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# Assessment of the efficacy of footbaths as a means of improving the mental health of nurses: a preliminary report

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Key words : 1. chromogranin A 2. footbath 3. stress

*Objective:* There are few studies that have subjectively and objectively verified the efficacy of footbaths as a means of relieving stress. The purpose of the present study was to validate the stress-reducing efficacy of footbaths both subjectively and objectively by means of a stress indicator, chromogranin A (CgA).

*Methods:* The subjects were 21 female nurses working at a general hospital. After evaluating their current mental and physical condition, and measuring their salivary CgA levels, the subjects took a 10-min footbath. After the bath their mental and physical condition was evaluated again, and their salivary CgA levels were measured again. The changes in their mental and physical state before and after the footbath were assessed by the Wilcoxon signed-rank test. CgA levels taken before and after the footbath were assessed by the paired *t*-test.

*Results:* The results showed that both their subjective mental and physical condition improved and their CgA levels were lower after the footbath than before.

*Conclusions:* These results suggested that footbaths can exert a restorative effect on the stress associated with the performance of nursing duties and are effective in relieving nurses' stress.

## Introduction

Nursing work is said to involve greater job stress than other occupations<sup>1)</sup>, and for that reason there have been many studies examining nurses' stress management<sup>2-7)</sup>. Relaxation methods are one form of stress management. A variety of relaxation methods are available, e.g., listening to music or massage<sup>8)</sup>. In the present study we turned our attention to footbaths, which are familiar as a nursing activity. Footbaths require no special facilities and are more convenient than showers or taking a bath, and, unlike massage, they do not require any special skills. Some previous studies showed that footbaths produced (1) significant changes in the autonomic responses, indicating a shift to increased parasympathetic and decreased sympathetic activity and (2) significant increases in the white blood cell (WBC) count and natural killer (NK) cell cyto-

toxicity, suggesting an improved immune status<sup>9,10)</sup>. However, few studies have focused on footbaths as a relaxation method for nurses' stress management, and although there have been subjective evaluations by means of questionnaires to assess the efficacy of footbaths, few evaluations have used objective indicators<sup>11,12)</sup>.

Chromogranin A (CgA) is a protein secreted by the chromaffin cells of the adrenal medulla and by sympathetic neurons<sup>13)</sup>. It is present in endocrine organs and sympathetic neurons, where it is stored along with catecholamines, and they are secreted together in response to sympathetic nervous system stimulation<sup>14)</sup>. CgA is present in salivary glands and released into saliva in response to stimulation of the autonomic nervous system<sup>15-17)</sup>. According to a report of a study in which salivary concentrations of CgA, catecholamines, and cortisol were measured in association with stress

・看護職者のメンタルヘルス向上を目指した足浴の効果に関する予備的検討

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loading, when subjects were exposed to a stress load, the CgA level rose before the cortisol level, whereas during exercise stress loading the catecholamine levels increased dramatically, but there were no marked changes in the CgA level<sup>18)</sup>. The testing method is characterized by the advantages of requiring collection of saliva alone and enabling measurements to be made painlessly. Salivary CgA levels react specifically to stress. They rise even when exposed to only minor stress, and they rapidly decline at the conclusion of the stress<sup>19)</sup>. The major advantage of the use of salivary CgA, therefore, is that the sampling is non-invasive and can be performed in non-stressful conditions. Furthermore, CgA is secreted immediately after stress without the influence of circadian rhythm<sup>20)</sup>.

The aim of this preliminary study was, subjectively and objectively and based on salivary CgA levels, to verify the efficacy of footbaths as a means of relieving the stress of nurses. If the efficacy of footbaths were demonstrated in this study, footbaths could possibly be used as a coping strategy to relieve stress and to contribute to improving the mental health of nurses.

## Method

After obtaining the approval of the Institutional Review Board of the institution, the purpose, content, etc., of the study were explained to the candidates in a document requesting cooperation with the study. The study was conducted only on candidates who had given their written consent to participate.

The participants were 21 female nurses, with a mean age of 29.2 years (22 to 47 years). There were nine nurses with fewer than 5 years of nursing experience, seven with 5 to 9 years, and five with 10 or more years of experience.

The survey was conducted on the subjects after they had completed their day duty (8:20-17:00). All experiments were performed in an air-conditioned quiet room between 17:15 and 18:15. First, after basic information, including age and number of years of nursing experience, was taken during an interview when they came off duty, saliva was collected, and they were requested to fill out a questionnaire on their current mental and physical states. Current mental and physical states were evaluated on a 6-point Likert scale that the authors had prepared (1: very poor, 2: poor, 3: somewhat poor, 4: somewhat good, 5: good, 6: very good). Then a

special footbath vessel (MA-226; Marutaka, Tokyo, Japan) was filled with hot water so as to immerse the feet in 40°C water from the ankle joint to the dorsum of the foot and the toes. The footbath was continued for 10 min based on a previous study<sup>21)</sup>. After completion of the footbath, saliva was collected again, and the subject was asked to fill out the questionnaire on their current mental and physical states again.

The saliva was collected in the following manner. The subject gently bit on two cotton rolls with the molar teeth for about 1-2 min, allowing saliva to penetrate them thoroughly. The cotton rolls were then removed from the mouth by the subject. They were then returned to the original saliva collection vessel, and it was sealed. The vessel was then immediately stored in a cold place, and after placing it in a cold storage envelope, it was sent to a specialized facility for measurement. The concentration of CgA was determined using an enzyme-linked immunosorbent assay kit (YK070 Human Chromogranin A EIA, Yanaihara Institute, Shizuoka, Japan).

During the footbath the examiner was in the same room, and observed the subjects without speaking to them.

The changes in mental and physical state before and after the footbath were assessed by the Wilcoxon signed-rank test. CgA levels between before and after the footbath were assessed by the paired *t*-test. The *p* values in all of the tests were two-tailed, and *p* values <0.05 were considered significant. Statistical Package for the Social Sciences (SPSS) ver. 14.0J for Windows software was used to perform all of the statistical analyses.

## Results

Comparisons between the CgA levels before and after the footbath showed a significant change in levels (Fig. 1).

