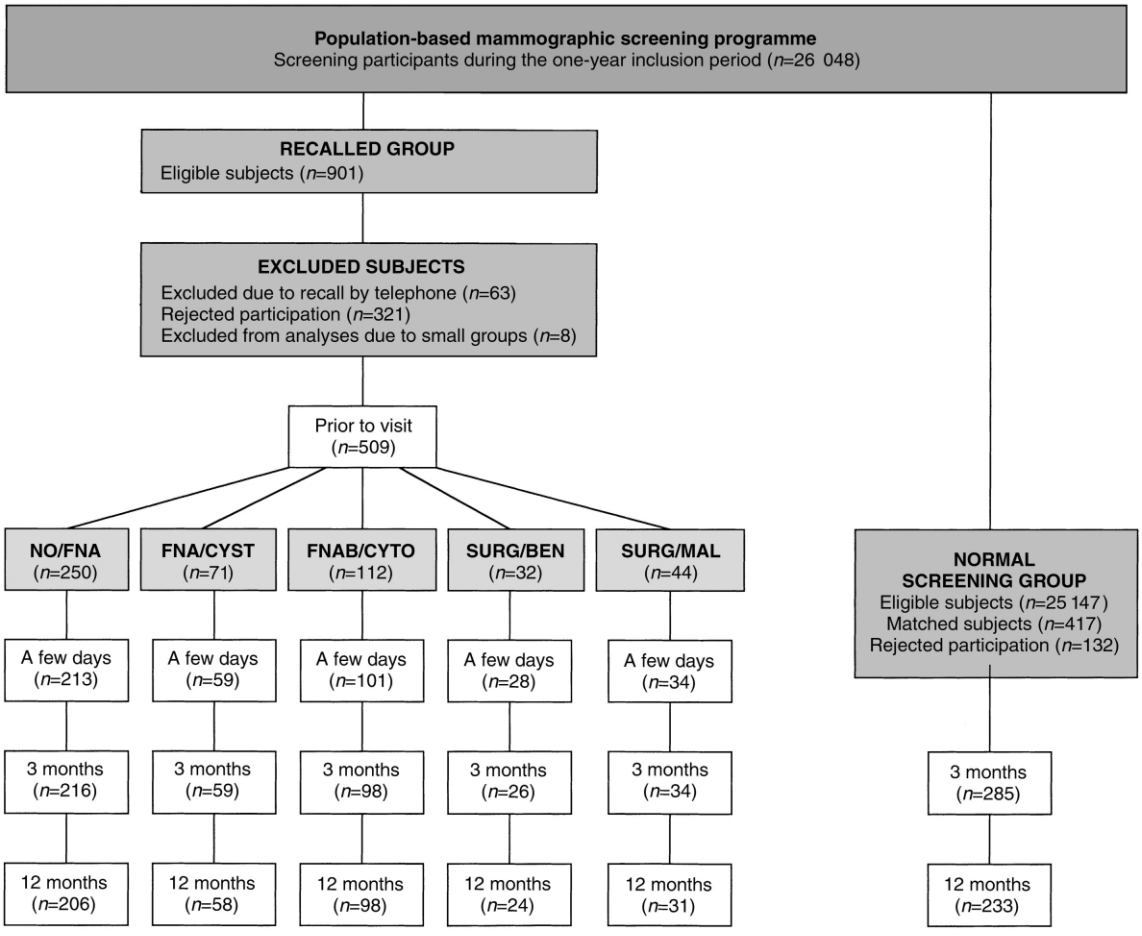

Fig. 1. Flowchart of study participants. 'NO/FNA', immediate information about normal results. No fine-needle aspiration (FNA). 'FNA/CYST', FNA of a cyst with or without pneumocystography, and immediate information about a benign diagnosis. No cytological examination. 'FNAB/CYTO', fine-needle aspiration biopsy (FNAB) of a lesion judged as probably benign at mammography, and immediate information about a probable benign diagnosis. After the mammography department received a non-malignant cytology report on the specimen, women were informed of the benign results in a mailed letter (approximately 1–2 weeks after the visit). 'SURG/BEN', examination with or without FNAB, immediate information about a possible or probable malignancy and referral to the surgical department for open biopsy. Information about benign results was given after biopsy, in a majority of cases (67%) within 6 weeks after the recall visit. 'SURG/MAL', medical examinations and information at the clinic as in group 'SURG/BEN', but information about malignancy after surgical biopsy, in most cases (82%) within 6 weeks after the recall visit.

window employed is 'during the last week'. In order to assess anxiety specifically connected to receiving the recall letter and attending the recall visit, the time windows in the first and second questionnaires were altered to 'since you received the recall letter' and 'since the recall visit'.

