Feasibility and effectiveness of a cosmetic intervention program for institutionalized older women in Japan

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A B S T R A C T

We examined the feasibility and effectiveness of a cosmetic intervention program for frail older women. Thirty-nine older adults (83.0 ± 8.65 years) from two nursing homes in Tokyo were allocated to a cosmetic (intervention: n = 27) or a light-exercise (control: n = 12) group according to their nursing home residence. Both groups attended weekly classes over a 5-week period from May to June 2009. The program feasibility was examined using class participation, class attendance, and program adherence rates, while the effectiveness of the program was examined using the Geriatric Depression Scale (GDS) and participants’ engagement in positive activities (i.e., engaging in social activities and going outside). The intervention group showed significantly higher rates on all feasibility measures than did the control group (class participation: 24.1% vs. 13.3%, class attendance: 75.5% vs. 32.6%, program adherence: 70.8% vs. 10.0%). Furthermore, the GDS scores decreased significantly in the intervention group, but not the control group. Although the change in GDS score was larger in the intervention group (−1.30 ± 2.36) than in the control group (−0.75 ± 3.53), the inter-group difference in this change was not significant. No significant differences were found between pre- and post-intervention positive activity rates in either group, or in the inter-group comparisons of changes in these rates. Overall, the cosmetic program was highly feasible and effective for improving the mental health of frail older women. However, further studies using longer intervention periods and larger samples would be needed to identify the program effectiveness.

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1. Introduction

Exercise programs that involve muscle-strength training, such as resistance training and stretching, have been demonstrated to be effective as part of nursing care prevention efforts (Fiatarone et al., 1994; Oida et al., 2003). However, the usage rate of such exercise programs by frail older adults is extremely low (Harada et al., 2008). Therefore, it would be important to develop new nursing care prevention programs that frail older adults—the target population of long-term care prevention services—can join and adhere to for longer periods, in place of these earlier exercise programs.

Frail older adults targeted for long-term care prevention services exhibit significant declines in activities of daily living due to their decreased physical functioning (Ono, 2009). They also tend to experience declines in psychological health, which often manifest as impaired cognitive functioning and depression; notably, these declines can often precede the aforementioned declines in physical and functional activities (Ono, 2009). Therefore, it is important for frail older adults to maintain or improve their mental health. As such, it is necessary to develop nursing care prevention programs for mental health that are easy to join and attend for longer periods for frail older adults, particularly for older women. Because the ratio of women among the oldest-old population is especially higher than that of men and is expected to increase in the next few decades in Japan, nursing care prevention programs might focus on maintaining the health of older women in particular.

Both young and older women tend to have a high level of interest in beauty (Taoka et al., 2007). Indeed, many women perform cosmetic routines on a daily basis, and these routines reflect their own individuality. Changing one’s normal appearance can have notable psychological effects, including promoting therapeutic levels of excitement and satisfaction or encouraging more proactive interpersonal behaviors (Yogo, 1990). Studies of cosmetic interventions in clinical settings have noted improvements in the quality of life and psychological health status of patients with cancer (Kendrick, 2008), psychiatric disorders (Hama et al., 1990; Hibino et al., 2002), and dementia (Hara, 2004). However,
few Japanese or international studies have reported on the effects of using cosmetic activities as a therapeutic intervention for institutionalized or community-dwelling frail older women.

Therefore, we developed a cosmetic intervention program intended to improve the psychological and social health of frail older women. In this study, we examined the program's feasibility and effectiveness.

2. Methods

2.1. Participants

Participants were recruited from among residents living in two nursing homes operated by the same social welfare corporation in Hachioji, Tokyo, Japan. Both facilities were located near local communities and were similar in terms of their design and living conditions. Participants were recruited using two methods, which were the same at both sites. First, handmade posters informing residents that an intervention class would be held and that they could register for it at the office of that facility were posted on bulletin boards throughout each facility. Additionally, care staff members in each facility were asked to introduce the class to residents at facility meetings and recommend that they participate.

Thirty-nine residents volunteered as participants for this study. Oral and written information concerning the initial investigation and the details of the intervention were provided to all them. Participants who were able to comprehend and make decisions personally signed the consent forms; in contrast, a legally authorized representative, such as a family member or facility director, signed the consent form for participants who were judged as having difficulty in comprehending and making decisions.