Regarding their mental and physical states, at the end of duty, two subjects evaluated their mental and physical state before the footbath as "good", but after the bath both changed it to "very good". There were nine subjects who initially evaluated their mental and physical state as "somewhat good". Two of them changed it to "very good", while the other seven changed it to "good". There were three subjects who initially rated their condition as "somewhat poor", and all three changed it to "somewhat good". There were five

Table 1. Comparison of mental and physical state between before and after the footbath

	Before footbath			After footbath	
	N	CgA level <sup>a</sup>		N	CgA level <sup>a</sup>
Good	2	2.04 (1.97-2.10)	→	Very good	2 0.53 (0.27-0.78)
Somewhat good	9	0.83 (0.07-1.98)	→	Very good	2 0.56 (0.55-0.57)
			↘	Good	7 0.52 (0.08-1.73)
Somewhat poor	3	1.11 (0.06-3.16)	→	Somewhat good	3 0.60 (0.13-1.53)
Poor	5	0.60 (0.29-1.56)	→	Good	2 0.31 (0.23-0.38)
			↘	Somewhat good	3 0.90 (0.25-1.60)
Very poor	2	0.55 (0.27-0.82)	→	Somewhat poor	1 0.48
			↘	Poor	1 0.25

a: mean (range)

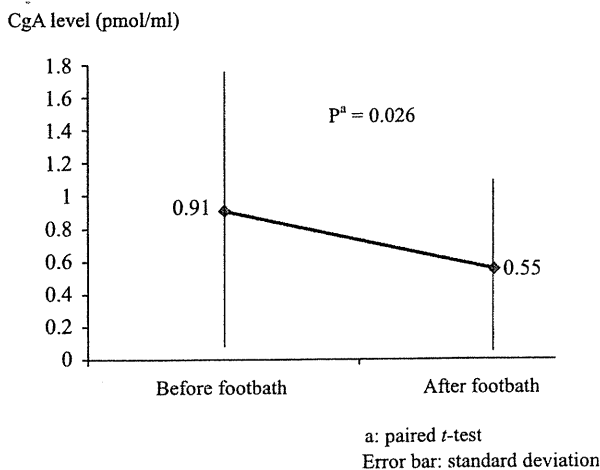


Fig. 1. Comparison of the CgA levels between before and after the footbath

subjects who evaluated their condition as “poor”, and two of them changed it to “good”, while the other three changed it to “somewhat good”. There were two subjects who rated their initial state as “very poor”. One changed it to “somewhat poor”, while the other changed it to “poor”. A comparative statistical evaluation of mental and physical states before and after the footbath showed significant changes in scores ( $Z=-3.80$ ,  $p < 0.001$ ) (Table 1).

## Discussion

Subjective mental and physical states before and after the footbath showed improvement in all of the participants, and the fact that even those who answered “good” or “somewhat good” after duty showed a further improvement after the footbath suggests that footbaths after the completion of duty have a clear efficacy in reducing stress. In this study we filled a footbath vessel with hot water and evaluated the efficacy of the footbath by immersing the feet from the ankle to the dorsum of

the foot and the toes. That alone was sufficient to exert an effect on the mental and physical condition of nurses after the completion of their duties, suggesting that even the limited measure of taking a footbath is capable of exerting an adequate relaxation effect.

CgA is characterized by increasing during stress earlier than previously known stress indicators, such as cortisol, and also by declining sooner<sup>20</sup>. It possesses the characteristic of responding to the stress that occurs as a result of everyday work, and is regarded as an indicator that is capable of specifically and very sensitively detecting stress<sup>15-17</sup>. In our previous pilot study, there were no significant changes in CgA levels between before and after when subjects sat down for 10 min (unpublished). These characteristics of CgA and the results of this study showing that CgA levels after the footbath significantly decreased suggest that footbaths have a stress relieving effect and are an effective means of recovering from the stress that is felt after the completion of nursing duties.

The subjective and objective efficacy of footbaths suggest that they lead to relaxation in accordance with an increase in parasympathetic response and a decrease in sympathetic response, and CgA reduction.

This study is preliminary, and has several limitations. The first limitation is that there was no control group against which to compare the intervention. The second limitation regards the assessment of stress. In this study, we did not use existing validated instruments of stress other than CgA. Lastly, we only assessed the outcomes immediately after the intervention, and could not assess how long the effects would have continued. In future research it is necessary to assess the efficacy of footbaths in a randomized controlled study using validated assessment tools of stress.

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## Research Article

# Evaluation of the Effectiveness of a Group Intervention Approach for Nurses Exposed to Violent Speech or Violence Caused by Patients: A Randomized Controlled Trial

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The purpose of this study was to evaluate the effectiveness of a group intervention approach aimed at improving the mental health of psychiatric nurses exposed to violent speech/violence. Sixty-two nurses having experienced serious episodes of violent speech/violence were enrolled in this study. A group intervention approach was used in the intervention group. For both the intervention and the control groups, evaluations were conducted at three time points. Evaluations were conducted using the Impact of Event Scale-Revised (IES-R) and Profile of Mood States (POMS). The results showed that changes in the flashback, hyperarousal, avoidance behavior, and total scores on the IES-R and anxiety and depression scores on the POMS differed significantly between the two groups. These results suggest that a group intervention approach can lessen the psychological burden of nurses exposed to violence and reduce their mental stress.

## 1. Introduction

Nurses working in clinical practice are often exposed to violent speech and/or even actual violence [1–3]. One background factor for violent speech/violence caused by patients and affecting nurses is the fact that patients staying in hospitals (environments that are totally different from their conventional lifestyles) are likely to become irritated if their freedom is restricted or if their disease does not subside or resolve [4]. Patients often view nurses as being “persons who are willing to listen to any request” or “persons who will agree to any desire.” Under such circumstances, the above-mentioned emotions experienced by patients occasionally assume the form of violent speech/violence directed against nurses [5].

A previous study demonstrated that the risk of exposure to violent speech/violence in the workplace is higher for nurses than for any other healthcare profession [6, 7]. The frequency of exposure to aggressive speech/behavior by hospitalized patients is especially high for nurses working in psychiatric facilities, with an exposure frequency that

is twice as high as that for nurses working in other specialties [8]. When exposed to violent speech/violence, nurses often endure the abuse or violence without resistance, considering it “part of their job” [9]. The tendency of nurses to have such views leads to inadequate reports of this type of event, thereby hampering the development of effective countermeasures against violent speech/violence. When exposed to violent speech/violence, psychiatric nurses tend to avoid attracting the close attention of surrounding people to the hazards to which they have been exposed, and investigators have pointed out the need to investigate the impact of this type of event on the psychological features of psychiatric nurses exposed to violence and to devise valid means of dealing with such impacts appropriately [10]. At present, however, a system for the psychological followup of nurses exposed to violent speech/violence is lacking at many medical facilities.

In our previous study [11], 141 (62.7%) of the 225 psychiatric nurses who were surveyed responded that they “have been subjected to memorable violent speech/violence,” and a diagnosis of posttraumatic stress disorders (PTSD)

seemed possible in 21.3% of these nurses. Previous reports on interventions for such nurses include discussions of the possibility of securing the safety of patients and nurses by learning defensive techniques based on methods of protecting oneself using self-defense [12]. Another report focused on reducing the risk of violence by providing a comprehensive violence prevention program [13]. However, these analyses and evaluations involved many ambiguities and were primarily concerned with how to deal with violence or what actions are needed to prevent violent speech/violence.

