Abstract. Background: Wirsching et al. introduced a psychosocial risk scale (PRS) for psychological identification of breast cancer patients before biopsy and found that women with cancer had a tendency to create bigger drawings than the women with a benign tumour. To our knowledge, the associations between body image drawing analysis and the risk of breast cancer have rarely been considered together in a prospective study. Patients and Methods: This study is an extension of the Kuopio Breast Cancer Study. Women with breast symptoms were referred by physicians to the Kuopio University Hospital (Finland) and were asked to participate in this study. These women (n=115) were interviewed, and all study variables were obtained before any diagnostic procedures were carried out, so neither the investigator nor the participants knew the final diagnosis of breast symptoms at the time of the interview. The research method used was the semistructured in-depth interview method. The investigator used the Montgomery-Åsberg depression rating scale (MADRS) to evaluate the depression of the study participants. All participants were also asked to complete standardized questionnaires (Beck depression inventory and Spielberger trait inventory). The overall content of the body image drawing was estimated using a 3-point scale: symbolistic, partly symbolistic, or humanlike. Two raters scored the body image drawings independently and the final scores were formed by comparing the separate scores of the two raters. The raters evaluated the difficulty of giving a score on a 5-point scale during scoring. Results: The clinical examination and biopsy showed breast cancer (BC) in 34 patients, benign breast disease (BBD) in 53 patients, and 28 individuals were shown to be healthy (HSS). The results indicated that breast cancer patients tended to make a body image drawing of a bigger size, and to draw a less positive body image than did those in the BBD and HSS groups. The BC group also made a less differentiated and less complete body image drawing in the area of the breast than did those in the other groups. Conclusion: The results of this study support a weak association between the size of the body image drawing and breast cancer risk. However, the biological explanation for such an association is unclear and the exact effects of psychological factors on the various hormones relevant to the development of breast cancer are present poorly defined.

The lifetime risk of breast cancer for a girl born today is double that of one born 50 years ago. Hormonal factors such as early age at menarche, later age at menopause, later age at first full term pregnancy and hormone replacement therapy are known to be the main risk factors for sporadic breast cancer (1). In addition, life-style factors, such as obesity, smoking, alcohol consumption and lack of physical activity, appear to contribute to the increased risk for this malignancy, although the results concerning these life-style factors are inconsistent (1-7). Psychological factors, such as stressful and adverse life events, are widely thought to play a role in the aetiology of breast cancer (8-13). Many case-control studies have also investigated the relationship between anxiety, depression, the history of psychiatric symptoms and the risk of breast cancer in relation to suppression of emotions and anger in particular (14-21). We have prospectively investigated breast cancer risk in relation to anxiety, coping and defending, depression, idealization, the history of psychiatric symptoms and stressful and adverse life experiences among patients with breast disease in the Kuopio Breast Cancer Study (22-26). The results of our study support an overall association between stressful life events, coping and defending, and breast cancer risk.

Wirsching et al. introduced the psychosocial risk scale (PRS) for psychological identification of breast cancer patients before biopsy and noticed that the women with breast cancer had a tendency to create bigger drawings than
the women with a benign tumour (15, 27). To our knowledge, the association between body image drawing analysis and the risk of breast cancer has rarely been considered together, and therefore we carried out a prospective study to examine the role of body image drawing analysis in women with breast symptoms referred by physicians to the Kuopio University Hospital (Finland).

Patients and Methods

The Kuopio Breast Cancer Study is a multidisciplinary cooperative project conducted by different departments of the University of Kuopio and Kuopio University Hospital. The participants of the project included all women who were referred to the Kuopio University Hospital (North-Savo Health Care District) for breast examination between April 1990 and December 1995. The Kuopio Breast Cancer Study follows the protocol of the International Collaborative Study of Breast and Colorectal Cancer coordinated by the European Institute of Oncology in Milan, and was initiated as a SEARCH program of the International Agency for Research on Cancer. The collaborative study is based on the assumption that breast cancer and colorectal cancer may have common risk factors. Study centers for the breast cancer study are situated in Canada, Finland, Greece, Ireland, Italy, Russia, Slovakia, Spain and Switzerland (28). The participants of the Kuopio Breast Cancer Study consisted of individuals showing breast cancer symptoms (a lump in the breast or in the axilla, pain in the breast, bleeding from the nipple, nipple discharge and skin dimpling), or an abnormality of the breast detected during outpatient consultations for women referred to the Surgical Outpatient Department at the Kuopio University Hospital, Finland. There had been no pre-selection of the study participants and the indications for referral in this study are in line with our previous results by a Breast Cancer Diagnostic Unit in Finland (29). We maintain that our study sample can be considered clinically representative for this type of prospective case-control study design.