The specific inclusion criteria included being an older woman residing in one of the two nursing homes, being capable of continuous participation during the intervention period, and consenting to participate. The exclusion criteria included diagnosed or suspected dementia or being judged by facility workers as having difficulty in participating in the study. A physician diagnosed all cases of dementia; suspected cases were identified by facility workers based on their observations of potential participants during daily activities.

This study was conducted after obtaining the approval of the Research Ethics Review Board of the School of Sport Sciences, Waseda University.

2.2. Study design

This was an intervention study with a non-randomized cluster allocation. We assigned participants to an intervention or control group arbitrarily according to the facility in which they lived. Specifically, 27 residents of Facility A (mean age 82.3 ± 9.3 years) were assigned to a cosmetic intervention group (i.e., intervention group) and 12 residents of Facility B (mean age 81.8 ± 6.1 years) were assigned to a light-exercise intervention group (control group).

2.3. Intervention protocol

The intervention period was four weeks from May 27 (one week after baseline) to June 24, 2009. During this period, the intervention group participated in a health class involving cosmetic activities designed for this study, while the control group participated in a health class comprising tea parties and light calisthenics. Both groups attended the classes once a week for five weeks and each class lasted for approximately 60 min.

2.4. Intervention program

The intervention program was conducted by licensed beauticians and volunteers who had completed an educational course developed by the researchers. The aim of the cosmetic intervention was for participants, by the final class, to be able to apply cosmetics on their own. In other words, the program was designed to teach methods of applying cosmetics, starting with passive methods and progressing to active ones. The program staff comprised one volunteer beautician who taught cosmetic skills to participants and volunteers who provided support for each participant.

The control group's classes were conducted under the same conditions (i.e., time, frequency, and duration) as the intervention group's to ensure that we isolated the effects specific to the cosmetic program—in other words, to ensure that we excluded unplanned intervention effects, such as a “group effect.” The class routine comprised staff endorsements of the participants' physical condition (10 min), simple calisthenics performed in a sitting position (20 min), and teatime (30 min).

2.5. Assessment of program feasibility

We evaluated the feasibility of both programs based on class participation, mean class attendance, and program adherence rates. The class participation rate was calculated by dividing the number of residents in each group who participated in the baseline investigation (i.e., number of registrants) by the total number of female residents in each facility. The mean class attendance rate was calculated by dividing the number of participants who attended each class by the number of enrolled participants in each group. The mean value of the class attendance rates of the five classes was used as the mean attendance rate. Finally, the program adherence rate was calculated for each participant by dividing the number of times that the person attended the program by the total number of classes (i.e., five). Participants with a class adherence rate of 80% or higher were defined as “program adherents.” We calculated the program adherence rate of each group based on the ratio of program adherents to the total number of class registrants of each group. Participants who were hospitalized, withdrew from the facility, or died were excluded from calculations of the class attendance and program adherence rates from the point that attendance was not possible.

2.6. Assessment of program effectiveness

2.6.1. Assessment

Both groups were evaluated before and after the intervention. The post-intervention evaluation was performed before the final class for both groups to prevent the occurrence of any acute effects of the intervention on the final measure of its effectiveness. Mental status was assessed using a self-administered questionnaire. For participants who were unable to complete the questionnaire, the research staff, who had received appropriate training before the intervention, administered the questionnaire via an interview. The following measures were used.

2.6.2. Depression

The 15-item (i.e., shorter) version of the Geriatric Depression Scale (GDS) was used to evaluate mood (Yatomi, 1994). Participants who scored five points or higher were judged as being depressed; higher scores indicated more severe depression.

2.6.3. Positive activity

Participants' engagement in positive activity was judged according to their desire to go outside and to participate in the facility's social activities. In response to the question, “How do you feel about going outside?” participants selected one of four answers: (1) strong desire to go outside, (2) moderate desire to go outside, (3) little desire to go outside, and (4) no desire to go outside. We also assessed participants' desire to participate in the leisure, cultural, or educational activities held in the facility (13 activities in the intervention facility and 14 activities in the control facility). Most activities were held once a month. This desire was assessed with the question, “Do you want to participate in activities
Participants selected one of four answers in response: (1) strong desire to participate, (2) moderate desire to participate, (3) little desire to participate, and (4) no desire to participate.