Under these circumstances, we attempted a group intervention approach aiming at reducing the psychological stress of psychiatric nurses exposed to violent speech/violence and analyzed changes in the psychological impacts of violent speech/violence following this intervention.

## 2. Method

**2.1. Subjects.** Of the nurses working at five psychiatric hospitals in the Chugoku and Kyushu districts of Japan with 200–300 beds/hospital, those satisfying all the following requirements were enrolled in this study:

- (1) experience of serious violent speech/violence,
- (2) a 6-month or longer career working as a psychiatric nurse at the time of the invitation to participate in this study,
- (3) ability to participate in all the intervention programs,
- (4) provision of informed consent to participate in the study,
- (5) not in an administrative position (director of nursing department, vice director of nursing department, or chief nurse).

**2.2. Definition of Violent Speech/Violence.** Prior to the intervention, a definition of “violent speech/violence” by patients directed at nurses was needed. Taking into account the results of our preceding questionnaire survey of what forms of violent speech/violence were seen at psychiatric facilities (a survey involving 282 subjects) and referring to published articles and the definitions prepared by the International Council of Nurses, we defined violence from three aspects: physical violence, sexual violence, and verbal abuse. A portion of verbal abuse was viewed as violent speech. Experiencing any of these types of violence from patients was rated as “exposed to violent speech/violence.” Thus, the definition of “violent speech/violence” includes

- (1) physically violent behaviors involving physical contact (beating, kicking, biting, or scratching) and behaviors involving physical contact using pencils, eating utensils, or other objects as weapons for stabbing,
- (2) sexually violent behaviors, such as touching the nurse’s body, inappropriate hugging, genital display, indecent speech, and requests for sexual relations (such behaviors were counted regardless of whether they were made by male or female patients),

- (3) verbal abuse involving hissing, using an angry tone, or making direct or indirect threats, such as “Die,” “You’re ugly,” “You’re bald,” “You silly ass,” “I’ll beat you,” “I’ll kill you,” or “I’ll remember this” (these types of expressions are hereinafter collectively called “violent speech”) and behaviors not involving physical contact such as throwing an object at the nurse, spraying water on the nurse, spitting at the nurse and kicking/damaging/destroying the door.

**2.3. Procedure.** The subjects of this study were recruited by holding orientation meetings at wards for acute psychiatric care and chronic psychiatric care, with the permission of the nursing director of each facility. The orientation meetings provided detailed information about the planned study to the nurses.

The nurses who provided informed written consent at each facility ( $n = 62$ ) were randomly allocated using the dice method to an intervention group ( $n = 30$ ) or a control group ( $n = 32$ ). Then, a group approach was used for the intervention group. The author, having worked as a psychiatric nurse for 11 years, served as the moderator. Each group was composed of 3–4 members who remained in the same group for all the sessions. At the end of each session, an outline of the discussion held during that session was reported to the nursing director (or vice director) of the hospital to communicate the need for systematic actions dealing with violent speech/violence.

For both the intervention and the control groups, evaluations were conducted at three time points, that is, at baseline (immediately before the start of intervention), immediately after the 6-week intervention, and 3 months thereafter. The evaluation at 3 months after the intervention was performed for the following reasons: many previous studies conducted evaluations at 3–6 months after the end of the intervention period based on the view that the influence of a group intervention approach on psychological features persists for 3–6 months after the completion of the intervention [14, 15]; an evaluation at this time point was possible in the present study.

**2.4. Intervention Program.** When conducting the intervention, we paid attention to group psychotherapy, which can be implemented by nurses and which has been reported to be a highly efficient means of treatment [16–19]. We thus adopted a group intervention approach previously applied to patients with psychiatric diseases and their family members [20–22] and used in our previous group work trials. The program was composed of a psychotherapy-based discussion, including topics regarding means of coping with violent speech/violence or psychological impacts and stress management, as well as behavioral therapy (progressive muscle relaxation + image therapy) for a total of four sessions (once weekly for 4 weeks, 90 minutes/session).

**2.5. Measures.** Based on our previous study results [11], we selected the following variables to evaluate psychological impact and stress.

**2.5.1. Social and Demographic Variables.** Information was collected regarding age, sex, length of nursing experience, length of work in a psychiatry department, number of persons in household, presence/absence of a spouse, presence/absence of social support, degree of satisfaction with social support, presence/absence of major episodes of violent speech/violence, and interval between the time of exposure to the violent speech/violence and the present, if any. Regarding social support, the following parameters were rated using a 4-point Likert scale: number of persons who provided social support (none to very numerous), degree of satisfaction with family support (not satisfied at all to quite satisfied), and degree of satisfaction with support from acquaintances (not satisfied at all to quite satisfied).

**2.5.2. Impact of Event Scale-Revised (IES-R).** The IES-R is a self-rated scale composed of 22 items designed to evaluate the effect of psychological trauma. The scale was devised by Weiss and Marmar [23] as a revised version of the Impact of Event Scale created by Horowitz et al. [24]. The IES-R enables the measurement of 3 subscales: intrusion, avoidance, and hyperarousal. The reliability and validity of the Japanese version have been confirmed [25]. Cronbach's alpha reliability for this sample was 0.859 (total score). The cutoff point in the Japanese version is set at 24/25, and a total score equal to or above the cutoff point suggests posttraumatic stress disorder (PTSD).

**2.5.3. Profile of Mood States (POMS).** The Profile of Mood States (POMS) is a self-assessment questionnaire composed of 65 items designed to evaluate temporary emotional states. The questionnaire was developed by McNair [26] and enables the assessment of emotional state using 6 scales: tension-anxiety, depression-depressed mood, anger-hostility, vigor, fatigue, and confusion. The reliability and validity of the Japanese version have been confirmed [27]. Cronbach's alpha reliability for this sample was 0.775 (total score). The frequency of the mood corresponding to each item during the past week is rated on a five-point scale that ranges from "never (score 0)" to "very often (score 4)." The scores of all the items for each scale are totaled [28]. A higher total score indicates a higher intensity of mood in that category.

## 2.6. Statistical Analysis

**2.6.1. Comparison between the Intervention and Control Groups at Baseline.** To compare variables and the scores for each scale at baseline between the two groups, the normality test and either the  $\chi^2$  test, *t*-test, or Mann-Whitney *U*-test were used.

**2.6.2. Evaluation of Responses to Group Intervention Approach.** Intergroup differences in the score for each scale immediately before, immediately after, and 3 months after the intervention were analyzed using a two-way analysis of variance (analysis of nonpaired factors and paired factors) with the magnitude of the change in each scale score [(score

immediately after intervention-baseline score) and (score 3 months after intervention-baseline score)] serving as a dependent variable.

All the *P* values were two tailed, and *P* values <.05 were considered significant. The Statistical Package for the Social Sciences (SPSS) software ver. 17.0J for Windows was used to perform all the statistical analyses.