This case-control study is an extension of Kuopio Breast Cancer Study (30-31). The study was approved by the Joint Committee of the University of Kuopio and Kuopio University Hospital. Participation was based on written consent. Women with breast symptoms or a suspicious breast lump had been referred by physicians to the Kuopio University Hospital (Finland) during the study period from January 1991 to June 1992. Women were asked to participate in the study and were interviewed by a psychiatrist (P.O.) before any diagnostic procedures (clinical examination and biopsy), so neither the interviewer nor the patient knew the diagnosis at the time of the interview. The interviews were tape recorded (P.O.), and the ratings were completed before the final diagnosis. Of the 115 patients who participated the clinical examination, mammography and biopsy showed breast cancer (BC) in 34 (29.6%), benign breast disease (BBD) in 53 (46.1%) and healthy breasts (HSS) 28 (23.4%) (Table I). The rated case record included the lost events from childhood (under three years of age and 4-12 years of age), adulthood and the last 10 years prior to the investigation.

Assessment of life events and stress. The method was a semistructured in-depth interview. At the beginning of the interview, the patients drew their ‘life lines’ and a line describing being a woman, which supported the interview. In ‘the draw a line of your life’ the patient was asked to draw positive life experiences (‘good times’) with lines pointing upwards and negative life experiences (‘hard times’) with lines pointing downwards. Adverse and stressful life events were evaluated over the whole lifespan, with particular reference to the previous 10 years before admission. The adverse or stressful life events and the context surrounding them was marked on the ‘life line paper’ during the interview. After the interview were rated (by P.O) the life events according to the degree of threat or stress they were likely to pose, and each adverse or stressful life event was graded on a 5-point scale, grade I (one point) indicating non-threatening event and grade V (5 points) a severely threatening event. The used defences were also assessed on a 5-point scale: grade I (one point) indicating very defensive, in denial and grade V (5 points) non-defensive. The ‘Working through and actively confronting the stressful event’ variable was also rated on a 5-point scale: grade I (one point) indicating not resolved and grade V (5 points) fully resolved. These measurements were put together in the final statement, 1 to 2 points on the scale means little or mild loss or stress, and 5 means severe loss or stress.

Assessment of idealization. The characteristics of the idealization of childhood and adolescence, of womanhood and motherhood, of own children, spouse and parity, and the idealization of present life-situation and of life in general in the BC, BBD and HSS groups were estimated using the 3-point scale: grade I, no idealization; grade II, mild/moderate idealization; grade III, severe idealization.

Coping and defence strategies. A modified Haan coping and defence inventory (32) was used. This inventory is divided into ten scales, and each scale has sub-scales from grade 0 to grade 3: with 0 meaning no definition, 1=coping, 2=defending and 3=fragmentation. In addition, the researchers estimated each patient’s ability to cope (scale 1 to 5), the degree of defensiveness (scale 1 to 5), and fragmentation (scale 1 to 5).

Beck depression inventory (BDI). The women completed the BDI (33, 34) with 21 variables. The investigator used the modified inventory divided into three grades: grade I (score 0-13), no depression; grade II (score 14-24), moderate depression; grade III (score over 24), severe depression.

Spielberger trait inventory. All study participants completed the Spielberger trait inventory (35). Trait anxiety was assessed using the subscale from the Inventory, and the 10 items refer to how a person generally feels, with a higher total score reflecting a higher anxiety trait (20-80 range). The investigator rated the test as follows: grade I (score 20-29), seldom anxious; grade II (score 30-49), sometimes anxious; grade III (score 50-69), often anxious; grade IV (score 70-80), always anxious.

Montgomery Åsberg Depression Rating Scale (MADRS). The MADRS with 10 variables (scores from 0 to 6) was used to evaluate the depression of the study participants (36), and the test was rated as follows: grade I (scores 0-6), no depression; grade II (score 7-19), mild depression; grade III (score 20-34), moderate depression; and grade IV (score 35-60), severe depression.

Assessment of psychosocial risk using Wirsching PRS. The Wirsching classification introduces 12 variables which measure personality and psychosocial stress. We used a modified Wirsching PRS for psychosocial risk assessment (15, 27) with 12 scales, each scale has
The body image category. Human likeness of the drawing was evaluated by comparing it to the human body, so that the more realistic the drawing, the higher it scored in this category.