2.3.2. Demographic questionnaire

At inclusion, subjects were asked to report civil and occupational status, whether they had children, whether they were currently afflicted by any illness, and if they previously had been diagnosed with a cancer disease.

2.4. Medical data

Medical file data concerning women in the recalled and screening groups included age, dates for screening, recall and surgery, as well as results of examinations. Data on the results of further breast examinations and the occurrence of breast cancer were gathered throughout the data collection period. One woman in the normal screening group was diagnosed with breast cancer between the 3- and 12-month assessments and was therefore excluded from analyses regarding the latter assessment.

2.5. Statistical analysis

Comparisons of means were performed by unpaired, two-tailed *t*-tests. Factorial analyses of variance (ANOVA) were used for comparisons of three or more groups, and repeated measures ANOVAs for analyses involving repeated assessments. Due to unequal sample sizes, *post hoc* comparisons were performed with the Tukey HSD Unequal Sample Sizes-Spjotvoll-Stoline test. In all analyses, P values $\leqslant 0.01$ were regarded as statistically significant.

3. Results

3.1. Anxiety and depression prior to the recall visit

The anxiety level (mean = 7.7, S.D. = 4.5, $n = 501$) reported by the recalled group in the period (approximately 1 week) between receiving the recall letter and attending the recall visit was relatively high compared to anxiety (mean = 4.8, S.D. = 3.8) reported for a female sample of the general Swedish population [18]. Using the recommended cut-off score of 8 points or more [16], 46% of recalled women suffered probable clinical anxiety. Depression scores were lower than the anxiety mean scores (mean = 3.5, S.D. = 3.1, $n = 500$), and 11% achieved a level of probable clinical depression. There were no significant differences in anxiety or depression ratings between groups of women with respect to the following background variables: age ($\leqslant 52$ versus > 52), history of cancer disease, or of previous recall after screening, or self-report at this screening of feeling a lump in their breasts (data not shown).

3.2. Anxiety and depression in subgroups of recalled women

The following sections present results of two repeated measures ANOVAs including only ratings by women (70%) who completed HADS ratings at all four assessments. Potential bias due to systematic dropout was investigated in the following manner. First, comparisons were performed of responders and non-responders at the three follow-up assessments with respect to HADS scores at the previous assessments, yielding no significant differences. Second, factorial ANOVAs of data from all responders at each of the assessments yielded identical results regarding between-group differences except in one case; comparison of depression levels between groups FNA/CYST and SURG/MAL at the 3-month assessment did not reach statistical significance when all responders were included, and was therefore regarded as a nonsignificant finding (data not shown).

Repeated measures ANOVA showed that anxiety levels before the visit were significantly higher compared with those at subsequent assessments ($F(3,1041) = 29.23$, $P < 0.0001$), and that this effect was moderated by a significant interaction with the type of received examination and information ($F(12,1041) = 4.48$, $P < 0.0001$) (Fig. 2). Overall, depression levels differed significantly between groups FNA/CYST and SURG/MAL ($F(4,349) = 3.63$, $P = 0.007$), and there was a significant interaction with point of assessment ($F(12,1047) = 3.30$, $P = 0.0001$) (Fig. 3).