**2.7. Ethical Considerations.** The protocol for this study was submitted to the nursing director of each of the five participating hospitals and was approved by the ethics committee of each hospital prior to the start of the study. Each candidate nurse was informed about the study using a leaflet stating the objectives and methods of the study, the design of the intervention, the capability and right of each nurse to refuse participation at any time, the strict protection of privacy, the lack of any disadvantage to nurses refusing to participate, the capability and right of the nurse to revoke their consent to participate in the study at any time.

## 3. Results

**3.1. Enrollment in the Study.** During the survey period, participants were recruited from among nurses working at five facilities. Sixty-two nurses who satisfied the inclusion criteria and provided their informed consent were randomly allocated to either the intervention group (*n* = 30) or the control group (*n* = 32).

Five subjects from the intervention group were unable to remain in the study until the end, and the collection of the questionnaire at 3 months after intervention was not possible for seven subjects in the control group. Thus, a final evaluation was possible for 25 subjects in the intervention group and 25 subjects in the control group.

**3.2. Examples of Violent Speech/Violence Identified during Discussions with the Group Intervention Approach.** The episodes of violent speech/violence experienced by nurses were summarized as follows.

### (1) Physical violence:

- (i) a nurse was beaten by a dissatisfied patient using a bar or similar object,
- (ii) a patient, whose demand was not satisfied, kicked the door of the nurses' station, grabbed a nurse by the collar, and used violence,
- (iii) a patient suddenly slapped the face of a nurse when the nurse was engaged in the care of another patient,
- (iv) a patient with nocturnal delirium beat a nurse,
- (v) a patient in a borderline case threw a chair at the nurse when care was delayed.

### (2) Violent speech:

- (i) a patient suddenly said "Die" or "Go away" in a loud voice.



TABLE 1: Comparison between baseline data in the intervention group and the control group.

Variables	Intervention group (n = 30)	Control group (n = 32)	p <sup>(a)</sup>
<b>Gender</b>			
Male	11	12	.95
Female	19	20	
<b>Spouse</b>			
Presence	17	18	.98
Absence	13	14	
	Median (range)		p <sup>(b)</sup>
Age (y)	33.0 (20–59)	29.0 (19–59)	.08
Length of nursing experience (months)	85.5 (14–435)	72.0 (13–469)	.94
Length of work in the psychiatry department (months)	47.5 (14–346)	54.5 ( 8–353)	.78
Interval between the time of exposure to the violent speech/violence and the present (months)	5.0 (1–180)	6.0 (1–36)	.64
Number of persons in the household	3.0 (1–8)	2.5 (1–6)	.18
Number of persons who provided social support	2 (1–4)	2 (1–4)	.26
Degree of satisfaction with support by family	2 (1–4)	2 (1–4)	.31
Degree of satisfaction with support by acquaintances	2 (1–4)	2 (1–4)	.70
	Mean (standard deviation)		p <sup>(c)</sup>
<b>IES-R<sup>(d)</sup></b>			
Intrusion	4.77 (4.28)	6.62 (3.85)	.18
Avoidance	5.50 (4.13)	6.84 (4.04)	.20
Hyperactivity	5.17 (3.28)	5.43 (3.20)	.74
Total	15.43 (1.97)	18.44 (1.69)	.25
<b>POMS<sup>(e)</sup></b>			
Tension-Anxiety	8.30 (2.70)	8.90 (4.21)	.51
Depression	15.93 (11.21)	14.91 (7.77)	.68
Anger	12.50 (10.23)	13.00 (7.03)	.83
Vigor	12.90 (7.35)	13.78 (6.17)	.61
Fatigue	13.42 (7.72)	13.13 (5.99)	.86
Confusion	11.70 (5.18)	12.09 (4.81)	.76
Total	56.80 (37.62)	58.00 (26.78)	.89

<sup>(a)</sup>  $\chi^2$  test.<sup>(b)</sup> Mann-Whitney *U*-test.<sup>(c)</sup> *t*-test.<sup>(d)</sup> Impact of Event Scale—Revised.<sup>(e)</sup> Profile of Mood States.

The subjects exposed to these episodes judged them as being violent speech/violence if they exceeded certain levels, for example, “It went beyond the limit,” “I cannot deal with this patient any further,” “I am sure the patient is behaving this way intentionally,” or “This behavior is not acceptable.” Some nurses stated that when they reported

the event to their superior, their superior answered “That happened because you treated the patient poorly” or “Your way of dealing with the patient is problematic.” These nurses continued to experience fear or self-loathing after exposure to violent speech/violence or felt regret and intense unhappiness, depending on the attitude of their superior.

TABLE 2: Changes in the IES-R scores from immediately after completion of the intervention to 3 month after completion of the intervention.

	Time		Effects					
	Score change <sup>(a)</sup> (Immediately after intervention)	Score change <sup>(b)</sup> (1 month after intervention)	Interaction Group × time			Main effect Group		
	Mean (SD)	Mean (SD)	Freedom	F <sup>(c)</sup>	P	Freedom	F <sup>(c)</sup>	P
<i>Intrusion</i>								
Intervention group	-1.47 (2.46)	-1.70 (2.07)	2	2.90	.058	1	4.28	.040
Control group	-0.53 (1.97)	-0.38 (2.81)						
<i>Avoidance</i>								
Intervention group	-2.10 (2.71)	-2.03 (2.70)	1.58 <sup>(d)</sup>	6.30	.005	1	7.96	.006
Control group	-0.22 (1.67)	-0.66 (2.40)						
<i>Hyperactivity</i>								
Intervention group	-1.50 (1.73)	-2.10 (2.04)	2	8.64	<.001	1	11.55	.001
Control group	-0.59 (1.97)	0.63 (2.40)						
<i>Total</i>								
Intervention group	-5.07 (4.91)	-5.83 (5.21)	2	10.00	<.001	1	15.49	<.001
Control group	-1.34 (3.65)	-0.97 (5.00)						

<sup>(a)</sup> [Score immediately after intervention] - [Baseline score].

<sup>(b)</sup> [Score 3 months after the completion of the intervention] - [Baseline score].

<sup>(c)</sup> F statistic in repeated measures analysis of variance.

<sup>(d)</sup> Greenhouse-Geisser correction.

**3.3. Comparison between the Intervention and Control Groups at Baseline.** A comparison of the variables and scores for each scale at baseline between the two groups revealed no significant intergroup differences in any of the variables or scores (Table 1).

**3.4. Comparison of Changes in IES-R Scores between the Two Groups.** Table 2 compares the changes in the IES-R scores (intrusion, avoidance, hyperarousal and total scores) during the period from immediately after until 3 months after the end of intervention between the intervention and control groups.

In a two-way analysis of variance, significant intergroup differences in the changes in scores were noted for both the interaction and main effects on the avoidance, hyperarousal, and total score scales and for the main effect on the intrusion scale.