2.7. Statistical analysis

The equivalence of the baseline data between the intervention and control groups was determined using the independent t-test, Mann–Whitney U test, and chi-squared test. The statistical significance of any inter-group differences in class participation and program adherence rates was examined using the chi-squared test, while an independent t-test was used for the mean class attendance rates. The Mann–Whitney U test was used to examine changes in participants’ GDS scores as a result of the intervention. An analysis of covariance was used to examine between-group differences in the groups’ pre- and post-intervention changes using group and time as explanatory variables and baseline GDS score, gender, and age as covariates. McNemar’s test was used to compare the rates of the participants who responded positively (answers 1 and 2) to the questions in each positive activity before and after the group interventions. A z-test was used to analyze inter-group differences in changes in participants’ desire to pursue the positive activities based on the assumption that the between-group difference of this variable was normally distributed. SPSS Statistics 22 for Windows was used for all analysis, and the significance level was set at 0.05.

3. Results

Fig. 1 shows the flow chart of the study’s participants. Seven intervention-group participants were dropped from the study (four refused to participate, one died, one was hospitalized, and one left the facility), along with four control-group participants (two refused to participate, one was hospitalized, and one left the facility). The baseline comparison of participant characteristics revealed no significant differences between the intervention and control groups (Table 1).

|                        | Intervention group | Control group | Inter-group differences |
|------------------------|--------------------|---------------|-------------------------|
| Age (years)            | 82.9 ± 9.84        | 83.3 ± 5.06   | 0.914                   |
| Body height (cm)       | 143.0 ± 4.95       | 142.40 ± 9.15| 0.754                   |
| Body weight (kg)       | 44.9 ± 6.38        | 44.3 ± 7.39   | 0.880                   |
| BMI                    | 22.0 ± 3.52        | 22.1 ± 5.07   | 0.875                   |
| Psychological health status (GDS scores) | 4.6 ± 2.96 | 5.4 ± 2.45 | 0.493 |
| Positive activity (yes, %) | | | | |
| Desire to participate in social activities in nursing homes | 55 | 87.5 | 0.194 |
| Desire to going outside | 60 | 100 | 0.063 |

3.1. Program feasibility

The class participation, mean class attendance, and program adherence rates are shown in Table 2. The intervention group showed significantly greater class participation, mean class attendance, and program adherence rates than did the control group.

3.2. Program effectiveness

Changes in GDS scores and positive activity rates from before to after the intervention in each group, and the inter-group differences in these changes, are shown in Table 3.

The GDS score showed a significant decrease from before to after the intervention in the intervention group, whereas no significant change was found in the control group. Regarding the differences in program effectiveness, the adjusted mean difference (± standard error) in GDS scores between the groups was $-0.99 ± 1.01$. Although the change...
was larger in the intervention group than in the control group, it did not reach statistical significance.

The ratio of participants who responded positively to the questions regarding their desire to participate in social activities increased by 20 percentage points (55.0% before the intervention and 75.0% after the intervention) in the intervention group, whereas a 25-percentage-point decrease was found in the control group (87.5% before the intervention and 62.5% after the intervention). However, these changes were not significant in either group, and no significant difference in these changes was found between the groups. Furthermore, we found no changes in the percentage of participants who responded positively to going outside in the intervention group (60.0% both before and after the intervention); in contrast, 100% of those in the control group responded positively at baseline, whereas only 75% did so after the intervention. However, no significant within-group change in the control group or between-group differences in these changes were found in these participation items.

4. Discussion

We developed a cosmetic intervention program to promote mental health among institutionalized older women. In developing a health promotion program, it is important to consider both its effectiveness and its feasibility. Thus, we assessed both of these parameters using a quasi-experimental design and frail women participants from two nursing home facilities.

We used three indicators (class participation, mean class attendance, and program adherence rates) of program feasibility. The class participation rate in the intervention group was 1.8 times the rate in the control group. To our knowledge, no similar studies have reported nursing home residents’ participation rates in health programs in Japan. According to the Fact-finding Survey on Long-term Care for the Elderly in Japan (Ministry of Health, Labour and Welfare, 2011), the participation rate in an exercise class involving a motor function improvement program for community-dwelling older adults was only 8.3%. Notably, the participation rate of the control group in the present study was 5 percentage points higher than this rate. One possible reason for the higher participation rate in the control group is that the classes were held in participants’ residences. However, importantly, the intervention group showed a significantly higher participation rate than the control group. A possible reason for the higher participation rate in the intervention group is the characteristics of the intervention program, specifically its beauty-related contents. In other words, its contents may have been particularly interesting to potential participants, which in turn may have contributed to the higher participation rate.