3.2.1. Within-group comparisons

In women who had received normal results at the clinic (NO/FNA) there was a significant decrease of anxiety (before: mean = 8.0, S.D. = 4.8; after: mean = 4.0, S.D. = 4.0; $P < 0.0001$) and depression (before: mean = 3.5, S.D. = 3.3; after: mean = 1.9, S.D. = 2.4; $P < 0.0001$) between assessments before and a few days (range: 0–15 days) after the recall visit. Between these points of assessments, women who received benign results at the clinic (FNA/CYST) also reported a significant decrease in anxiety (before: mean = 6.8, S.D. = 3.5; after: mean = 2.7, S.D. = 2.7; $P < 0.0001$) and depression (before: mean = 3.2, S.D. = 2.3; after: mean = 1.4, S.D. = 2.1; $P = 0.0040$) (Figs. 2 and 3). In addition, anxiety of women awaiting cytological results (FNAB/CYTO) decreased significantly between these points of assessment. (Before: m = 7.4, S.D. = 3.7; after: m = 5.5, S.D. = 4.2; $P = 0.0014$.) For women in group NO/FNA, there was a significant increase of anxiety and depression levels from a few days after the visit to the 3-month assess-

ment. Compared with ratings before the recall visit, all non-surgical groups reported significantly lower anxiety scores 3 and 12 months later.

3.2.2. Between-group comparisons

A few days after the visit, women awaiting cytological results (FNAB/CYTO) and women in group SURG/BEN reported significantly more anxiety than did women who had received immediate benign results following FNA (FNA/CYST). Also, the SURG/MAL group reported significantly more anxiety and depression than did women who had received immediate normal (NO/FNA) or benign (FNA/CYST) results at the clinic. Ratings by women in groups SURG/BEN and SURG/MAL were analysed separately, although the final medical diagnoses of these women were unknown at this assessment. No significant group differences with respect to anxiety or depression ratings were found at the 3- and 12-month assessments.

3.3. Anxiety and depression in the normal screening and 'false-positive' groups 3 and 12 months after screening

Due to a significant age difference between the normal screening (mean = 56, S.D. = 10.2) and the false-positive groups (mean = 53, S.D. = 9.2) ($t(747) = 3.95$, $P < 0.0001$), age was included as an independent variable in the ANOVAs. Participants were divided in subgroups using the mode of the age distribution (52 years) as a cut-off point.

There were no significant differences in anxiety scores reported by the normal screening (mean = 5.9, S.D. = 4.1) and false-positive (mean = 5.4, S.D. = 4.3) groups at the 3-month ($F(1,671) = 2.68$, $P = 0.10$) or 12-month assessments (normal: mean = 5.4, S.D. = 4.0; false-positive: mean = 5.7, S.D. = 4.2) ($F(1,610) = 0.15$, $P = 0.70$). Depression levels of false-positives were significantly lower (mean = 2.9, S.D. = 2.9) than that of normals (mean = 3.9, S.D. = 3.1) both at the 3-month ($F(1,674) = 16.17$, $P < 0.0001$) and the 12-month assessments (false-positive: mean = 3.1, S.D. = 2.9; normal: mean = 3.9, S.D. = 3.2) ($F(1,618) = 9.84$, $P = 0.0018$). Age had no significant main effect on anxiety or depression scores, and there were no significant interactions between group and age.

4. Discussion

The main findings are (a) a high prevalence of anxiety in women prior to the recall visit, (b) significant differ-

