

- Since several studies have shown an association with mortality (all-cause mortality and breast cancer mortality), the mortality risk of breast cancer patients may be increased by smoking.

#### Isoflavones and breast cancer prognosis

- The number of high-quality studies on the effects of isoflavones in breast cancer patients is limited. There have been 4 studies in Chinese patients and 2 in American patients.
- A meta-analysis of 4 of these studies showed a significant association with recurrence reduction [89]. A combined analysis of 2 datasets in US women and 1 dataset in Chinese women indicated a significant association with mortality and a significantly reduced risk of recurrence [90].

The relationship between intake of fat, alcohol, and dairy products after diagnosis of breast cancer and prognosis was judged to be “limited-no conclusion” based on the lack of an established association between these factors and prognosis, and the absence of high-quality studies.

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**Conflict of interest** The authors declare that they have no conflict of interest.

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## Partnership in Psycho-Social Group Intervention for Cancer Patients: Factors to Creating Group Dynamics

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### ABSTRACT

**Background** The purpose of this study was to conduct a psycho-social group intervention consisting of 3 parts, educate patients on methods to cope with stress and solve problems, hold group discussions and practice progressive muscle relaxation (PMR) for cancer patients, and investigate the way that group dynamics work in psycho-social group interventions in Japan.

**Methods** Three facilitators and 2 sub-facilitators who conducted the group intervention for breast cancer patients were qualitatively and inductively analyzed using a phenomenological approach.

**Results** As a result, “hard effort,” “harmony of the whole group” and “collaboration between therapists” were extracted as the partnership functions of participants that work on the creation of group dynamics in psycho-social group interventions. There was a structure in which “harmony of the whole group” and “collaboration between therapists” coexisted based on the basic attitude of “hard effort.”

**Conclusion** It was considered that these 3 intervention forms are involved in group dynamics in which participants can easily hold discussions, and are techniques necessary for group intervention contributing to changes in the psychological distress and the coping of participants.

**Key words** group dynamics; group intervention; facilitator; nurse; partnership

Recent advances in cancer treatment have helped breast cancer patients live longer. However, breast cancer patients also have psychological burdens and therefore live with psycho-social problems.<sup>1–3</sup>

Group therapy, which was developed in the United States and Europe as one of the psycho-social interventions for improving psychological distress and helping cancer patients cope,<sup>4–9</sup> is a program consisting of edu-

cation on methods for coping with stress and for solving problems, group discussion and progressive muscle relaxation (PMR). This positive effects of this approach has also been verified in Japan.<sup>4, 5, 10</sup>

Group interventions are not considered susceptible to the skills of a therapist because a characteristic feature of intervention is that participants can understand each others' situations and support each other, i.e., they participate in group dynamics.<sup>11</sup> On the other hand, it was reported that facilitators, who play a role in smooth and effective organization of group discussion in group interventions, provide their patients with intervention, but have difficulty in, for example, managing participants with problems and feeling anxiety due to lack of knowledge.<sup>12</sup> This is thought to be because these facilitators and staff have more anxiety than necessary since the mechanism for creating group dynamics in group interventions for Japanese cancer patients has not yet been fully elucidated.

Based on the above background, we conducted a study of a psycho-social intervention which was proven to be useful for Japanese patients with primary and recurrent breast cancer.<sup>4, 10</sup> In this study, we investigated in detail the factors that create group dynamics experienced by Japanese facilitators.

### SUBJECTS AND METHODS

#### Subjects

**Facilitators and sub-facilitators:** Eligible subjects were facilitators of group interventions in cancer center A or cancer center B who met the following criteria: i) experience as nurses for more than 5 years; ii) facilitator training received in advance and iii) willingness to play a role in facilitating discussion among participants.

**Group participants:** Group participants were breast cancer patients followed in cancer center A or cancer center B who met the following eligibility criteria: i) adult women aged 20 years or older; ii) histological diagnosis of breast cancer and presence of histologically and/or clinically confirmed breast cancer; iii) no serious general condition; iv) no active double cancer; v) no clinical need for psychiatric treatment for depression, adjustment disorder, etc. and vi) no difficulty in understanding the essence of the study.

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Abbreviation: PMR, progressive muscle relaxation

These patients were requested to participate in the study from June 2002 to April 2003 in cancer center A and from October 2006 to February 2008 in cancer center B.

### Intervention methods

This study employed a short-term (6-week) psychosocial group intervention, which had been verified to be effective for Japanese patients with primary/recurrent breast cancer.<sup>4, 10</sup>

A total of 6 weekly 90-min sessions of group intervention were given to a group of 3 to 8 participants. Each session consisted of education on methods for coping with stress and for solving problems (20 min), discussion on coping (50 min) and learning about PMR (20 min).

### Evaluation

Intervention scenes were recorded with a digital video camera or IC recorder and later transcribed verbatim. The original records were discarded after verbatim transcripts were made.

### Ethical considerations

After obtaining approval from the ethics committees of the two research institutions and Fukuoka Prefectural University, the outline of the study, voluntary nature of participation and preservation of anonymity were explained verbally and in writing to the subjects and group intervention participants, and their consent to participate in the study was obtained.

### Analysis methods

For the analysis, we used a method to qualitatively and inductively extract factors creating group dynamics from the verbatim transcript data according to the purpose of the study, based on the concept of a phenomenological method.<sup>13</sup> First, we repeatedly read the interview descriptions to grasp the whole context, grouped similar expressions, compared and investigated the relationships among them, and named each group so that it represented a distinct meaning. We further reviewed the verbatim transcripts many times to check whether the given group names reflected the true nature of the data. We further grouped similar expressions, compared and investigated the relationships among them. By repeating these procedures, we abstracted expressions gradually. Expressions, for which the true nature of meaning was captured, were extracted as methods of the interventions used by facilitators.

In this process, we had discussions many times to improve the reliability and validity of the study and to investigate whether the results were reliable and symbol-

ized the “real” world of the subject (reliability), whether the study was conducted in the context considering the environment of the subject and all circumstances (meaning in the context), explanations and interpretations were adequately given, and whether the results found in this study could be applied to similar contexts or situations (transferability).

## RESULTS

### Characteristics of the subjects

**An experienced facilitator:** An experienced facilitator had experience as a nurse for more than 10 years, had experience of nursing breast cancer patients for more than 3 years, had received facilitator training and had experience as a facilitator of group interventions for more than 3 years.

**New facilitators:** Two new facilitators had experience as nurses for more than 10 years on average and had received facilitator training. These facilitators operated a 6-session course for the first time.

**An experienced sub-facilitator:** An experienced sub-facilitator had experience as a nurse for more than 10 years, had experience of nursing breast cancer patients for more than 5 years, had received facilitator training and had experience as a facilitator and sub-facilitator of group interventions for more than 5 years.

**A new sub-facilitator:** A new sub-facilitator had experience of medical care for psycho-oncology and breast cancer patients for 8 years and had received group facilitator training.

### A factor creating group dynamics during the group intervention:

As a result of the analysis, a core category “partnership” was extracted as a factor creating group dynamics during the group intervention (Table 1). In addition, there were differences in subcategories between experienced and new facilitators. Hereinafter, categories are shown in “ ” and subcategories in < >, and interventions used by facilitators on which these extractions were based in bold.