Integration of the body parts was evaluated from the synthesis of the body parts and the wholeness of the human figure. Integrative parts of the body, such as the throat, the shoulders, the waist, the hips and the joints were taken into consideration here.

Differentiation of the human figure was evaluated from the point of view of how clearly it could be seen what was portrayed in every part of the drawing. How clearly and realistic the parts and the outline of the body and the clothes were drawn was essential.

The boundary line referring to the outline of the human figure was evaluated by two variables: penetrability and impenetrability (the continuity of the line).

The nudity and clothing category was evaluated as indefinite when it was impossible to describe the human figure as being nude or clothed.

The completion of drawing in the pelvic and pubic areas evaluated the degree of specification and finishing in these areas. The detailedness, symmetry and completion of the breast area were evaluated using separate rating scales. Ways to express femininity were evaluated by two separate rating scales: i) general appearance, clothes, hair, jewellery; ii) the shape of the female body. The obviousness of the sex of the drawing was evaluated according to how clearly the figure represented a male or a female. The human figure was feminine when the drawing displayed roundness, sensitivity and maturity. In the evaluation of sexuality the same aspects were considered, emphasizing sensuality. The human figure was evaluated as motherly when the clothing was stereotypically womanly and there was a general feeling of tenderness and empathy. The impression of masculinity arose from strength, angularity and plainness. Realistic, cheerful and brightly coloured drawings were considered positive, while bizarre, cheerless and darkly coloured drawings were considered negative. The impression of the age of the drawn human figure and the drawer were evaluated on separate rating scales.

The depression category. The drawing was evaluated as depressive if it had features such as dark and faded colours, disintegration,
emptiness, lack of motivation and detail, if it was incomplete and undifferentiated. The emptiness of the body image drawing was evaluated so in contrast to features giving the impression of vitality. The impression of sorrow rose from withdrawn expressions and gestures, faintness of lines and colours. Detail and omissions were scored separately concerning the arms, the face, the hands, the heads and the legs. Motivation was evaluated from the extent of drawing and the completion of the drawing.

The anxiety category. The drawing was rated as expressing anxiety if the lines were heavily pressed and slowly drawn, and if there was a lot of redoing and shading. Impression of aggression rose from hostile expressions and gestures and violent lines. The line characteristics evaluated were the pressure and the continuity of the line, evaluated on a 3-point scale. The pressure of the line in the breast area was evaluated separately. Liveliness of the line arose from the motion of the pencil, so that the line was rated as lively if it got thinner towards the end. Redoing was evaluated on a 3-point scale on the basis of sketching and drawing again in order to improve or change. Redoing was also scored separately in different body areas. The darkened, coloured parts of the drawing were evaluated as shading on a 2-point scale. Shading was also scored separately in different body areas.

The colour category. The colours in the body image drawing analysis were divided into three categories. The division of the colours was made according to the primary colours, yellow and blue, according to which colour was used for the drawing. The third category included colours which cannot be categorized according to this principle, for example brown and black.

The assessment of the difficulty of scoring and the evaluation of the interrater agreement. The body image drawings were scored independently by two raters (37), who were not aware of the diagnosis nor of the grouping of the body image drawings. The scoring of body image drawings is a difficult task and this was studied in two ways. Firstly, the raters evaluated the difficulty of giving a score on a 5-point scale during scoring. The rating varied from 1 (very difficult) to 5 (very easy). Secondly, the body image drawing scores of the two raters were compared with each other and the interrater agreements of the scores, as the difference between the scores, were calculated. Finally, the means of the raters’ difficulty values were compared with the interrater agreements.

Statistical analysis. Significance of the results was calculated with SPSS/PC statistical package (SPSS Inc., Chigaco, IL, USA). Correlations and differences between the study groups (BC, BBD and HSS groups) were measured with the two-sided Chi-square test and non-parametric Kruskal-Wallis variance analyses. Results were considered statistically significant at a p-value <0.05. Associations between the major study variables and breast cancer risk were analysed by unconditional logistic regression to estimate risk ratios (RRs) and 95% confidence intervals (CI).

Results

The mean age of the BC patients was 51.5 years. The corresponding figures for the patients with BBD were 47.5 years and for the HSS group 45.7 years. Although the patients in the BC group were older than those in the BBD or HSS groups, the age difference was not statistically significant (p=0.12). The majority of the patients (85/115, 74%) were married or living in a steady relationship. Almost half of the women (41.7%) had graduated from primary school, and 25% had a college education. By profession, the patients represented industrial and service employees (25.2%), office employees (10.4%), health care employees (8.7%), and farmers (8.7%), and almost 23.5% were retired. The combined mean gross income of both spouses in the patients with BC was 36,100€ per year. The corresponding figures for the patients with BBD were 27,714€ per year. The patients with BC were significantly (p=0.03) wealthier than the patients with BBD and HSS, as estimated by the combined gross income of the both spouses. The groups differed only slightly from each other as to reproductive factors (Table I).