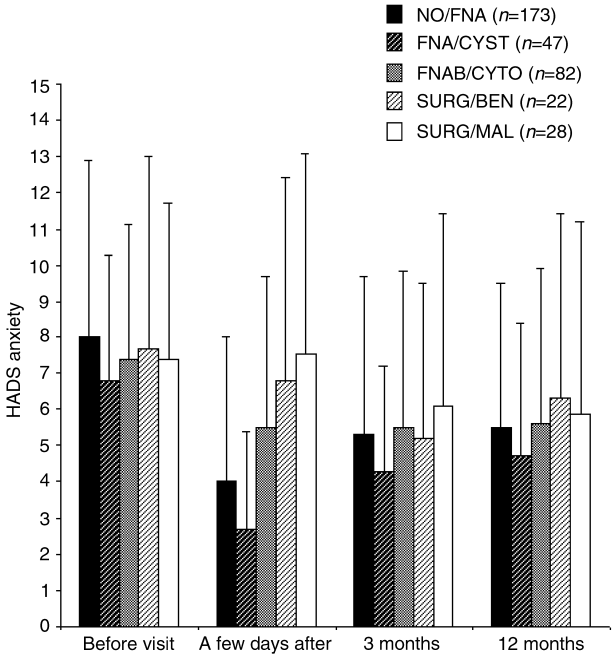

Fig. 2. Mean anxiety levels and standard deviations at different points in time related to recall for further breast examination: comparison of groups subjected to different medical examinations and with different outcome. Groups based on diagnostic outcome following the recall visit: immediate information about normal results (NO/FNA); fine-needle aspiration of a cyst and immediate information about a benign diagnosis (FNA/CYST); fine-needle aspiration biopsy of a lesion and immediate information about a probable benign diagnosis (FNAB/CYTO); immediate information about possible or probable malignancy and referral for open biopsy with benign (SURG/BEN) or

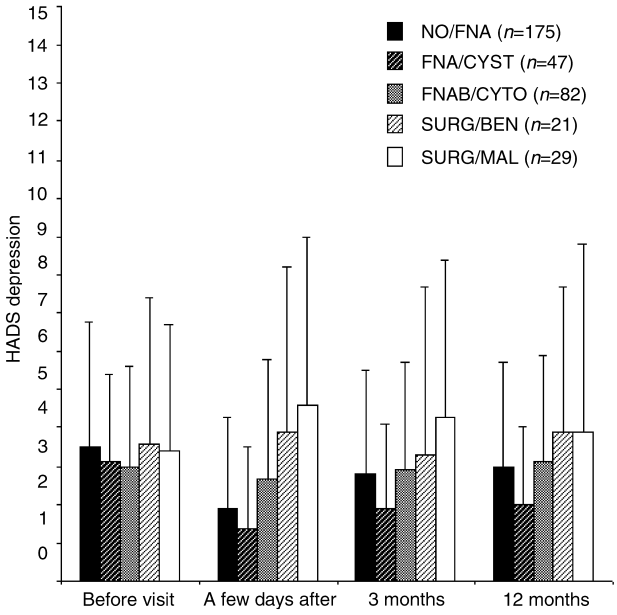

Fig. 3. Mean depression levels and standard deviations at different points in time related to recall for further breast examination: comparison of groups subjected to different medical examinations and with different outcome. Groups based on diagnostic outcome following the recall visit: immediate information about normal results (NO/FNA); fine-needle aspiration of a cyst and immediate information about a benign diagnosis (FNA/CYST); fine-needle aspiration biopsy of a lesion and immediate information about a probable benign diagnosis (FNAB/CYTO); immediate information about possible or probable malignancy and referral for open biopsy with benign (SURG/BEN) or malignant (SURG/MAL) results.

ences in short-term distress depending on the type(s) of examination and information received at the recall visit, and (c) no evidence of increased long-term distress in recalled women with false-positive mammograms.

The findings of borderline and clinically significant levels of anticipatory anxiety in nearly half of recalled women support recent results from the UK [8], and confirm that being recalled after mammographic screening is a stressful experience for many women. Findings by Austoker and Ong [19] indicate that careful phrasing of the recall letter and extensive information may reduce distress associated with the recall experience. Thus, although the recall letter used in the present study provided a number of practical as well as reassuring items of information, a revision may result in lower recall-induced distress. In addition, the present findings indicate the need for recall clinics to provide adequate support to very anxious women, e.g. by specialist breast care nurses.

Among those women who had received immediate normal results at the visit (NO/FNA), anxiety and depression scores decreased significantly from before to a few days after the visit, but had increased markedly at the 3-month assessment. One possible explanation of these findings is that the low distress levels soon after the recall visit represent a temporary 'relief effect' in this group. Although fine-needle techniques are regarded as quick, effective and low-cost alternatives to surgical procedures in the investigation of suspicious breast lesions, there has been a lack of research regarding the psychological aspects of these procedures [20]. The present results indicate that short-term anxiety in women examined with fine needle aspiration differed depending on the type of information received. Although women in the FNAB/CYTO group were informed about highly probable normal results, they reported significantly higher anxiety levels a few days after the visit than did women who received immediate benign results (FNA/CYST).