**“Hard effort”** This category means that facilitators worked exceedingly hard to interact therapeutically with participants. Even when the facilitators could not make skillful interventions, their sincerity was expressed in emotions and conveyed to the participants. This category included 3 subcategories.

<**Skillful interventions**> This subcategory means that in intervention facilitators speculated what a participant intended with his/her words and enhanced the feelings that he/she

**Table 1. Comparison of partnership between experienced and new facilitators**

Core category	Category	Subcategory in experienced facilitators	Subcategory in new facilitators
Partnership	Hard effort	Skillful interventions	Skillful interventions
		Interventions out of focus	Interventions out of focus
		Defense of the position of medical professionals	Defense of the position of medical professionals
	Harmony of the whole group	Watching over movements	Watching over movements
Promotion of exchange		Promotion of exchange	
Collaboration between therapists	Role complementation	Enhancement of mutual support	Enhancement of mutual support
			Need for support

wanted to convey so that the other participants could share his/her feelings.

Participant 15: “The doctor came to me to collect blood saying, ‘I want to check your blood oxygen content,’ and stuck a needle into my artery, like this. It was very painful. The doctor said, ‘I am scared, too’ (laughing). ‘I am scared, too’ (laughing). It was like a near-death experience.”

Participant 20: “I’m sorry to hear that. You really had a hard time.”

Facilitator A: “**I see. Your story . . . it was like you came back alive.**”

Participant 15: “When I thought about it later, it was . . .”

**<Interventions out of focus>** This subcategory means that facilitators dealt with the superficial meanings of words in discussion and failed to deal with the true meanings of the story behind the words, or improperly focused on a topic that a participant did not want the other participants to know.

Participant 4: “When someone tells me ‘You’re doing well,’ I just think, huh. I’m a worth.”

Participant 2: “I cry, maybe because the tension I feel is released all of a sudden.”

Participant 4: “I see.”

Facilitator A: “**So . . . maybe you usually . . . make a strong effort.**”

Participant 4: “I wouldn’t say I am making an effort like this (standing up firmly) . . . or maybe I do. I don’t know.”

**<Defense of the position of medical professionals>** This subcategory means that when medical services were criticized in the discussion, facilitators improperly explained the present state of, and/or defended, the medical services.

Participant 22: “When I saw a doctor at another hospital, a local hospital, I was told I had lung cancer and I was referred to this hospital. The doctor at the local hospital told me, ‘The amount of cancer is no problem, at least for a while, so let’s just leave things as they are.’ But I insisted on getting some treatment and visited a pulmonologist, complaining of severe symptoms, and it was finally found out that water had begun to accumulate in my lungs. So, if I think about my relationship with the

attending physician in this discussion, I start to feel like I can’t trust him or her because of that experience.”

Facilitator A: “**Other situations like this also often occur in this hospital, and many patients go through something similar. So when the doctor told you, ‘Let’s wait and see,’ the doctor might not mean that he or she knew was their cancer but would leave it alone.**”

**<Harmony of the whole group>** This category was also common to both experienced and new facilitators and is necessary for peaceful discussion among participants as the basis on which group dynamics work among participants. This category included 3 subcategories.

**<Watching over movements>** This subcategory means that when discussion was active in a group, facilitators wouldn’t dare to make active interventions.

Participant 26: “Well, I would like to take a trip, first of all. I will work harder for that and want to make an effort. After I began to come here, my anxiety went away a little bit, or considerably. My anxiety, anxiety in my feelings, has gone away completely.”

Participant 20: “(laughing) But you were anx. . .”

Participant 26: “No! It was real . . . really!”

Participant 21: “You’ll be OK.”

Participant 20: “Thanks, I appreciate that.”

Participant 21: “You’ll be OK, because you’re a cheerful person. A lot of patients tend to be emotionally unbalanced . . . (omission).”

Participant 26: “So, feelings are important. People say worry is often the cause of illness.”

Participant 21: “In places like this . . .”

Participant 26: “We have to chase our gloomy feelings away.”

**(The discussion continued as participants supported each other, and Facilitator A felt no need to take part in order to keep harmony in the group.)**

**<Promotion of exchange>** This subcategory means that facilitators took care so that all participants were able to take part in a discussion.

Facilitator A: “**Everyone has various problems. I think everyone tries desperately to make an effort the first time . . . with various problems . . .**”

Participant 15: "That's right. I really think so, too. I did not think I would die of cancer the first time around." (**Participant 26 came in the room when Participant 15 was speaking**)

Participant 21: "Right! The first time around! But the second time . . . somehow . . . I don't know yet. My point of view has changed."

Participant 15: "Right, but the first time around, I thought it [the cancer] was all gone."

Participant 26: "Me, too. I thought it was all gone . . ."

Participant 21: "The bad part of mine was resected, and I thought it was all gone, too."

Facilitator A: "**Welcome Ms. 26. Thank you for coming.**" (**Everyone agreed**)

Participant 26: "I'm sorry for interrupting. I had to work late, but I thought I could finish work early today . . . (omission)"

**<Enhancement of mutual support>** This subcategory means that in interventions, facilitators suggest that participants mutually express their feelings, share them and support each other, thereby making them all feel that they are surviving together.

Participant 16: "She was told, 'You can take a trip again and it is OK for you. If you undergo surgery soon, you will be fine.'"

Participant 8: "I see, but . . ."

Participant 16: "But, I myself couldn't think and my mind went blank . . ."

Participant 8: "I'm just a parent . . . It is only talk. If you are ill yourself like us, you would not be sensitive."

Facilitator A: "**Well, this place is where you can share your feelings like this and consult with me or each other.**"

Participant 8: "That's right."

**"Collaboration between therapists"** This category was also common to both experienced and new facilitators and means that therapists, i.e., a facilitator and a sub-facilitator in charge of education, collaborated so that group dynamics could work between them. Two therapists recognized the differences between them and complemented each other in their roles, which made the process of education and the discussion go smoothly in the group interventions. This category included 2 subcategories.

**<Role complementation>** This subcategory means that a sub-facilitator, whose main role was to provide education, and a facilitator, whose main role was to make interventions so that group dynamics would start to work in the discussion, understood each other's roles and complemented each other's weak points.

Participant 3: "I have always . . . thought positively, and I controlled myself as much as I can so that I would not be depressed. When recurrence occurred, I thought it was the same as death. But, thanks to this place, I can now expect my hair will grow again and expect other good

things. I now have something like a [progress] scale and it encourages me (omission). I already think I've gotten quite old, and I will not raise children any more (laughing). But, I think it is enough for me if I can live day by day."

Facilitator A: "I think Ms. 3 is great because she has been thinking positively from the beginning. It is important to have positive thinking, but it is also important to face the present situation . . ."

Sub-facilitator A: "**I think positive thinking includes more than hard effort.**"

Participant 2: "At first, I thought I had to control myself in that way and I had to be positive . . . which was like pressure. But I came to think I can sometimes be depressed, and I came to think I don't necessarily have to work hard . . . (laughing)"

**<Need for support>** This subcategory means that when a new facilitator did not know how to talk to participants and how to intervene, a sub-facilitator skillfully makes an intervention instead of the facilitator.

Facilitator B: "Well, let's start the discussion. In previous sessions, we talked about connections with people and support from people. Today's theme is the relationship with attending physicians, families, friends and society. I think sometimes you're supported by these people but sometimes you're not. Everyone, please give your opinion on how to cope with problems when you are not supported, or what to do when you cannot cope with problems . . . or you can ask for advice . . ."