**3.5. Comparison of Changes in POMS Scores between the Two Groups.** Table 3 compares the changes in the POMS scores (tension-anxiety, depression, anger, vigor, fatigue, confusion, and TMD scores) during the period from immediately after until 3 months after the end of intervention between the intervention and control groups.

In a two-way analysis of variance, significant intergroup differences in the changes in scores were noted for both the

interaction and main effects on the tension-anxiety scale and for the main effect on the depression scale.

## 4. Discussion

**4.1. Violent Speech/Violence Experienced by Nurses.** The present results demonstrate that the nurses in the present study frequently endured violent speech/violence with no active countermeasures, endorsing the previous findings that nurses are at a high risk of exposure to violent speech/violence from patients. The present study additionally revealed that some changes occurred in the way the nurses dealt with patients or in their feelings toward the patients after being exposed to violent speech, saying "I avoided contact with the patient as much as possible," "I was distressed just to see the face of the patient," "I minimized talking with the patient," and "I avoided contact with the patient, asking other staff members to perform my role as much as possible." Thus, the events resulted in the nurses having negative stances toward services or actions related to patient care.

**4.2. Efficacy of Intervention.** When the changes in the IES-R scores following intervention were analyzed in this randomized controlled trial, significant intergroup differences were noted for intrusion, hyperarousal, avoidance, and total

TABLE 3: Changes in the POMS scores from immediately after completion of the intervention to 3 month after completion of the intervention.

	Time		Effects					
	Score change <sup>(a)</sup> (Immediately after intervention)	Score change <sup>(b)</sup> (1 month after intervention)	Interaction Group × time			Main effect Group		
	Mean (SD)	Mean (SD)	Freedom	F <sup>(c)</sup>	P	Freedom	F <sup>(c)</sup>	P
<i>Tension-anxiety</i>								
Intervention group	-1.87 (4.95)	-2.97 (4.16)	2	30.01	<.001	1	53.55	<.001
Control group	5.47 (5.23)	6.62 (6.10)						
<i>Depression</i>								
Intervention group	-0.07 (8.17)	-0.73 (8.19)	2	2.36	.098	1	4.64	.035
Control group	3.88 (5.23)	3.59 (9.36)						
<i>Anger</i>								
Intervention group	-2.43 (8.80)	-2.10 (9.92)	1.35 <sup>(d)</sup>	0.85	.845	1	0.02	.881
Control group	-2.40 (11.01)	-2.93 (10.27)						
<i>Vigor</i>								
Intervention group	-0.17 (3.94)	-1.37 (6.66)	2	1.50	.227	1	2.49	.120
Control group	1.09 (8.05)	0.50 (5.98)						
<i>Fatigue</i>								
Intervention group	-0.60 (4.43)	-1.77 (6.21)	2	0.86	.426	1	1.14	.288
Control group	-2.53 (6.90)	-2.75 (6.05)						
<i>Confusion</i>								
Intervention group	-0.47 (3.44)	-1.07 (4.33)	2	0.62	.537	1	1.14	.289
Control group	-1.40 (5.42)	-2.34 (5.17)						
<i>Total</i>								
Intervention group	-2.57 (21.00)	-3.70 (30.45)	1.76 <sup>(d)</sup>	0.75	.452	1	0.26	.608
Control group	-2.71 (32.20)	3.31 (27.60)						

<sup>(a)</sup> [Score immediately after intervention] - [Baseline score].

<sup>(b)</sup> [Score 3 months after the completion of the intervention] - [Baseline score].

<sup>(c)</sup> F statistic in repeated measures analysis of variance.

<sup>(d)</sup> Greenhouse-Geisser correction.

score. Intrusion and hyperarousal, as evaluated using the IES-R scales, refer to symptoms characterized by extreme cautiousness and timidity, an inability to sleep because of concern over the event, and the repeated recollection of the event during daily life. During the intervention, various measures for dealing with violent speech/violence were discussed, and participants talked freely in a friendly atmosphere about how to control posttraumatic events, emotions, and stress by themselves and obtained knowledge regarding posttraumatic events and the resulting stress. Through these steps, the participants gained confidence in

their capability to face situations or events involving violent speech/violence appropriately in the future. Furthermore, by learning relaxation techniques, the symptoms that the participants had been suffering from seemed to be alleviated.

In the analysis of the changes in the POMS scores after intervention, significant intergroup differences were noted for anxiety and depression. The POMS system is designed to evaluate emotional status at a given time. Anxiety about possible violent speech/violence in the future and depression resulting from such anxiety seems to have been alleviated through frank discussions regarding the affliction and

associated anxiety, learning about violent speech/violence, exchanging information on ways to overcome such events, and learning relaxation techniques in a group of nurses with similar experiences organized under a group intervention approach. The efficacy of the group intervention approach for group psychotherapy, which focuses on changing emotions, has been demonstrated in a previous study [17, 29, 30]. This approach seems to have yielded a similar efficacy among the nurses exposed to violent speech/violence in the present study.

**4.3. Limitations of This Study.** This study has several limitations. First, the analysis of differences in the characteristics, safety management system, safety practices, and other factors among the participating facilities was inadequate. Second, we cannot rule out the possibility that the subjects did not have a full understanding of the definition of violent speech/physical violence, though we endeavored to provide a very concrete definition and explanation. Third, a double-blind design could not be adopted for this study because of its nature, possibly resulting in a lack of adequate care or attention when arranging and implementing the study. That is, the authors assumed all the roles performed in the study, ranging from inviting the nurses to participate in the study to the allocation of the subjects to the intervention and control groups as well as the implementation of the intervention and evaluation. Thus, the reliability of the findings can be argued. In addition, all the study subjects were nurses working in psychiatric departments. The psychological problems arising from violent speech/violence experienced by nurses working in other specialties should also be investigated and overcome in future studies.

## 5. Conclusions

The present results suggest that the group intervention approach is an effective means of alleviating the psychological impact and stress of nurses exposed to violent speech/physical violence caused by patients. This approach can contribute to the improvement of the mental health of nurses, thereby improving the quality of nursing care provided to patients.

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## Relationships Between Roles and Mental States and Role Functional QOL in Breast Cancer Outpatients

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**Objective:** To evaluate the degrees of role accomplishment, the importance of and satisfaction with roles, and to assess their relationships with mental states and role functional quality of life, in breast cancer patients receiving treatment on an outpatient basis.

**Methods:** The study was designed as a cross-sectional study. Thirty patients with primary breast cancer were evaluated using the Self-Rating Frenchay Activities Index, the Role Checklist, the Profile of Mood States and the Medical Outcome Study Short-Form 36-Item Health Survey. Spearman's rank correlation coefficients were used to analyze the relationships between each role-related item and each Profile of Mood States and Short-Form 36 subscale.

