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Effects of Cosmetic Therapy on Cosmetic Side Effects of Chemotherapy to Improve the Quality of Life of Cancer Patients

—Effects of Cosmetic Therapy on QOL of Cancer Patients

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Abstract

Introduction: Chemotherapy-induced skin symptoms are diverse and vary in severity. As more cancer patients live in the community while continuing treatment, changes in appearance due to skin disorders reduce their quality of life (QOL). Cosmetic therapy may be one effective method to improve QOL. We investigated the effects of cosmetic therapy on QOL of cancer patients with chemotherapy-induced changes in appearance. **Methods:** Female patients aged ≥ 20 years who underwent outpatient chemotherapy at our hospital and developed CTCAE ≥ grade 2 eyebrow or eyelash alopecia, or ≥ grade 1 skin hyperpigmentation were enrolled in this prospective study. Cosmetic therapy was performed by nurses who acquired skills in cosmetic therapy. QOL indices before and after cosmetic therapy were assessed and compared using Skindex-16, Visual Analogue Scale (VAS) skin condition and makeup satisfaction, and Cancer Patient Self-Efficacy Scale. **Results:** The study included 21 patients, 16 of whom were evaluated after cosmetic therapy. The mean age was 63.5 (43 -

79) years. The Number of cases by CTCAE grade were eyebrow alopecia grades 0/1/2 = 5/6/5, eyelash alopecia grades 0/1/2 = 3/7/6, and pigmentation grades 0/1/2 = 1/13/2. The Skindex-16 emotional score improved from 31.0 before to 3.7 after cosmetic therapy ($p < 0.01$), and overall score combining symptom, emotional, and functional subscales improved from 18.3 to 2.7 ($p < 0.01$). VAS skin condition satisfaction improved from 35.6 to 58.9 ($p < 0.01$) and makeup satisfaction improved from 44.5 to 80 ($p < 0.01$). **Conclusions:** Implementation of cosmetic therapy for cancer patients improved negative emotions caused by appearance changes associated with chemotherapy-induced skin damage, suggesting that cosmetic therapy improves QOL.

Keywords

Alopecia, Chemotherapy, Cosmetic Therapy, Pigmentation, Quality of Life

1. Introduction

In recent years, advances in cancer treatment and the development of outpatient treatment environments have led to an increasing number of cancer patients being able to maintain a social life while undergoing treatment. In particular, remarkable progress has been made in cancer chemotherapy through the development of new regimens, molecularly targeted drugs, immune checkpoint inhibitors, and other drugs that have dramatically improved the effectiveness of treatment, and cancer has now become a disease that patients can live with for a long time. At the same time, however, coping with the various side effects of cancer chemotherapy has become a challenge in balancing treatment and social life. It has been suggested that treatment-related changes in appearance have psychological and emotional effects that cause significant distress, such as a decrease in body image and self-esteem, limitations in social activities, and changes in interpersonal relationships [1] [2]. Alopecia has long been recognized as a common side effect of various chemotherapy regimens [1]. In addition, pigmentation caused by commonly used anticancer drugs and dermatitis caused by molecularly targeted drugs are also common side effects experienced by cancer patients in recent years [3] [4]. These cosmetic changes caused by cancer treatment have a significant emotional and psychosocial impact on cancer patients and significantly reduce their QOL [1] [5] [6].

Cosmetic therapy includes proper skin care management for sensitive skin with skin disorders and easy-to-learn, easy-to-use techniques for concealing skin disorders or skin surfaces with specially formulated cosmetics to temporarily give the skin a normal appearance. It has attracted attention in recent years because the application of specialized cosmetics often results in an immediate improvement in skin appearance, often to the satisfaction of the patient [7]-[10]. In this context, the efficacy of cosmetic therapy in improving the appearance of cancer patients has recently attracted attention [11]-[13]. For example, Haley *et al.* [11] reported