Sub-facilitator B: (**looking at the clock**)

Facilitator B: (**Facilitator B became aware that he/she should ask the participants whether they had time to continue the session**) "This session is originally scheduled to end at 16:30. But, I would like to extend the discussion for about 10 min. The session is scheduled to end at 16:30, but I would like to continue the session until about 16:40. Is that OK for you? (**the facilitator looks at the sub-facilitator**)

Sub-facilitator B: "Ms. 37 has to travel a long way."

Facilitator B: "I see. Ms. 37, are you OK with that?"

Participant 37: "It's OK for me. But we can't really discuss anything in only 10 min, can we?"

## DISCUSSION

A qualitative inductive analysis revealed that 3 factors creating group dynamics, "hard effort," "harmony of the whole group" and "collaboration between therapists," all coexisted as [partnership]. In addition, these 3 categories were observed in both experienced and new facilitators. However, there were some differences in the content of these categories between new and experienced facilitators.

First, the category of "hard effort" included 3 subcategories, <skillful interventions>, <defense of the position of medical professionals> and <interventions out of focus>. <Skillful interventions> was extracted, because

facilitators had virtual experiences in facilitator training as facilitators and patients in group interventions. In particular, experienced facilitators were considered to be able to make some interventions based on their past experiences, because they had encountered various scenarios. On the other hand, not only new facilitators, but also experienced facilitators experienced <defense of the position of medical professionals> and <interventions out of focus>, suggesting that it is very difficult even for experienced facilitators to always make effective group interventions in a stream of group interventions. However, even if facilitators and sub-facilitators could not make skillful interventions, their feelings that they wanted to interact with and support the participants with all their might were conveyed to the participants as “hard effort”. Probably for this reason, the participants supported facilitators and continuously attended as many as 6 sessions. Concerning qualifications required for facilitators, this study suggested that it is necessary for facilitators to have an attitude of not being dependent on others only because they are new facilitators, or are not satisfied with their experiences, as well as an attitude of continuously and seriously facing participants, as described by Spiegel et al.<sup>14</sup> and Kiba et al.<sup>15</sup> This indeed was considered to be the basic attitude required for facilitators who handle group interventions.

The category of “harmony of the whole group” included 3 subcategories, <watching over movements>, <promotion of exchange> and <enhancement of mutual support>. These intervention forms, observed in both new and experienced facilitators, are required to construct and maintain group dynamics that improve the effectiveness of group interventions. These results may be attributable to facilitator training, as in the case of basic facilitator skills, and the fact that facilitators discussed the condition of each participant and movements in each group before and after every group intervention and thereby obtained suggestions for better intervention methods. In addition, it was considered that <watching over movements> alone made group dynamics work in discussion, since the subjects were female patients which and were given an explanation about discussion sessions when recruited. There are female patients has resistance to talk each other less than male patients.

<Role complementation> and <need for support> were extracted in experienced and new facilitators, respectively, as subcategories of the category of “collaboration between therapists”. New facilitators have little empirical knowledge and sometimes do not know how to manage a group, which may influence the harmony of the whole group, and eventually influence whether or not group dynamics work well. Classen et al.<sup>7</sup> pointed out

that if facilitators have little experience, group interventions are often less effective. From this, if a new facilitator makes interventions, it is recommended to assign an experienced facilitator as his/her partner or to deploy additional staff so that other staff can oversee the whole picture and support the new facilitator.

To improve the effectiveness of group interventions, it is important that facilitators adjust the environment so that group dynamics work, as described by Yalom and Vinogradov.<sup>11</sup> The results of this study showed that there was a structure in which “harmony of the whole group” and “collaboration between therapists” coexisted based on the basic attitude of “hard effort”. In addition, these 3 subcategories created partnership among facilitators, sub-facilitators and participants. Yalom and Vinogradov<sup>11</sup> reported that group interventions created group dynamics in which participants understood each other’s situation and supported each other. The present study also showed that group dynamics worked in group interventions. A characteristic feature observed in the present study was that even when facilitators and sub-facilitators were beginners, group interventions allowed participants to understand each other’s situation and support each other. Classen<sup>7</sup> stated that interventions by new facilitators could not contribute to the improvement of the quality of life of participants, but this does not seem to be the case if the group dynamics of the participants.

In conclusion, A qualitative inductive analysis of the verbatim transcripts of group interventions extracted 3 categories, “hard effort,” “harmony of the whole group” and “collaboration between therapists,” as [partnership] which is a factor creating group dynamics. There was a structure in which “harmony of the whole group” and “collaboration between therapists” coexisted based on the basic attitude of “hard effort.” It is suggested that these 3 intervention forms are involved in group dynamics in which participants can have smooth discussions, and that these forms are techniques necessary for group interventions contributing to changes in the quality of life of the participants.

*The authors declare no conflict of interest.*

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## The Skills of Facilitator Nurses in Psycho-Social Group Intervention for Cancer Patients

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### ABSTRACT

**Background** The objective of this study was to provide cancer patients with a psychosocial group intervention consisting of 3 parts, i.e., education on how to cope with stress and solve problems, group discussions, and progressive muscle relaxation, and to investigate the intervention techniques of Japanese facilitators.

**Methods** Group interventions for breast cancer patients performed by 3 facilitators were analyzed qualitatively and inductively using a phenomenological approach.

**Results** The skills of facilitators included 10 intervention techniques and 1 problem in interventions. Intervention techniques, which promote group dynamics and thereby help participants acquire improvements in their coping abilities and quality of life (QOL), were somewhat different between new and experienced facilitators, with the content showing immaturity and maturity in the new and experienced facilitators, respectively. Both experienced and new facilitators faced the risk of experiencing problems in interventions, which countered the purpose of the intervention of improving the participants' coping abilities or QOL.

**Conclusion** While intervention skills are necessary for facilitators to execute group interventions, it must be borne in mind, that even well-experienced facilitators may not always be able to accomplish skillful intervention.

**Key words** group intervention; facilitator; nurse; art of intervention; cancer patient

Recent advances in cancer treatment have enabled breast cancer patients to live longer and longer. Accordingly, the problem of breast cancer patients carrying psychological burdens, such as anxiety and depression, and living their lives with psychosocial problems<sup>1</sup> has appeared.

Thus, increasing attention has been paid to the psychosocial problems of breast cancer patients, and studies have been conducted to verify the effectiveness of psychosocial interventions for reducing the psychological burden of breast cancer patients and for improving their quality of life (QOL).<sup>2–4</sup> Group interventions, often consisting of education on how to cope with stress and how to solve problems, group discussions and progressive muscle relaxation (PMR)<sup>4</sup> were first developed in Western countries, and have also been verified to be effective in Japan.<sup>2,3</sup>

Many attempts have been made to undertake psychosocial group interventions for cancer patients, and these interventions are expected to spread in popularity in the future. Therefore, it is our task to improve the therapeutic environment for providing group interventions. One of the problems in this task is the shortage of people who can act as facilitators. Facilitators execute interventions, while perhaps having difficulty in managing participants with problems and in overcoming anxiety due to a lack of knowledge and fear of executing such interventions.<sup>6</sup> Under such circumstances, there are no systematic reports on the facilitators' intervention methods.