**Results:** A higher number of roles played was positively associated with the score for Vigor but was negatively associated with the score for physical quality of life. A higher degree of the importance of roles was negatively correlated with the score for Confusion and positively correlated with the score for mental quality of life. A higher degree of satisfaction with roles was negatively correlated with depression, tension-anxiety, confusion and the total mood disturbances score, and was positively correlated with both the physical and negative quality of life scores. No significant correlations were apparent between the degrees of role accomplishment (Self-Rating Frenchay Activities Index scores) and the Profile of Mood States and Short-Form 36 scores.

**Conclusions:** The results indicated that qualitative and subjective factors (i.e. the degrees of importance of and satisfaction with roles) are associated more closely with emotional states and role functional quality of life in breast cancer outpatients than quantitative and objective factors (i.e. degree of role accomplishment and the number of roles).

*Key words:* ADL – APDL – breast cancer – emotional state – QOL

### INTRODUCTION

Recent advances in healthcare have led to the establishment of evidence-based chemotherapy for breast cancer (1). The result has been a shift in the focus of postoperative care for breast cancer patients from being based primarily on hospitalization to a new emphasis on outpatient care, while maintaining the routine aspects of each patient's daily life to the maximum extent possible (2). Breast cancer patients may be required to play various roles, including the traditional feminine roles of wife and mother, as well as professional, care

provider and other roles. Such patients need to play various roles while living with anxiety as they undergo ambulatory treatment after discharge and must undergo treatment while preserving normality in their daily lives. According to one report, breast cancer patients often resume housework by 2 weeks after discharge while complaining of symptoms associated with mental stress, fatigue, reduced vigor and physical stress (postoperative arm function disorders, etc.) (3,4). The difficulties faced by breast cancer outpatients are related to housework, child care and so on, and these

difficulties have been shown to sometimes reduce the patients' quality of life (QOL) (5). Rehabilitation covers not only the activities of daily living (ADL), such as changing locations, dressing/undressing and having meals, but activities parallel to daily living (APDL) that provide more social and advanced ADL related to role function, such as cleaning, shopping and cooking. Such rehabilitation is provided, primarily by occupational and physical therapists, to prevent decreases in QOL arising from these difficulties. Thus, patients begin to receive ADL training, housework training, instructions upon hospital discharge, etc., soon after undergoing surgical treatment for their breast cancer (6–8). However, some investigators have found that the rehabilitation provided to such patients has been inadequate because of early discharge, the difficulty of visiting the hospital frequently or the lack of visiting rehabilitation efforts (9).

The term 'role' indicates social status as well as other issues. Since people assess their own value based on an understanding of their roles in the family and society, the absence of adequate roles can cause people to lose their self-identity or daily life objectives. Disturbances in role function are considered a cause of psychosocial disorders (10). Females, particularly middle-aged women, have been reported to tend to develop depressive disorder if they lose their roles (10). Thus, these roles are significant for females and can be viewed as being closely related to their mental states. Many women with breast cancer have been reported to tend to become aware of their mental instability when they imagine the outcome of their inability to satisfactorily play the diverse roles assigned to them because of limitations imposed by the treatment of their disease (11).

Thus, an increasing number of studies focusing on the difficulties in role function encountered by breast cancer patients and in the situations related to ADL and APDL that such patients face have been conducted recently. However, these studies have only recently begun to be performed in breast cancer outpatients, and very few reports have ever been published concerning the influence of role-related difficulties and role functional status on the mental states of such patients. The present study was undertaken to investigate the degree of role accomplishment, the number of roles (quantitative role factors) and the degrees of the importance of and satisfaction with roles (qualitative role factors), and to assess their relationships with mental states and role functional QOL in breast cancer outpatients. This study was expected to demonstrate the importance of roles to breast cancer patients, as well as to identify areas that require closer attention during the rehabilitation of surgically treated patients before their discharge and to facilitate effective follow-up care of such patients, which should lead to a better QOL after hospital discharge.

## PATIENTS AND METHODS

### SUBJECTS

Patients were recruited in the Outpatient Clinic of Hiroshima University Hospital. We consecutively requested the

cooperation of all the patients who were eligible to participate during the study period. The eligibility criteria were as follows: (i) women over the age of 18 years, (ii) current ambulatory treatment for breast cancer after confirmation of the diagnosis, (iii) at least 2 weeks after but no more than 6 months prior to discharge from a hospital (since breast cancer patients reportedly resume housework after 2 weeks while complaining of symptoms associated with mental or physical stress, but these symptoms may continue until about 6 months), (iv) the ability to understand the purpose of the study and the questions in the questionnaire and (v) the absence of severe physical symptoms.

### ETHICAL CONSIDERATIONS

This study was conducted after receiving the approval of the ethics review committee of Hiroshima University.

### MEASURES

#### BASIC INFORMATION

##### (1) Sociodemographic variables

Inquiries about age, household composition/housemate, key person and occupation were made during an interview.

##### (2) Medical variables

Medical data, including surgical history and cancer stage, current ambulatory therapy, disease history, presence/absence of rehabilitation, length of stay, time since surgery and time since hospital discharge, were collected from the medical records of each subject.

### ROLES

##### (1) Japanese version of Self-Rating Frenchay Activities Index (SR-FAI)

The FAI is a 15-item index developed by Holbrook (12) as a means of evaluating applied activity, social activity and role activity during daily life (for example, housework, shopping and working). The SR-FAI is the Japanese version of the FAI and was prepared by Hachisuka et al. (13) as an index tailored to situations in Japan. Each activity in the index is rated on a four-grade scale that ranges from 'done every day (score 3)' to 'never done (score 0)'. The scores for all the activities are totaled. Higher total scores indicate more complete accomplishment of the activities. The index is designed for disabled individuals who are living at home and free of dementia and/or severe aphasia, sick individuals and middle-aged and elderly individuals. Its reliability and validity have been established (12–16). In this study, the total scores for all the items were used as the degree of role accomplishment.

##### (2) Role Checklist

The Role Checklist is a self-assessment instrument prepared by Oakley et al. (17) and consists of two parts. Part 1 is designed to assess the status of the individual's participation in 10 roles by having the subject choose one of three possible replies: 'participated in the past', 'participating currently' and 'will participate in the future'. Part 2 identifies the degree to which each of the same 10 roles is valued, and the subject chooses one of three possible replies: 'not at all valuable', 'somewhat valuable' and 'very valuable'. The validity and reliability of the Japanese version of the Role Checklist have been demonstrated (18). In the present study, only the 'participating currently' roles were assessed in both Parts 1 and 2.

In the Part 1 assessment, the total number of roles identified as 'participating currently' was used as the number of roles (0–10). In the Part 2 assessment, to enable a numerical analysis of the degree of each role's importance, the ratings for each of the 'participating currently' roles were scored according to a 3-point system ranging from zero (not at all valuable) to two (very valuable). In addition, the total score was divided by the number of selected roles to obtain the mean importance score.