The mean class attendance and program adherence rates of the intervention group (75.5% and 70.8%, respectively) were higher than were those of the control group (32.6% and 10.0%, respectively). In a study by Tabira et al. (2008) on the prevention of dementia progression in community-dwelling older adults who were suspected of having mild dementia, 22% of the participants attended all nine of their program’s classes. Of course, the participants’ characteristics and the intervention period of Tabira et al.’s study differed from those of the present study, which makes it difficult to directly compare the results of these two studies. However, the adherence rate in the control group of our study was only 10%, which was notably lower than that in Tabira et al. (2008). Thus, the content of the control group’s program (light calisthenics and teatime) might not have been sufficiently interesting to participants. In contrast, the intervention group in the present study showed more than twice the adherence rate reported by Tabira et al. (2008); furthermore, the attendance rate for each class was high (mean: 70.8%) and 75.5% of participants attended 80% or more of the classes. One possible reason for the high rates of class attendance and program adherence in the intervention group of this study was that participants could attend classes in the facility in which they lived. Another possible reason is that the program’s content matched participants’ interests: specifically, the classes might have met participants’ psychological needs by providing a sense of satisfaction. This has been supported by past research indicating that cosmetic activities are associated with feelings of satisfaction arising from the pleasant sensations of self-caressing and the fulfillment of a desire to change one’s appearance (Matsui et al., 1983). Furthermore, the volunteers in charge of the intervention group’s classes supported participants’ engagement in cosmetic activities; thus, a relationship of mutual trust might have been formed, which might have contributed partly to the intervention group’s high rates of class attendance and program adherence.

A health benefit expected of the cosmetic program was an improvement in participants’ depression. No studies have examined the effects of a cosmetic intervention on depression, although one study did report an improvement in participants’ mood after such an intervention.

### Table 2
Comparisons of the class participation rates, mean class attendance rates, and program adherence rates between the two groups.

| Measures | Intervention group | Control group | p |
|----------|--------------------|---------------|---|
| n = 27   | n = 12             |               |   |
| Class participation rates (%)<sup>a</sup> | 24.1 (27/112) | 13.3 (12/90) | <0.005 |
| Mean class attendance rates (%)<sup>b</sup> | 75.5 ± 6.8 | 32.6 ± 14.4 | <0.001 |
| Adherence rates (%)<sup>c</sup> | 70.8 (17/24)<sup>d</sup> | 10 (1/10)<sup>d</sup> | <0.001 |

The significance of the differences between the control and intervention groups is shown with p values.

<sup>a</sup> Class participation rate was calculated by dividing the number of residents who participated in the baseline investigation (number of registrants) by the total number of residents in each facility.

<sup>b</sup> Mean class attendance rate was calculated by dividing the number of participants who attended each class by the number of enrolled participants in each group. The mean value of class attendance for the five classes was used as the mean attendance rate.

<sup>c</sup> Program adherence rate was calculated for each participant by dividing the number of times that the person attended the program by the total number of classes (five).

<sup>d</sup> Participants who were hospitalized, withdrew from the facility, or died were excluded from the calculations of class attendance from the time that attendance was not possible.

### Table 3
Changes in the GDS score and percentages of the desire to participate in facility activities and to go outside from baseline and the differences in these changes between the intervention and control groups.

| Measures                                      | Intra-group changes | Control group | Inter-group differences in change |
|-----------------------------------------------|---------------------|---------------|-----------------------------------|
|                                               | Intervention group  | n = 20        | Control group                      |
| Mean<sup>a</sup>                              | SD                   | p             | Mean<sup>a</sup>                  | SD                   | p             | Mean<sup>a</sup> | SE | p   |
| GDS score                                     | −1.30                | 2.36          | 0.028                             | −0.75                | 3.53          | 0.498          | −0.99 | 1.007 | 0.334 |
| Desire to participate in facility activities (%) | 20                  | 0.219<sup>c</sup> | 0.007                             | 25                  | 0.625         | >0.05         | >0.05<sup>d</sup> |       |     |
| Desire to go outside (%)                       | 0                   | 1.000<sup>d</sup> | 0.500                             |                    |               |               |       |     |     |

SD = Standard Deviation; SE = Standard Error; GDS = Geriatric Depression Scale.

<sup>a</sup> Mean intra-group changes were calculated by subtracting pre-intervention values from post-intervention values in each group.

<sup>b</sup> Mean inter-group differences in changes in GDS were adjusted for age and baseline value.