Based on the above background, we undertook psychosocial group intervention in this study consisting of 3 parts, i.e., education on how to cope with stress and solve problems, group discussions and PMR, which has been shown to be useful for Japanese breast cancer patients,<sup>2</sup> with the aim of investigating the actual intervention skills employed in the intervention methods used by Japanese facilitators. Clarification of the facilitators' intervention styles in group interventions for cancer patients in this study is expected to form one of the bases for finding the direction for facilitator education and for contributing to the dissemination of group interventions.

### SUBJECTS AND METHODS

#### Subjects

#### Facilitators

Group intervention facilitators in cancer centers A and B were eligible for the study if they i) had experience as nurses for 5 years or more, ii) had received facilitator

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Abbreviations: PMR, progressive muscle relaxation; QOL, quality of life

training in advance and iii) wished to play a role in facilitating discussions among the participants (as facilitators).

### **Participants of the group intervention**

Breast cancer patients followed in cancer centers A and B were eligible for the study if they met the following criteria: i) adult women aged 20 years or older; ii) histological diagnosis of breast cancer and presence of histologically and/or clinically evident breast cancer; iii) no serious systemic conditions; iv) no active double cancer; v) no clinical need for psychiatric treatment (that is, no depression, adjustment disorder, etc.); vi) no difficulty in understanding the purpose of the study (that is, no impairment of consciousness including advanced dementia and delirium, mental retardation, etc.) and vii) pertaining to the disease stage, first recurrence in cancer center A and during or after chemotherapy in cancer center B.

The eligible patients were asked to participate in the study from June 2002 to April 2003 in cancer center A and from October 2006 to February 2008 in cancer center B.

### **Intervention methods**

This study employed a short-term (6-week) psychosocial group intervention, which has been verified to be effective in Japanese primary and recurrent breast cancer patients.<sup>2</sup>

In the group intervention, a total of six 90-min weekly sessions were undertaken for groups of 3 to 8 participants each. Each session consisted of education on how to cope with stress and how to solve problems (20 min), discussion on the ability to cope (50 min) and training for PMR (20 min).

### **Evaluation**

Intervention scenes were recorded with a digital video camera or IC recorder and later transcribed verbatim. The original recorded data were discarded after the verbatim transcripts were prepared.

### **Ethical considerations**

The study was approved by the Ethical Committees of the 2 research facilities and the Fukuoka Prefectural University. The outline of the study, the voluntary nature of participation and the preservation of anonymity were explained verbally and in writing to the study subjects and group intervention participants, and written consent to participate in the study was obtained from each of the participants.

### **Analysis methods**

For the analysis, we used a method of qualitatively and inductively extracting the facilitators' intervention styles from verbatim transcripts according to the purpose of the study, by reference to the phenomenological method.<sup>7</sup> First, we repeatedly read the verbatim transcripts to grasp the whole context, and then divided and classified the transcripts into expressions with similar meanings. Next, we comparatively investigated the relationships among these expressions and gave them names with meanings. We reviewed the verbatim transcripts again and again to check whether the given names represented the true nature of the data, further divided and classified the expressions according to their meanings, and comparatively investigated the relationships among them. We gradually abstracted the expressions by repeating these procedures, which allowed extraction of the true nature of each expression, and obtained the facilitators' intervention methods.

In this process, we repeatedly held discussions to improve the reliability and validity of the study, i.e., investigated whether the results were reliable and represented the "real" world of the study subjects (reliability), and whether the study was conducted in context considering the environment of the study subjects and all circumstances (meaning in context), whether all possible explanations and interpretations were thoroughly considered, and whether the results found in this study were applicable to other similar contexts or situations (transferability).

## **RESULTS**

### **Subjects' characteristics**

#### **Experienced facilitator**

One facilitator in cancer center A who had experience as a nurse for more than 10 years, had 3 years' experience of nursing breast cancer patients, had received facilitator training and had 3 years' experience as a group intervention facilitator took charge of a total of 18 sessions for 3 groups.

#### **New facilitators**

Each of the 2 facilitators in cancer center B who had experience as a nurse for more than 10 years on average and had received facilitator training took charge of 6 sessions for 1 group each (total 12 sessions). These facilitators performed the 6-session intervention for the first time.

#### **Skills of facilitators**

The analysis of the facilitator nurses' intervention methods enabled extraction of the "skills of facilitators" as the core category (Table 1). In addition, there was a dif-

ference in the categories derived from this core category between the experienced and new facilitators. Hereinafter, the core category is shown in “”, the categories in [ ],

the subcategories in < >, the discussion themes in italics with \*, and the facilitators’ interventions based on which the categories were extracted in bold.

**Table 1. Comparison of the skill of facilitators between experienced and new facilitators**

Core category	Categories	Subcategories (experienced facilitators)	Subcategories (new facilitators)
Skill of facilitators	Intervention skills	To proceed with the intervention	To proceed with the intervention
		To speak for the participants	To speak for the participants
		To encourage participants to reflect on themselves	To encourage participants to reflect on themselves
		To protect the participants’ physical health	To protect the participants’ physical health
		To protect the participants’ mental health	To protect the participants’ mental health
		To face participants with the facilitators’ reality	To face participants with facilitators’ reality
		Presence	Presence
		To grasp the context	To grasp the context
		To return the topic to the theme	To return the topic to the theme
		To weave different skills together	
	Problem in interventions	Inability to perform skillful interventions	Inability to perform skillful interventions

**“Skills of facilitators”**

This core category refers to facilitators steering the discussion according to the theme with the aim of making the group dynamics work, toward a decrease in psychological burden and improvement in the QOL, which are the purposes of group interventions, and use the necessary techniques for the participants. The categories of [intervention techniques] and [problem in interventions] were extracted from this core category.

**[Intervention techniques]**

This category means that facilitators promote group dynamics when performing group interventions. This was useful for the participants to acquire improvement in their coping ability and QOL. From this category the following subcategories were extracted: <to proceed with the intervention>, <to speak for participants>, <to encourage participants to reflect on themselves>, <to protect the participants’ physical health>, <to protect the participants’ mental health>, <to face participants with the facilitators’ reality>, <presence>, <to grasp the context>, <to return the topic to the theme> and <to weave different skills together>. Of these, <to weave different techniques together> was only extracted in the experienced facilitator.

**<To proceed with the intervention>**

This subcategory is an intervention method in which facilitators take care so that the group intervention goes on without problems, by correctly allocating time to each part of the group intervention and giving each participant an equal opportunity to speak. Facilitators may

answer medical questions, if they think that it would reduce the participants’ anxiety and thereby allow the intervention to go on more smoothly. This is an intervention technique with which facilitators proceed with interventions not as the chair, but by taking an overview of the whole group and grasping the participants’ feelings.

Participant 26: “Oyster supplement, I know that. It is said to be good for health, particularly for people with cancer.”

Participant 20: “A small bottle is very expensive, and costs 10,000 yen, but my mother worries about me and sends me several bottles of the supplement. Like so, people around me worry about me.”

Facilitator A: **“Well, it may depend on how you tell people around you. This topic is the theme in the next week, and I hope you will talk a lot about it again next week. Now, let’s begin relaxation.”**

(Start of relaxation)

**<To speak for the participants>**

This subcategory is an intervention method in which facilitators sympathize with and express in words what the participants really want to say and how they feel. The participants were often unable to well express their feelings in words, and their true intentions often lay behind their words.