No significant group differences were found at later assessments, i.e. after all women had received information about non-malignant results. The present results also show that distress levels reported by women in the FNA/CYST group did not differ significantly from ratings by women examined by renewed mammography only (NO/FNA). This suggests that breast examination by FNA had no negative psychological effect provided benign results were given immediately.

The present finding of high distress levels a few days after the visit in women referred for surgical biopsy confirm earlier reports of distress prior to breast biopsy [21,22]. The somewhat higher distress rates reported by the SURG/MAL group compared with the SURG/BEN group are most likely due to differences in performed medical examinations and information received from the physician. For example, FNAB of a suspicious lesion was performed at the recall visit in a larger proportion of women in the SURG/MAL group (80%) than in the SURG/BEN group (44%).

Among the recalled women with false-positive mammograms, those examined by surgical biopsy (SURG/BEN) did not report higher levels of long-term distress than did the other groups. While these results support earlier findings among 'false-positive' women [10], other researchers have reported more difficulties attributed to thoughts and feelings about breast cancer in benign biopsy groups than in recalled women examined by complete mammography only [9,11]. Thus, although the present results do not indicate higher levels of long-term general anxiety or depression in false-positive women examined by surgical biopsy, this group may, to a higher degree, attribute experienced difficulties to thoughts about breast cancer.

Three and 12 months after screening participation, recalled women with false-positive mammograms did not differ from women with normal screening results with regard to anxiety, but reported significantly lower depression scores than did the latter group. These findings are contradictory to earlier results by Scaf-Klomp and colleagues [23], indicating lower HADS anxiety levels in normal screening than in false-positive women 2 months after screening and no group differences in HADS depression scores. These discrepant results are mainly due to higher distress scores (anxiety: mean = 5.9, S.D. = 4.1; depression: mean = 3.8, S.D. = 3.1) in the normal screening group of the present study than in the Dutch study (anxiety: mean = 2.9, S.D. = 2.8; depression: mean = 2.5, S.D. = 3.0) [23]. The fact that HADS mean scores for the normal group in the present study correspond well with those reported for a female sample of the general Swedish population (anxiety: mean = 4.8, S.D. = 3.8; depression: mean = 3.8, S.D. = 3.4) [18], support the validity of our findings and may indicate cultural differences in psychological distress. One possible explanation for our results of lower depression levels in the false-positive group than in the normal screening group is that the relief induced by receiving information about non-malignant results following a recall experience may have a long-term positive effect on women's psychological wellbeing. However, it should be noted that these findings are based on small differences in mean scores (between 2.9 and 3.9).

The relatively low response rate of the recalled group (509/838; 61%) is a threat to the external validity of our findings. In view of the stressful situation in which we invited these women to the study, our main concern was that a disproportionate number of anxious women would decline participation. This issue was investigated by asking 100 consecutive women attending the mammography unit to rate their anxiety in the waiting room (95 women agreed to do so). There was no significant difference in anxiety ratings between participants and

non-participants. In addition, participants' ratings of their anxiety in the waiting room were strongly correlated with their anxiety ratings (HADS) in the first questionnaire prior to the visit ($r = 0.78$). These findings suggest no systematic differences between anxiety levels of study participants and non-participants at inclusion.

In conclusion, the present results indicate that a recall for further investigation after mammographic screening is associated with considerable anticipatory anxiety in many women. While the recall experience does not appear to have adverse consequences in terms of long-term psychological distress for a majority of false-positive women, results indicate that this group would benefit from procedures and routines minimising the delay in receiving information of definitive results.

Acknowledgements

We want to express our thanks to all patients and controls for their participation, and to the staff at the Mammography Unit for their help with the data collection. This study was made possible by grants from the Vårdal Foundation and the Swedish Cancer Society.