Of the 10 roles covered in the Role Checklist, those identified as 'participating currently' were selected to assess the degree of satisfaction. The degree of satisfaction with each of the roles selected was rated using a four-grade Likert scale that ranged from one (not at all satisfied) to four (very satisfied), with higher scores indicating a higher degree of satisfaction with the role that was played. The total satisfaction score was divided by the number of selected roles to obtain the mean satisfaction score.

#### MOOD STATES: PROFILE OF MOOD STATES

The Profile of Mood States (POMS) is a self-assessment questionnaire composed of 65 items designed to evaluate temporary emotional states. It was developed by McNair et al. (19) and enables the assessment of emotional state on six scales: tension-anxiety, depression, anger-hostility, vigor, fatigue and confusion. The reliability and validity of the Japanese version have been established (20). The frequency of the mood corresponding to each item during the past week is rated on a five-grade scale that ranges from 'never (score 0)' to 'very often (score 4)'. The scores for all the items belonging to a scale are totaled (21). Higher total scores indicate a higher intensity of mood in that category.

#### ROLE FUNCTIONAL QOL: JAPANESE VERSION OF MOS SHORT-FORM 36-ITEM HEALTH SURVEY

The Medical Outcome Study (MOS) Short-Form 36-Item Health Survey (SF-36) is a comprehensive health evaluation scale that was developed in the MOS conducted in the USA in the 1980s (22). The reliability and validity of this scale have been confirmed (23), and it is now being used in research in more than 15 countries (24). The scale is

designed for individuals aged 16 years and over and is composed of eight subscales. Each item is rated on a five-grade scale that ranges from 'always' (score 1) to 'never' (score 5), and the total score for each subscale is calculated. The validity and reliability of the Japanese version of this scale have been established (25,26). Two of the eight subscales [i.e. 'everyday role function (physical)' and 'everyday role function (mental)'], which are related to role functional QOL were used in this study. The total possible scores for each of these subscales were 20 and 15, respectively. A lower score indicates a lower QOL.

#### ANALYSIS

After the normality of the data had been checked using the Shapiro–Wilks test, the relationships between the degree of role accomplishment assessed using the SR-FAI, the number of roles, the mean importance score and the mean satisfaction score assessed using the Role Checklist, and the emotional states assessed using the POMS and role functional QOL assessed using the SF-36 were analyzed using the Spearman's rank correlation coefficients.

In all the statistical tests,  $P < 0.05$  (two-sided) was regarded as statistically significant. All the statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) 15.0J computer program.

## RESULTS

### SUBJECT CHARACTERISTICS

Of the 32 patients who were eligible to participate, the 30 who provided informed consent were enrolled in this study. The mean age of the subjects was  $55.8 \pm 11.9$  years (range: 33–74 years). Many of the subjects had a spouse (27 subjects) and children (23 subjects). Twenty-five subjects lived with someone. Half (16 subjects) had an occupation. During their hospital stay, 17 subjects received rehabilitation, and the duration of the rehabilitation was  $1.4 \pm 1.4$  days. The mean number of roles played by the subjects was  $5.5 \pm 2.0$  (range: 2–9). The mean degree of the importance of the roles was  $1.6 \pm 0.3$ , and the mean degree of satisfaction was  $1.9 \pm 0.4$ . Table 1 shows the scores for each assessment. The mean score for each item assessed using the SF-36 and the mean score for each POMS subscale were lower than the national average for females.

### RELATIONSHIPS BETWEEN ROLES AND POMS

The results of the analysis of the relationships between each role-related item and the score for each subscale showed a significant positive correlation between the number of roles and V (vigor) ( $P < 0.001$ ), and significant negative correlations between the mean degree of satisfaction and D (depression-depressed mood) ( $P = 0.002$ ), T-A (tension-anxiety) ( $P < 0.001$ ), C (confusion) ( $P = 0.001$ )



**Table 1.** Subject demographics

	<i>n</i>	Mean ± SD
Age (year)		55.8 ± 11.9
Spouse		
Present	27	
Absent	3	
Child		
Present	23	
Absent	7	
Other family member		
Present	25	
Absent	5	
Key person		
Spouse	24	
Child	3	
Others	3	
Job		
Present	16	
Absent	14	
Tumor location		
Right lateral	10	
Left lateral	13	
Left medial	3	
Papilla	4	
Operation history		
Breast-preserving surgery + sentinel lymph node biopsy	17	
Breast-preserving surgery + axillary lymph node excision	7	
Mastectomy + sentinel lymph node biopsy	2	
Mastectomy + axillary lymph node excision	4	
Stage		
I	13	
IIA	11	
IIB	5	
IIIA	1	
Ambulatory treatment		
Radiotherapy	8	
Radiotherapy + hormone therapy	4	
Hormone therapy	10	
Chemotherapy	6	
Chemotherapy + hormone therapy	2	
Rehabilitation		
Present	17	1.4 ± 1.4
Absent	13	
Hospital stay (days)		9.6 ± 2.8

*Continued*

**Table 1.** *Continued*

	<i>n</i>	Mean ± SD
Time since surgery (days)		79.7 ± 47.5
Time since discharge (days)		74.3 ± 48.1
Number of roles		5.5 ± 2.0
Importance of roles		8.8 ± 3.3
Mean importance of role number		1.6 ± 0.3
Satisfaction with role		10.4 ± 3.8
Mean satisfaction with role		1.9 ± 0.4
SF-36 Everyday role functional QOL		
Mental		70.0 ± 20.6
Physical		58.9 ± 17.5
FAI		26.9 ± 5.5
POMS		
V		12.2 ± 5.8
D		10.9 ± 8.8
A-H		7.8 ± 7.4
F		9.2 ± 5.6
T-A		8.7 ± 4.8
C		7.9 ± 4.3
TMD		32.4 ± 29.3

V, vigor; D, depression; A-H, anger-hostility; F, fatigue; T-A, tension-anxiety; C, confusion; TMD, total mood disturbances; SF-36, Short-Form 36; QOL, quality of life; FAI, Frenchay Activities Index; POMS, Profile of Mood States.

**Table 2.** Correlations between roles and POMS

Factor	T-A	D	A-H	V	F	C	TMD
No. of roles							
rs	0.243	0.179	0.086	0.620	0.168	0.067	0.016
<i>P</i> value	0.196	0.345	0.678	<0.001	0.374	0.724	0.935
Total importance							
rs	0.064	0.079	-0.077	0.623	-0.013	-0.150	-0.170
<i>P</i> value	0.735	0.678	0.684	<0.001	0.947	0.429	0.370
Mean importance							
rs	-0.296	-0.105	-0.229	0.024	-0.334	-0.475	-0.317
<i>P</i> value	0.112	0.582	0.223	0.898	0.071	0.008	0.088
Total satisfaction							
rs	-0.236	-0.143	0.004	0.680	-0.019	-0.302	-0.262
<i>P</i> value	0.210	0.450	0.982	<0.001	0.920	0.105	0.161
Mean satisfaction							
rs	-0.739	-0.551	-0.189	-0.012	-0.329	-0.579	-0.446
<i>P</i> value	<0.001	0.002	0.318	0.950	0.076	0.001	0.013

T-A, tension-anxiety; D, depression; A-H, anger-hostility; V, vigor; F, fatigue; C, confusion; TMD, total mood disturbances; rs, Spearman's rank correlation coefficient.