Participant 31: “Colleagues in the workplace are in their 20s and 30s, and I told them, ‘You should at least undergo breast cancer screening’. I actually let them touch my

breast, saying ‘This stiffness! If you feel this stiffness in your breast, it’s absolutely too late!’”

Facilitator B: **“Those people will never forget it. You don’t want them to suffer as you do. I suppose that is the thought dominating your mind.”**

Participant 31: “That’s right.”

#### **<To encourage the participants to reflect on themselves>**

This subcategory is an intervention method in which facilitators try to make the participants aware of coping and management methods that the participants themselves may not be aware of from the various experiences that are talked about. The purpose of this intervention method is to make participants understand their own trends in coping and other people’s coping methods and utilize such understanding in the future.

Participant 3: “We are planning to go to Tokyo, and this is the second visit to Tokyo in my life. So, I’m looking forward to it. I am going to expand my activities. Now I take very good care of myself to avoid becoming ill.”

Facilitator A: **“In your story you seem to enjoy your life more than ever before....”**

Participant 3: “Yes..., it seems like I am freed from my fetters. I was a housewife and I kept to my house. I used to feel timid when I went on a visit and stayed over somewhere.”

#### **<To protect the participants’ physical health>**

This subcategory is an intervention method in which facilitators show that they try to support participants, prevent a participant isolated from the others in discussions, consider the participants’ health status, etc.

The facilitators took care of the participants’ health, asked them in advance about any physical problems such as pain, and provided cushions for everybody if any participants of the group had pain. In addition, because most participants were receiving chemotherapy, the facilitators provided them with water or hot tea for hydration.

#### **<To protect the participants’ mental health>**

This subcategory is an intervention method in which facilitators provide participants with a safe, easy-to-talk place by keeping the discussion confidential themselves and asking the participants also to do so.

Participant 30: “(After self-introduction) Every day there are times when I feel tremendously blue, and every day I shed tears. Please don’t be put off! I am naturally sentimental (while shedding tears).”

Facilitator B: “(While handing Participant 30 facial tis-

ues) **It is important to express your feelings, and nobody will laugh or be put off. This is a place that we can share, that is protected, and that we try to protect.”**

Participant 30: “Thank you (she continued to shed tears).”

#### **<To face participants with facilitators’ reality>**

This subcategory is an intervention method in which the facilitators frankly speak what they themselves feel while facing the participants. The relationship between facilitators and participants is not the same as the relationship between therapists and patients; a facilitator is always one of the group members who views things from the perspective as the participants.

Participant 1: “I visited palliative care unit in my daughter’s workplace. How would you feel if your parent were admitted to your workplace...palliative care unit...Ms A (facilitator), will you find it burdensome?”

Facilitator A: **“...Let me think about that?... No, I don’t think so...What does your daughter say about that?”**

Participant 1: “My daughter says, ‘You can come to our hospital.’”

#### **<Presence>**

This subcategory is an intervention method in which the facilitators share space with the participants, stay with them, and understand, or try to understand, and share their natural feelings. The facilitators focused on what was going on among the participants here and now and stayed with their feelings at each moment.

Participant 15: “Clothes..., my husband ask me to buy clothes a lot, but before I die, I won’t wear the clothes... But, now I think I will buy some... I’ve come to feel like this. I also bought clothes for the first time in several years.” (everyone laughed.)

Facilitator A: **“That’s a great change, isn’t it? (joyfully)”**

Participant 15: “Yes! That’s really a great change.”

#### **<To grasp the context>**

This subcategory is an intervention method in which facilitators judge what the topic of the participants’ discussion is at each moment and whether the topic is consistent with the theme of the session or would lead to an improvement in the participants’ QOL and coping ability.

*\*Under circumstances in which the number of times PMR exercises performed by the participants had*

*decreased*

Participant 26: "Some time ago I was told I should not carry heavy things after shopping in supermarkets."

Participant 27: "In my case, so many people deliver things to me saying, 'I did shopping around here, so I thought I would buy for you.'"

Participant 20: "I thought the diseased limb just hung down from the body, but I used it a lot."

Participant 27: "I exercise gymnastics in my bed."

Facilitator A: **"Oh, really?" (in response to the remark concerning PMR, the facilitator directed the discussion to the initiation of PMR.)**

#### **<To return the topic to the theme>**

This subcategory is an intervention method used when the topic of the group discussion deviates from the theme. The facilitators fully explained the theme to the participants in advance to avoid deviation of the topic of discussion from the selected theme. When the topic of discussion deviated from the theme, the facilitators found parts of the topic overlapping with the theme and pointed out the relationship between those parts of the topic and the theme to return the topic to the theme, or directly pointed out the deviation from the theme.

*\*Theme: "from surgery to disclosure of the diagnosis of recurrence"*

Participant 10: "On some occasions from the third year...and because I had a job (laughing)...(omission) I worked a little too hard, and I developed recurrence in a little over 4 years. Maybe I was overconfident." (the participants agreed.)

Participant 10: "I had recurrence in the bone...(omission)."

Facilitator A: **"A moment ago you told me that you were overconfident... (the facilitator repeated what the participant said about the condition before recurrence)."**

Participant 10: "That is right. I had surgery in my right breast, and the right breast had been swollen for a long time."

#### **<To weave different techniques together>**

This subcategory is an intervention method that was extracted only in the experienced facilitator. The facilitator performed the intervention for multiple participants according to the situation quick-wittedly, combining humor with his/her intervention techniques and dealing with problems that could not be solved at that moment sometime later in the sessions.

*\*To execute the intervention while considering the participants' feelings*

Participant 1: "After my drugs were changed, I felt uneasy and I visited the doctor every week. Then the doctor told me, 'How about participating in a clinical trial?' The instruction brochure for the trial said, 'For patients with bone metastases from breast cancer', and I knew immediately that I had bone metastases."

Participant 2: "I feel both uneasy and positive. Sometimes I am depressed, and sometimes I feel positive and think I have to work hard. I was told about recurrence... and of course I was shocked. But my feeling of uneasiness and fear of recurrence were gone, and in this sense I felt relieved."

Facilitator A: **"Both of you sometimes think you will work hard and sometimes feel uneasy, but maybe you will eventually work hard by finding your own way to cope. I wonder whether other participants have similar experiences... (while looking at Participant 3)"**

Participant 3: "I don't particularly have such experiences... My initial symptoms were not so severe and I was optimistic. Other participants experience times of serious despair, and I am surprised."

#### **[Problem in interventions]**

Facilitators always have to keep this category in mind when performing group interventions. This category does not contribute to improvement of the participants' coping ability or QOL, and both experienced and new facilitators face the risk of experiencing this problem. This category included the subcategory of <Inability to perform skillful interventions>.

#### **<Inability to perform skillful interventions>**

This subcategory refers to facilitators becoming enthralled by the participants' words and forgetting their role as therapists and becoming too confused to decide how to intervene. This was more commonly extracted in the new facilitators than in the experienced facilitator.

Participant 35: "But, if I have recurrence, I will think differently...in such a case. So, the first thing I want to think about now is how to prevent recurrence. If I can prevent recurrence by thinking positively, I think I have to think positively."