<sup>c</sup> Intra-group changes in the percentages of participants who desired to participate in facility activities and go outside from before to after the intervention were examined using McNemar’s test.

<sup>d</sup> Inter-group differences in changes in the desire to pursue positivity activities were examined using z-tests.
Specifically, Ramkumar et al. (2009) reported that a massage intervention helped to increase participants' energy level by stimulating feelings of pleasantness. However, their study did not include a control group, which was a serious flaw in their design. The act of participating in groups or interacting with others can also independently improve participants’ psychological conditions (group effects Shinkai, 2005); thus, the potential influence of the group effect must be considered. However, we might discount the group effect because the programs share common applications of intervention components, such as the timing, frequency, and duration of socialization (e.g., by offering the opportunity for class participants to talk with each other and intervention staff during the class). Therefore, the differences in intervention effects on GDS score between the groups would not be influenced by the group effect. Although other unknown components may differ between the programs, it is not possible to clarify how much they affected the differences in intervention effects between the groups. We believe, however, that the difference in intervention effects is mainly due to the differences in the main program components—namely, cosmetics or exercise.

In the present study, a significant improvement in the GDS score was observed only in the intervention group, but no significant inter-group difference in the change in GDS score was observed. Furthermore, the inter-group difference in the change had a rather small effect size, at 0.368. These results suggest that the cosmetic program is effective in improving the mental health of frail older women, but that its specific effect is small and remains unclear. This lack of an inter-group difference in depression may be related to the intervention’s length and frequency. The intervention period was short (five weeks) and only four classes were held before evaluating the program’s effects. Psychological changes can occur even during a single intervention (Nakahata and Yoshida, 2007), and long-term effects can be obtained from an accumulation of short-term effects. Therefore, we surmise that the program’s effects would increase with the intervention period. Mean intra-group changes in total GDS scores in the intervention and control groups were −1.30 and −0.75 points, respectively. We might thus presume that the specific effect of the cosmetic intervention program would increase along with the length of the intervention period. Another reason for the non-significant inter-group difference would be the small sample size, which reduced the statistical power to detect significant differences. Therefore, the specific effect of cosmetic intervention program on GDS score should be examined over a longer period and with an adequate number of participants in a future study. For reference, we have calculated the necessary sample size that future cosmetic intervention studies can use to detect a sufficiently powerful specific intervention effect on depression. Specifically, using an α of 0.05, a power of 0.80, a mean change of 1.00, and a standard deviation of 2.72, we found that each group must have a sample size of 117 for sufficient power.

The health care program was also expected to improve participants’ daily life activities (Shinkai, 2005; Sugai et al., 1996). The percentage of participants in the intervention group who indicated a desire to participate in social activities increased from 55.0% to 75.0%. Although the change was not significant, an increasing trend was observed. These improvements are possibly due to the improved psychological health (i.e., reduced depression) among participants, which led to a stronger tendency for participants to desire to participate in facility activities. A previous study on older patients with dementia reported that the length of interactions significantly increased on days when an active care program was conducted compared to days when it was not (Tsutsumi et al., 2007). The social activities held in the facilities provided important opportunities for participants to leave their rooms and interact more with others. Previous studies have also noted that participation in such activities is related to higher levels of satisfaction among elderly adults (Sugai et al., 1996) and may help prevent “shutting themselves off from others” (Shinkai, 2005). However, these changes in the intervention group did not affect certain positive activities such as going outside of the facility. This result might be related to the small effect size (0.368) of the change in GDS score, or the fact that participants in this study lived in the facility and did not normally go outside.

This study has some limitations. First, the participants were all residents of nursing care facilities; thus, they are not representative of older women residing in the local community, which means that our results are limited to older women residing in similar facilities. Second, the small number of participants in each group limits the capacity to detect statistical differences. Third, the assignment of participants to the intervention and control groups was not random. Although statistical adjustments were performed for gender, age, and baseline scores, we cannot exclude the possibility of other confounding factors. Finally, as both intervention programs had a multicomponent nature, we can only tentatively conclude that the intervention effect of the GDS was due to the cosmetic application.

Despite these limitations, the cosmetic program developed for this study had high feasibility and may be effective for improving the mental health of frail older women. Future studies using randomization, larger samples, and longer intervention periods are needed to clarify the specific effectiveness of the cosmetic intervention program.

Conflicts of interest statement

The authors declare that there are no conflicts of interest.

Transparency Document

The Transparency document associated with this article can be found, in the online version.

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