References

1. Alexander F, Anderson T, Brown H, *et al*. 14 years of follow-up from the Edinburgh randomised trial of breast-cancer screening. *Lancet* 1999, **353**, 1903–1908.
2. Gøtzsche P, Olsen O. Is screening for breast cancer with mammography justifiable? *Lancet* 2000, **355**, 129–134.
3. Cockburn J, Staples M, Hurley S, Luise de T. Psychological consequences of screening mammography. *J Med Screen* 1994, **1**, 7–12.
4. Dean C, Roberts M, French K, Robinson S. Psychiatric morbidity after screening for breast cancer. *J Epidemiol Comm Health* 1986, **40**, 71–75.
5. Ellman R, Angeli N, Christians A, Moss S, Chamberlain J, Maguire P. Psychiatric morbidity associated with screening for breast cancer. *Br J Cancer* 1989, **60**, 781–784.
6. Sutton S, Saidi G, Bickler G, Hunter J. Does routine screening for breast cancer raise anxiety? Results from a three wave prospective study in England. *J Epidemiol Comm Health* 1995, **49**, 413–418.
7. Walker L, Cordiner C, Gilbert F, *et al*. How distressing is attendance for routine breast screening? *Psycho-Oncology* 1994, **3**, 299–304.
8. Gilbert F, Cordiner C, Affleck I, Hood D, Mathieson D, Walker L. Breast screening: the psychological sequelae of false-positive recall in women with and without a family history of breast cancer. *Eur J Cancer* 1998, **34**, 2010–2014.
9. Brett J, Austoker J, Ong G. Do women who undergo further investigation for breast screening suffer adverse psychological consequences? A multi-centre follow-up study comparing different breast screening result groups five months after their last breast screening appointment. *J Publ Health Med* 1998, **20**, 396–403.
10. Bull A, Campbell M. Assessment of the psychological impact of a breast screening programme. *Br J Radiol* 1991, **64**, 510–515.
11. Ong G, Austoker J, Brett J. Breast screening: adverse psychological consequences one month after placing women on early recall because of a diagnostic uncertainty. A multicentre study. *J Med Screen* 1997, **4**, 158–168.
12. Olsson P, Armelius K, Nordahl G, Lenner P, Westman G. Women with false-positive screening mammograms: how do they cope? *J Med Screen* 1999, **6**, 89–93.
13. Thurfjell E, Lindgren A. Breast cancer survival rates with mammographic screening. Similar favorable survival rates for women younger and those older than 50 years. *Radiology* 1996, **201**, 421–426.
14. Lampic C, Wennberg A, Schill J-E, Brodin O, Glimelius B, Sjödén P-O. Anxiety and cancer-related worry of cancer patients at routine follow-up visits. *Acta Oncol* 1994, **33**, 119–125.
15. Lampic C, Nordin K, Sjödén P-O. Agreement between cancer patients and their physicians in the assessment of patient anxiety at follow-up visits. *Psycho-Oncology* 1995, **4**, 301–310.
16. Zigmond A, Snaith R. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand* 1983, **67**, 361–370.
17. Hernnann C. International experiences with the Hospital Anxiety and Depression Scale — a review of validation data and clinical results. *J Psychosom Res* 1997, **42**, 17–41.
18. Lisspers J, Nygren A, Söderman E. Hospital Anxiety and Depression Scale (HAD): some psychometric data for a Swedish sample. *Acta Psychiatr Scand* 1997, **96**, 281–286.
19. Austoker J, Ong G. Written information needs of women who are recalled for further investigation of breast screening: results of a multicentre study. *J Med Screen* 1994, **1**, 238–244.
20. Poole K. The emergence of the 'waiting game': a critical examination of the psychosocial issues in diagnosing breast cancer. *J Adv Nurs* 1997, **25**, 273–281.
21. Northouse L, Jeffs M, Cracchiolo-Caraway A, Lampman L, Dorris G. Emotional distress reported by women and husbands prior to a breast biopsy. *Nurs Res* 1995, **44**, 196–201.
22. Scott D. Anxiety, critical thinking and information processing during and after breast biopsy. *Nurs Res* 1983, **32**, 24–28.
23. Scaf-Klomp W, Sanderman R, van de Wiel H, Otter R, van den Heuvel W. Distressed or relieved? Psychological side effects of breast cancer screening in the Netherlands. *J Epidemiol Comm Health* 1997, **51**, 705–710.