Facilitator B: **(the facilitator's mind went blank, with the body frozen and the face down, looking at the feet.)**

## **DISCUSSION**

[Intervention techniques], one of the 2 categories under the core category of "skills of facilitators", included the following 10 subcategories: <to proceed with the intervention>, <to speak for participants>, <to encourage

participants to reflect on themselves>, <to protect the participants' physical health>, <to protect the participants' mental health>, <to face participants with a facilitator's reality>, <presence>, <to grasp the context>, <to return the topic to the theme>, and <to weave different techniques together>; the other category, namely, [problem in interventions], included one subcategory, that is, <inability to perform skillful interventions>.

At first, the subcategory of <inability to perform skillful interventions> under the category of [problem in interventions] was commonly observed in the new facilitators. The new facilitators, like the experienced facilitator, also had long experience of interacting with cancer patients in clinical settings and experienced simulation training for facilitators as group intervention facilitators and patients. However, they supported actual patients in group interventions for the first time, and it seemed difficult for them to cope with each situation. Classen<sup>8</sup> reported that interventions by new facilitators cannot contribute to improvement of the participants' QOL. The effect of the intervention was not investigated in this study, however, considering from the results, it is difficult to rule out the possibility that the participants' QOL was not improved by the new facilitators' intervention. In addition, even experienced facilitators sometimes cannot maintain concentration during the 50-min sessions and sometimes cannot instantly grasp the meaning of what the participants are saying. It was revealed that <inability to perform skillful interventions> is a problem that can be faced by both new and experienced facilitators, suggesting that it is necessary for both new and experienced facilitators to continue to earnestly face participants, as described by Spiegel et al.<sup>9</sup> and Kiba and Maruguchi.<sup>10</sup>

Regarding [intervention techniques], we were afraid that there might be facilitator techniques that new facilitators may not be able to use with ease. However, both new and experienced facilitators could use all techniques with equal ease, except for the applied techniques of <to weave different techniques together>. This seemed to be because the facilitators were explained the purposes, methods and effects of group interventions in advance in the facilitator training, therefore, even new facilitators understood the concept of group interventions. On the other hand, both new and experienced facilitators faced the risk of experiencing [problem in interventions]. In addition, the facilitators were also provided simulation training on the techniques necessary for all 6 sessions of the group intervention by role playing. Therefore, it seemed that all the facilitators could use most facilitator techniques effectively. Previous studies<sup>10, 11</sup> have also pointed out the necessity of role-play training, and the results of this study also revealed the effectiveness

of facilitator training prior to group interventions. In addition, in this study, the facilitators held discussions about the condition of each participant and trends in each group before and after each group intervention session, which enabled even the new facilitators to understand the direction of their own group and to use most techniques efficiently. However, <to weave different techniques together> is an applied skill using which facilitators can execute effective interventions for multiple participants at the same time, and it appeared that this technique could be used only by the experienced facilitator. The art of intervention revealed in this study was different from that reported by Yalom.<sup>12</sup> This difference could be attributed to cultural differences between Japan and western countries.

Previous reports on group interventions have focused on the effects of the interventions and the facilitators' anxiety and understanding of their roles, but not fully addressed the role of role playing.<sup>11</sup> For reducing the facilitators' anxiety,<sup>6</sup> it is necessary to provide them with a deeper understanding of the interactions between facilitators and participants in group interventions and to provide simulation training on the skills necessary for facilitators. For this purpose, it is considered necessary to develop programs in which the trainees can spend much time in role playing as simulation training.

*The authors declare no conflict of interest.*

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# A Single Session of an Integrated Yoga Program as a Stress Management Tool for School Employees: Comparison of Daily Practice and Nondaily Practice of a Yoga Therapy Program

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## Abstract

**Objectives:** The aim of this study was to assess the effect of the daily practice of a yoga therapy program learnt during a single session of an integrated yoga intervention that was developed by us as a stress management tool for school employees.

**Subjects:** Ninety school employees.

**Design:** Case–control study. Three months after the intervention, the subjects were assigned to a daily practice group (case:  $n=43$ ) and a nonconsecutive daily practice group (control:  $n=47$ ) according to their daily practice level of the yoga therapy program.

**Interventions:** The subjects participated in a stress management education program based on an integrated yoga therapy session. The program included psychological education and counseling about stress management and yoga theories, as well as the practices of asanas, pranayama, relaxation, and cognitive structure based on Indian philosophy.

**Outcome measures:** Assessments were performed before and after the program using the Subjective Units of Distress for mind and body and the Two-Dimensional Mood Scale. The General Health Questionnaire 28 (GHQ28) was used to assess the mental health state before the intervention and at 3 months after the program.

**Results:** The subjects showed significant increases in their levels of calmness, comfort, and cheerfulness ( $p<0.001$ ) and significant decreases in cognitive mind and body stress ( $p<0.001$ ) after participating in the integrated yoga program. A comparison of the total scores on the GHQ28 using a two-way analysis of variance showed significant differences between the two groups in terms of both interaction ( $p=0.047$ ) and the main effect ( $p=0.026$ ).

**Conclusions:** The present results suggested that a single session of an integrated yoga program was effective for reducing stress and that the mental health of school employees was promoted by the daily practice of the yoga therapy program.

## Introduction

**I**N JAPAN, STRESS MANAGEMENT is now positioned as an important issue, as reflected in the preparation of mental health guidelines.<sup>1</sup> Teachers, in particular, suffer from greater job stress than workers of general corporations in Japan, and the absentee rate of Japanese teachers because of mental disease has increased by about 3-fold over the last 10 years.<sup>2</sup> Japanese teachers reportedly find it difficult to assist students, such as those with developmental disorders or

attention-deficit/hyperactivity disorder, who need special support and to satisfy the requirements of their students' parents. In addition, they are busier and work longer hours to submit an increasing number of papers on different aspects of school education at the expense of spending time communicating with their students.<sup>3</sup>

The use of yoga to reduce stress has been attempted in various groups, including pregnant women,<sup>4</sup> women during the climacteric period,<sup>5</sup> patients with physical/mental disorders or diseases associated with stress (hypertension,<sup>6</sup>

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pain,<sup>7</sup> cancer,<sup>8-10</sup> or psychiatric diseases<sup>11,12</sup>), individuals who may be exposed to high levels of stress (e.g., managers,<sup>13,14</sup> university staff,<sup>15</sup> or social workers<sup>16</sup>), children at educational facilities,<sup>17-19</sup> and also for individuals suffering from postdisaster trauma (e.g., tsunami survivors<sup>20</sup>). Yoga is an ancient Indian science and way of life that brings about relaxation and also induces a balanced mental state. It involves the technique of harmonizing individual dimensions (physical, vital, mental, and spiritual dimensions) based on the *Taittreya Upanishad* (a theory of the five sheaths of our existence) and *Patanjali's Yoga Sutras*. Yoga incorporating these techniques in their entirety is practiced as integrated yoga.<sup>4,5,8-10,19-22</sup> According to past studies, an integrated yoga course for stress management requires about a week.<sup>23-28</sup> However, for stress management courses held at educational facilities or industrial fields, the course often needs to be brief and should be provided in such a way that the techniques can be acquired in one to a few sessions of training, as the recipients may not always be interested in the practice of yoga. Bearing this in mind, we designed a program that could be administered in a single session as a component of stress management education and assessed the benefits of the program.

The aim of this study was to assess the effect of the daily practice of integrated yoga taught during a single session of an integrated yoga program that we developed as a stress management education tool for school employees.