Psychological self-report questionnaires (BDI and STI) and MADRS. The mean BDI score (SD) of the BC group was 8.4 (6.9) and 8.8 (7.4) and 7.1 (7.3) (p=0.5) for the BBD and HSS groups, respectively. The mean MADRS score (SD) of the BC group was slightly higher at 11.4 (9.2) than that of the BBD group, at 10.7 (9.2) and the HSS group, at 8.4 (9.7) (p=0.23). The mean (SD) STI differed only slightly between the BC group, at 40.1 (8.6), the BBD group, at 41.5 (7.2) and the HSS group, at 39.1 (6.4) (p=0.20).

The characteristics of Wirsching’s PRS. The characteristics of the PRS in the BC, BBD and HSS groups were categorized according to Wirsching’s classification. The mean sums of the scores of PRS functions were significantly higher in the BC group than in the BBD or HSS groups. However, the mean scores for the PRS for HSS, for BBD and for BC groups differed only slightly when the PRS functions were considered separately. The BC group used more suppression of feelings, optimism, self-sufficiency, rationalizing attitude, remoteness, harmonizing behaviour and altruism than the BBD and HSS groups according to Wirsching’s classification.

The interrater disagreement of the body image drawing variables. The interrater disagreement of the body image drawing variables in the BC, BBD and HSS groups was defined as the difference between the scores given by the two raters. If there was no disagreement in scores given by the two raters, as both raters had given the same assessment, the extent of disagreement was scored as 0 and disagreement ranged from score 0 (no disagreement) to score 4 (disagreement for all variables; maximum disagreement). The two raters fully agreed for 70.6% of variables, score 0; and the interrater agreement of the body image drawing variables was score 0: 70.6%; score 1: 20.9%; score 2: 4.5%; score 3: 2.3%; and score 4: 1.8%.

Table II shows each of the body image drawing variables separately: the extent of the agreement of the body image
drawing variables in percentages, and the mean and the standard deviation of the raters' estimated difficulty of rating. The high mutual agreement of rating of the body image drawing variables with the ease of the assessment and a correlation between these indicate the ability to recognize which body image drawings were difficult or easy to score. Variables of this kind were e.g. overall content and nudity. Low mutual agreement of rating of the body image drawing variables with ease of the assessment, and a correlation between these, indicate raters systematically gave different scores. A variable of this kind was e.g. the shape of the body.

The descriptive aspects of the body image drawings. The body image drawings were mostly placed in the middle of the paper and the human figure was mostly drawn from the front. The general impression was that the drawings were quite primitive and the human figures drawn were characteristically undifferentiated and lacking in detail, 69.2% of the women did not draw breasts or drew only a hint of breasts. Over half (57.7%) of the human figures drawn by the study participants gave the impression of being younger than adult.

The body image variables. The instructions for drawing “the image of your own body” permitted the drawing of an image of any kind, but most women drew the whole human figure. The HSS, BBD and BC groups did not differ to any a statistically significant degree in respect to drawing or not drawing, nor in respect to the overall content of the drawing. Six women refused to draw, and six women also drew a symbolistic drawing e.g. a circle, a rose, a tree, and nine women drew drawings involving a symbol e.g. a bag, a flower, words (Table III).

The patients with breast cancer tended to make a body image drawing of a bigger size ($p=0.083$), and to draw a less positive body ($p=0.069$), and less differentiated body image ($p=0.056$) than women in the BBD and HSS groups. The BC group also made a less complete body image drawing in the
pelvic and pubic areas ($p=0.099$) and in the area of the breast ($p=0.073$) than individuals of the BBS and HSS groups. The patients in the BC group also tended to depict the sex of the body image drawing less obviously than women of the BBD and HSS groups ($p=0.097$). In the clothing variable, the lowest score for clothing was given when it was not possible to determine whether there were clothes or not. There was a trend for the women with breast cancer to draw more incomplete and more indistinct clothing ($p=0.073$) than women in the BBD and HSS groups.