**Table 3.** Correlations between roles and SF-36 scores

Factor	Role functional mental QOL		Role functional physical QOL	
	rs	P value	rs	P value
No. of roles	-0.252	0.179	-0.415	0.023
Total importance	-0.081	0.671	-0.347	0.060
Mean importance	0.366	0.047	0.091	0.631
Total satisfaction	0.031	0.871	-0.156	0.410
Mean satisfaction	0.525	0.003	0.509	0.004

and TMDs (total mood disturbances) ( $P = 0.013$ ) as well as between the mean degree of importance and C (Confusion) ( $P = 0.008$ ) were obtained (Table 2).

#### RELATIONSHIPS BETWEEN ROLES AND SF-36 SCORES

The mean SF-36 scores for everyday role functional QOL, i.e. for mental and physical, were  $70.0 \pm 20.6$  (8–100) and  $58.9 \pm 17.5$  (25–100), respectively. An analysis of the relationships between each role-related item and the score for each SF-36 subscale revealed a significant positive correlation between role functional mental QOL and both the mean importance ( $P = 0.047$ ) and the mean satisfaction ( $P = 0.003$ ), a significant negative correlation between the role functional physical QOL and the number of roles ( $P = 0.023$ ), and a significant positive correlation between the role functional physical QOL and the mean satisfaction ( $P = 0.004$ ) (Table 3).

#### RELATIONSHIP BETWEEN SR-FAI SCORES AND POMS AND SF-36 SCORES

An analysis of the relationships between the SR-FAI scores and the POMS and SF-36 scores revealed no significant correlations (Table 4).

## DISCUSSION

#### RELATIONSHIP BETWEEN ROLES AND EMOTIONAL STATES

An analysis of the relationships between each role-related item and the POMS scores revealed several significant correlations. First, a strong positive correlation was found between the number of roles and Vigor. This means that patients tended to have greater vigor or positive emotions during their daily life as the number of roles they played increased. As stated above, roles support people's sense of identity. Playing roles means that the individual's existence is recognized or that the individual can live a unique life. It seems that playing many roles enables people to establish

**Table 4.** Relationship between SR-FAI scores and POMS and SF-36 scores

Factor	rs	P value
POMS		
V	0.286	0.124
D	0.205	0.276
A-H	0.154	0.418
F (fatigue)	0.036	0.856
T-A	-0.127	0.504
C	-0.136	0.475
TMD	-0.016	0.931
SF-36		
Role functional mental QOL	0.174	0.358
Role functional physical QOL	0.112	0.554

V, vigor; D, depression; A-H, anger-hostility; F, fatigue; T-A, tension-anxiety; C, confusion; TMD, total mood disturbances.

their identity, obtain a greater sense of achievement from their roles and achieve relief from anxiety about their existence, leading to greater mental vigor in daily life. However, some investigators have reported negative impacts of playing multiple roles, in contrast to the findings in the present study (27–29). Taken together, playing roles that are suited to the abilities of the individual may be associated with increases in vigor during daily life.

A strong negative correlation was found between the mean degree of importance and the score for confusion, and between the mean degree of satisfaction and the scores for depression, tension-anxiety and confusion. These findings indicate that a higher degree of satisfaction with roles and the value of the roles played by individuals are associated with lower negative emotions, such as depression and confusion. Oakley et al. (17) proposed the concept of 'role value'. Role value pertains to the degree of importance attached by individuals to a given role and is thought to affect decisions regarding behavior and the probability of satisfaction arising from such behaviors. People who play roles to which they attach great value reportedly tend to be satisfied with their daily lives (30). Therefore, the degree of satisfaction is closely related to the value of a given role. A previous study also showed that the magnitude of the sense of achievement or satisfaction was related to depression or anxiety (27,28). In addition, the loss of roles can sometimes trigger depression, and people who play roles rated as more important are better able to adapt to the loss of other roles (10). The present results suggest that the degree of satisfaction with given roles and the feeling that they are playing roles to which they can attach high value greatly affect the emotional states of breast cancer outpatients.

## RELATIONSHIPS BETWEEN ROLES AND ROLE FUNCTIONAL QOL

The analysis of the relationships between each role-related item and the scores on the SF-36 also revealed several significant correlations. Everyday mental role function was found to be strongly positively correlated with the mean degree of satisfaction and with the mean degree of importance. Everyday physical role function was also strongly positively correlated with the mean degree of satisfaction. However, a negative correlation between the number of roles and the physical role function was observed. This relationship was the opposite of the above finding related to Vigor as assessed by the POMS. Thus, the results showed that an increase in the number of roles played increases vigor but can reduce physical QOL. Physical problems such as reduced physical strength, fatigue, and adverse reactions to treatment can cause patients considerable pain during ambulatory treatment as well (31,32). Playing many roles can result in additional vigor through a sense of achievement, but can also cause physical stress and reduce QOL in patients required to go about their daily lives while receiving ambulatory treatment. To maximize vigor through an increase in the number of roles, a support system that provides optimum environments for individual patients is needed. The spouses and children of breast cancer patients serve as their primary sources of support (27,33,34). However, in view of the report on the recent trend toward decreased familial support, future efforts to provide the support of healthcare professionals or communities may have greater significance than familial support efforts (35).

As shown above, the results of this study suggest that emotional states and QOL related to everyday role functions are affected more strongly by qualitative factors (degree of importance or satisfaction) than by quantitative factors (degree of role accomplishment or number of roles) in breast cancer outpatients. Therefore, rehabilitation approaches to enhance the degrees of importance of and satisfaction with roles may improve the emotional states or QOL of breast cancer patients.

## LIMITATIONS AND PERSPECTIVES

The first limitation of this study is that it relied totally on Self-Rating scales and subjective assessments. A future study in which objective indicators are also used is needed. Second, only breast cancer outpatients receiving ambulatory treatment at one hospital were enrolled in this study, and all the patients were at least 30 years of age, making it difficult to extrapolate the results of this study to a wider population of breast cancer patients. Thus, additional systematic and random studies conducted using larger patient populations and multiple institutions are needed. Third, the questionnaire used for this study took about 15 min to complete, which may have caused fatigue or imposed other forms of stress on the outpatients. Thus, a shorter, simpler questionnaire should be designed.

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## Conflict of interest statement

None declared.

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