### Materials and Methods

This study was conducted with the approval of the Ethics Review Board of the Graduate School of Biomedical and Health Sciences, Hiroshima University.

#### Participants

The subjects were 90 volunteers (24 males and 66 females) attending a stress management workshop. All the participants were school staff members, including school managers, teachers, school nurses, school office workers, nutritionists, and cooks. Subjects who had any history of practicing yoga or any other relaxation procedures were excluded from the present study.

#### Intervention

In the design of stress management programs for individuals, emphasis should be placed on reducing the attendees' psychological resistance and enhancing their motivation to practice the techniques in daily life.<sup>29</sup> Programs with an

easily and clearly understandable rationale and techniques that can be practiced easily and usefully are important prerequisites of stress management programs for general individuals who are not typically interested in yoga, especially if the amount of time available to administer the program is limited.

In this study, we administered the program as a single 3-hour session, as a component of a Stress Management Education<sup>30</sup> program. The program included group psychological education (60-minute session) intended to impart an understanding of the concepts related to stress (step 1), including the definition of stress, the types of stress, reactions, neuropsychiatry, immunology, and so on, and individual counseling (30-minute session) to encourage the participants to become aware of their own reactions to stress (step 2). In addition, stress management techniques (90-minute session) based on theory and practice were also included in the integrated yoga program to help cope with stress (step 3). Theoretical explanations (45-minute session) were provided regarding (1) deepening of relaxation through repeated cycles of tension and relaxation, (2) deepening of both motion and respiration through linkage between the two, (3) slow deep breathing practice (*Pranayama*), (4) concentration on attention enabling deep meditation (*Dharana*), (5) chanting of sacred verses (*Svadyaya*), (6) Indian philosophy applicable to daily living (*Karma Yoga*), and (7) the theory of the five sheaths of existence (*Pancha koshas*) (citing the phrase, "Try to touch the inner core of oneself in solitude and establish in the experience that *Ananda* is the basic fabric of this universe, including the self")<sup>22</sup> (Table 1). The subsequent 45-minute training program was focused on controlling stress, shoulder stiffness, and lower back pain (Fig. 1).<sup>23</sup> In the training, the participants were instructed to concentrate on their body sense and breathing and to make suitable movements with their own body and mind.

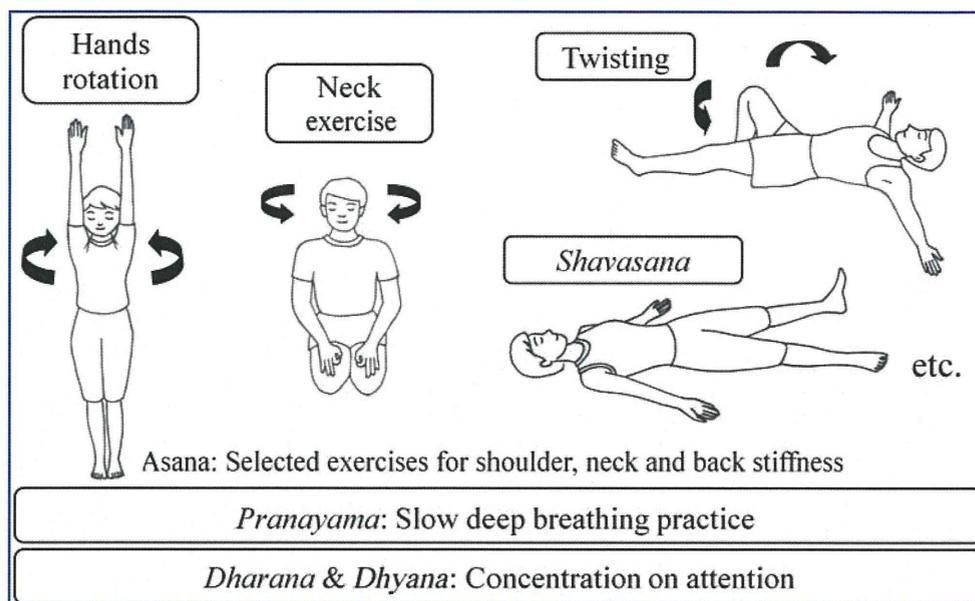
#### Study design and setting

After the single session of the integrated yoga intervention, the participants were recommended to practice what they had learned in the yoga therapy program on a daily basis. Three months after the intervention, the participants were asked whether they had practiced the yoga therapy program daily or not. We divided the participants into two groups based on whether they had continuously practiced the program for 3 months. As a result, the subjects were assigned to a daily practice group (DP group), in which the subjects had practiced the program more than 3 days a week for 3 months at home, at the workplace, or while commuting, and so forth,

TABLE 1. THEORETICAL EXPLANATIONS BASED ON THE INTEGRATED YOGA

Type	Explanations
<i>Asana</i>	1. Deepening of relaxation through repeated cycles of tension and relaxation
<i>Asana &amp; pranayama</i>	2. Deepening of both motion and respiration through their linkage
<i>Pranayama</i>	3. Slow deep breathing practice
<i>Dharana &amp; dhyana</i>	4. Concentration on attention enabling deep meditation
Indian philosophy for daily living	5. Reading of sacred verses or books ( <i>Svadyaya</i> )
	6. Indian philosophy applicable to daily living ( <i>Karma Yoga</i> )
	7. "Try to touch the inner core of oneself in the experience that is the basic fabric of this universe including the self" ( <i>Panchakoshas</i> )

**FIG. 1.** Yoga therapy program based on the integrated yoga.



and a nonconsecutive daily practice group (NDP group), in which the subjects had practiced the program on 2 days or less each week.

#### Assessment

Immediately before the intervention and 3 months after the intervention, the General Health Questionnaire 28 (GHQ28) was used to assess the recent mental health status. The GHQ designed by Goldberg,<sup>31,32</sup> is a self-administered questionnaire that was developed to identify psychiatric morbidity in general practice. It is composed of 28 items organized in four subscales, and measures somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression. The responses to all the items are graded using a four-point scoring system: better than usual, same as usual, worse than usual, and much worse than usual. The cutoff total score for the diagnosis of good mental health is 5/6.

Immediately before and after the intervention, a test was conducted to assess the cognitive indicators of stress using the Subjective Units of Distress (SUD: ranging from 0, no stress, to 10, extreme stress) covering physical and mental aspects, as well as the Two-Dimensional Mood Scale<sup>33</sup> (TDMS: each of cheerfulness and stability level scored from -10 to +10, and each of comfort and awareness level scored from -20 to +20). Immediately after the intervention, the subjects were also asked to complete another questionnaire regarding (1) whether there were any stress management techniques in each group that individual subjects might desire to apply in their daily lives, and (2) any techniques at all that the subjects might desire to apply in their daily lives.

#### Data analysis

After performing the Kolmogorov-Smirnov test of normality, the physical/mental SUD scores and TDMS scores recorded before and after the intervention were compared using the Wilcoxon's signed rank sum test. The changes in the total score and the scores for each subscale on the

GHQ28 in the DP group and the NDP group were assessed using a paired *t*-test. Comparison of the total scores on the GHQ28 recorded before and 3 months after the intervention between the two groups was performed using a two-way repeated-measures analysis of variance (ANOVA). Furthermore, the difference in the total scores on the GHQ28 recorded 3 months after the intervention between the two groups was assessed using a *t*-test.