**Discussion**

The important bias related to case-control studies is recall bias, which occurs, for example, if cases report their life experiences differently from controls. This may happen because they have often thought about their previous experiences in order to find causes for their breast cancer. To avoid recall bias, we conducted this case-control study with a so-called ‘limited prospective study design’: women were asked to participate in the study, were interviewed, and reports on psychological factors and body image drawings were obtained before any diagnostic procedures, so neither the investigator nor the participants knew the diagnosis at the time of interview. However, the patients were encountered in an extremely stressful situation before the diagnosis. It can be assumed that on the basis of clinical impressions, some of the patients had already been given more or less clear hints by their doctors on their expected diagnosis. One potential bias comes from age being a confounding factor, and some studies have been criticized on such methodological grounds as having limited controlling for age (38). In our study, the BC group was 4.0 years and 5.9 years older than the BBD group and the HSS group, respectively. However, no statistically significant age difference between these groups was found ($p=0.12$). The participants of our study consisted of individuals showing breast cancer symptoms (a lump in the breast or in the axilla, pain in the breast, bleeding from the nipple, nipple discharge and skin dimpling), or an abnormality of the breast detected during outpatient consultations referred to the Surgical Outpatient Department at the Kuopio University Hospital, Finland. There had been no pre-selection and the indications for referral in this study are in line with our previous results in a Breast Cancer Diagnostic Unit in Finland (29). We maintain that our study sample can be considered clinically representative for this type of prospective case-control study design. It should be noted that the control group (healthy individuals) of our study is not representative of the whole population, since it consists of women who presented primarily with breast symptoms.

The study sample can be considered clinically representative of this type of prospective case-control study design if the variables characterized by the investigator and these characterized by the participants correlate. In our study, the variables reported by the investigator, the ‘MADRS’ and ‘depression’ variable correlated with high significance ($p$-value <0.001) with those variables reported by the study participants, BDI, A-trait, Forsen score 0-2 years and Forsen score 2.6 years. The ‘anxiety’ variable characterized by the investigator correlated with the A-trait and Forsen score 0-2 years variable reported by the study participants ($p$-value <0.05).

Our results shown in this study are in line with those of Stentella et al. (39), who also made the observation that women with breast cancer draw the sex of human figures indifferently. This could indicate difficulty in facing the emotions associated with sexuality or sexual area. What was defined as a negative attitude toward sexuality in Wirsching et al. (15) for women with breast cancer may also have been a manifestation of the difficulty of facing sexual emotions and sexuality. Todarello et al. (40) also noticed that women with breast cancer have difficulty in verbalizing emotions and expressing emotions. These alexithymic traits could be the basis for the lack of differentiation of the body image.

Many investigators (41, 42) have shown that the large body image drawing is related to good self-esteem and high level of energy. The large size of the body image drawing may also reflect fantasy self-inflation (41). In other words, the large size could also reveal a defensive style. The fact that the women

**Table III.** The overall content of the body image drawings for healthy study participants (HSS), patients with breast disease (BBD) and for patients with breast cancer (BC).

<table>
<thead>
<tr>
<th>Overall content</th>
<th>HSS</th>
<th>BBD</th>
<th>BC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>No drawing</td>
<td>3</td>
<td>(8.3)</td>
<td>1</td>
<td>(2.2)</td>
</tr>
<tr>
<td>Symbol</td>
<td>2</td>
<td>(5.6)</td>
<td>4</td>
<td>(8.9)</td>
</tr>
<tr>
<td>Human figure with symbol</td>
<td>1</td>
<td>(2.8)</td>
<td>5</td>
<td>(11.1)</td>
</tr>
<tr>
<td>Human figure</td>
<td>30</td>
<td>(83.3)</td>
<td>35</td>
<td>(77.8)</td>
</tr>
</tbody>
</table>
with breast cancer had a tendency to draw larger body image drawings than women of the BBD and HSS groups, may be an indication of defensive self-esteem and compensatory action. The latter phenomenon has been discovered to be characteristic of women with breast cancer (27, 43).

In summary, our findings of a weak relationship between an undifferentiated body image and a big size of the body image drawing and breast cancer risk are in line with the findings Wirsching et al. (15, 27), who specifically investigated the defensive self-esteem of breast cancer patients before biopsy.

**Conclusion**

The results of this study support there being a weak association between a less differentiated body image and a large body image drawing for women with breast cancer than those in the BBD and HSS groups. However, the biological explanation for the association is unclear and it might be that psychological factors impact indirectly on breast cancer risk by affecting behaviours such as diet or sleep, or, directly on neuroimmunological or hormonal systems.

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**References**