The *p*-values in all the tests were 2-sided, and a *p*-value < 0.05 was considered to denote significance. All the statistical analyses were performed using IBM SPSS Statistics, ver. 21.0.

#### Results

At 3 months after the intervention, the 90 subjects were classified into a DP group of 43 participants (13 males and 30 females) and an NDP group of 47 participants. Among the 47 participants in the NDP group, 23 (4 males and 19 females) practiced the program 1-2 days a week and 24 (7 males and 17 females) did not practice the program at all. There were no significant differences in the numbers of males and females (DP group: male/female = 13/30, NDP group: male/female = 11/36;  $p = 0.485$ , chi-square test) or age (DP group: mean  $\pm$  SD = 49.1  $\pm$  9.2 years, NDP group: mean  $\pm$  SD = 47.2  $\pm$  8.3 years;  $p = 0.302$ , *t*-test) between the groups. Furthermore, no significant differences in the stress levels observed before the intervention were seen between the two groups: total GHQ score (DP group: mean  $\pm$  SD = 9.0  $\pm$  5.3, NDP group: mean  $\pm$  SD = 9.7  $\pm$  6.4;  $p = 0.575$ , *t*-test); physical (DP group: median = 6.0, NDP group: median = 5.0;  $p = 0.545$ , Mann-Whitney *U*-test), and mental (DP group: median = 5.0, NDP group: median = 5.0;  $p = 0.292$ , Mann-Whitney *U*-test) stress in the SUD; and cheerfulness (DP group: median = 2.0, NDP group: median = 0.5;  $p = 0.080$ , Mann-Whitney *U*-test), stability (DP group: median = 5.0, NDP group: median = 5.0;  $p = 0.973$ , Mann-Whitney *U*-test), comfort (DP group: median = 6.5, NDP group: median = 5.0;  $p = 0.267$ , Mann-Whitney *U*-test), and awareness (DP group: median = -2.5, NDP group: median = -3.0;  $p = 0.181$ , Mann-Whitney *U*-test) levels in the TDMS.

TABLE 2. COMPARISON OF THE GENERAL HEALTH QUESTIONNAIRE 28 SCORES RECORDED BEFORE THE INTERVENTION AND 3 MONTHS AFTER THE INTERVENTION IN EACH GROUP

	Before the intervention, mean (SD)	3 months after the intervention, mean (SD)	p <sup>a</sup>
<b>DP group<sup>b</sup></b>			
Total scores	9.02 (5.33)	5.53 (4.50)	0.021
Subscales scores			
Somatic symptoms	3.30 (1.94)	2.11 (2.02)	0.001
Anxiety and insomnia	3.34 (1.87)	2.20 (1.79)	0.002
Social dysfunction	1.97 (1.94)	0.86 (1.40)	0.001
Severe depression	0.39 (0.62)	0.34 (0.71)	0.688
<b>NDP group<sup>c</sup></b>			
Total scores	9.72 (6.46)	9.38 (5.89)	0.712
Subscales scores			
Somatic symptoms	3.65 (2.10)	3.44 (1.98)	0.515
Anxiety and insomnia	3.42 (2.20)	3.36 (2.35)	0.845
Social dysfunction	1.85 (2.01)	1.85 (1.98)	0.999
Severe depression	0.78 (1.73)	0.72 (1.39)	0.767

<sup>a</sup>Paired *t*-test.

<sup>b</sup>Daily practice group, in which the subjects had practiced the yoga therapy program more than 3 days a week.

<sup>c</sup>Nonconsecutive daily practice group, in which the subjects practiced the yoga therapy program on 2 days or less each week.

*Comparison of physical/mental stress and TDMS scores recorded before and after the intervention*

After the intervention, the scores for both physical stress ( $p < 0.001$ ) and mental stress ( $p < 0.001$ ) decreased, and the scores for stability ( $p < 0.001$ ), comfort ( $p < 0.001$ ), and cheerfulness ( $p < 0.001$ ) increased. No significant difference in the score for awareness ( $p = 0.107$ ) was observed before and after the intervention.

*Comparison of the GHQ28 scores recorded before the intervention and at 3 months after the intervention*

Regarding the changes in the total and subscale scores on the GHQ28, the total score and the scores for somatic symptoms, anxiety and insomnia, and social dysfunction significantly decreased in the DP group; on the other hand, no significant changes in either the total or subscale scores on the GHQ28 were observed in the NDP group (Table 2).

A comparison of the total scores on the GHQ28 using two-way ANOVA showed significant differences between the two groups in terms of both interactions and the main effect (Table 3). Furthermore, a significant difference in the total score on the GHQ28 at 3 months after the intervention was observed between the two groups ( $p = 0.002$ ).

**Discussion**

After the intervention, the SUD scores for physical and mental stresses decreased, while the TDMS scores for stability, comfort, and cheerfulness increased. The results suggested that the participants were able to master the integrated yoga techniques for coping with stress, taught as a component of a stress management education program administered in a single session of 3-hour duration. A previous report showed that yoga practice reduced negative mood and enhanced positive mood, yielding emotional stability.<sup>34</sup> The results of the present study support this previous finding.

The mean total score on the GHQ28 before the intervention was 9.4. This score suggested that the participants had severe mental health problems because the cutoff point of the total score on the GHQ28 for the diagnosis of good mental health is 5/6. At 3 months after the intervention, the DP group showed a significant decrease in the score to less than 6, suggesting the resolution of the mental health problems. Moreover, the GHQ28 subscale scores for somatic symptoms, anxiety and insomnia, and social dysfunction also showed significant decreases. In contrast, no significant changes in either the total or any of the subscale scores of the GHQ28 were observed in the NDP group. These results are consistent with previous reports that showed the effects of successive yoga intervention sessions on improvements in the GHQ28 scores,<sup>27</sup> and the results of physiological monitoring and brain imaging for somatic symptoms,<sup>35</sup> anxiety,<sup>36</sup> insomnia,<sup>37</sup> and social dysfunction.<sup>38</sup> On the other hand, no significant change in the score for severe depression recorded before and at 3 months after the intervention was observed in the DP group. This is thought to be because the severe depression score before the intervention was too low to improve.

The daily practice of yoga has been reported to reduce perceived stress and to improve adaptive autonomic responses to stress.<sup>39</sup> The daily practice of the yoga therapy program in this study may have reduced physical and mental stress and increased comfort according to the TDMS, which is negatively correlated with the salivary cortisol level,<sup>40</sup>

TABLE 3. COMPARISON OF THE TOTAL SCORES ON THE GENERAL HEALTH QUESTIONNAIRE 28 BETWEEN THE TWO GROUPS

	Time				Effects					
	Before the intervention		3 months after the intervention		Interaction: group × time			Main effect: group		
	DP group, mean (SD)	NDP group, mean (SD)	DP group, mean (SD)	NDP group, mean (SD)	Freedom	F <sup>a</sup>	p	Freedom	F <sup>a</sup>	p
GHQ28 total scores	9.0 (5.3)	9.7 (6.4)	5.5 (4.5)	9.3 (5.8)	1	6.15	0.015	1	5.13	0.026

<sup>a</sup>F-statistic in repeated measures analysis of variance.

GHQ28, General Health Questionnaire 28; DP, daily practice; NDP, nonconsecutive daily practice.