that skin care management with test products (skin moisturizers, facial moisturizers, and facial cleansers) improved the quality of life (QOL) of cancer patients undergoing chemotherapy or radiation therapy. In addition, the use of these products was effective in reducing skin toxicity symptoms such as skin dryness, hand-foot syndrome, and dermatitis. In addition, Titeca *et al.* [13] reported the benefit of cosmetic care interventions on QOL in 27 breast cancer patients in a multicenter prospective randomized controlled trial. The results of these studies suggest that cosmetic therapy may be effective in improving the appearance of chemotherapy-induced skin changes. And Wakeda T *et al.* reported that camouflage makeup improves QOL in cancer patients with treatment-related skin changes [14]. Appearance care is complex care that improves the patient's QOL from physical, psychosocial, and social aspects and is provided by healthcare professionals. Nurses provide holistic care on a daily basis based on a deep understanding of the disease, the treatment process, and the patient's psychology and background. Therefore, skin care and the use of makeup applied by nurses as a means of providing appearance care to patients can be expected to alleviate various distress caused by changes in appearance and improve their patients' QOL. However, research to date has been limited in scope, and it is not yet clear how cosmetic therapy specifically affects the QOL of cancer patients. In addition, chemotherapy-induced skin symptoms are diverse, including hair loss, skin pigmentation, pustular rash, edema, hand-foot syndrome, and nail changes, and vary in severity [15] [16]. Not all skin conditions may benefit from cosmetic therapy, and conditions with erosions or active dermatitis are difficult to treat with cosmetics; however, cosmetics may be particularly useful for conditions such as alopecia and hyperpigmentation, where the skin surface is less irregular [17]. The purpose of this study was to evaluate the effects of cosmetic therapy on the QOL of cancer patients and to gain a better understanding of the scope and magnitude of these effects. The results of this study are expected to provide important information on whether cosmetic therapy is beneficial in improving the QOL of cancer patients, and to support the usefulness of cosmetic therapies in patient care.

2. Methods

The study subjects were female cancer patients aged 20 to 80 years who received outpatient chemotherapy at Oita University Hospital between April 2022 and September 2023 and who had Common Terminology Criteria for Adverse Events grade 2 or higher alopecia of eyebrows or eyelashes, or grade 1 or higher facial skin pigmentation (**Table 1**). Cases with active dermatitis or severe rashes were excluded based on physician judgment, including consultation with a dermatologist when necessary. The intervention in this study was defined as the provision of specialized cosmetic products to the study subjects by nurses who were instructed in cosmetic therapy techniques to improve cosmetic side effects of chemotherapy, which the subjects were to practice applying at home from the time of counseling until two weeks after the second cosmetic therapy instruction session (**Figure 1**). The cosmetic therapy techniques were mainly related to skin care, skin

color coverage, and eyebrow and eyelash drawing. The nurses who directly supervised the patients had previously attended a specialized cosmetic therapy course taught by a beauty technician of Shiseido Co., Ltd. (Tokyo, Japan). The nurses, who learned cosmetic therapy techniques such as skin care management and color correction according to changes in skin tone, selection of cosmetics and concealers, and selection and application of foundation colors, provided hands-on guidance to the patients in the method of skin tone coverage. Patients were instructed to cover skin tone changes using special cosmetics (Perfect Cover Series Foundation and Powder provided by Shiseido Co., Ltd.) and achieve a natural appearance (**Figure 2**). The nurses also taught the patients how to draw eyebrows and eyelashes, including the basic balance of eyebrows that have been depilated due to the side effects of chemotherapy, how to check the position of the eyebrow head when depilating, how to choose eyebrows, techniques for drawing on sparse eyebrows, and techniques for drawing eyeliner. The first instruction session for patients was conducted by nurses, who performed the techniques for one hour. The second session was conducted by the patients themselves, with nurses providing assistance as needed.

Table 1. Patient inclusion and exclusion criteria.

Inclusion criteria
Female
Age 20 - 80 years
Outpatient
Histologically proven carcinoma
Undergoing chemotherapy or experienced chemotherapy
Alopecia of eyebrows and eyelashes of Grade 2 or higher, or hyperpigmentation of skin of Grade 1 or higher in the Common Terminology Criteria for Adverse Events v5.0
Performance status: 0, 1
Adequate organ function
Consent to join this clinical trial
Exclusion criteria
Male
Hospitalized patient
Previous history of hypersensitivity due to drug and/or cosmetics
Acne-like rashes or similar skin disorders
Severe complication
No ability or intention to comply with the protocol method
Physicians consider inadequate

We administered a questionnaire survey to each patient to obtain their impressions of the cosmetic therapy procedures. The cosmetic therapy evaluation procedure consisted of a questionnaire survey conducted immediately after consent was obtained, followed by post-guidance evaluation at 2-week intervals during each outpatient visit, with a second questionnaire survey administered as a final post-guidance evaluation (**Figure 1**). The survey items used for assessment were the Skindex-16 (**Table S1**) [18] [19], the Visual Analogue Scale (VAS) for skin and makeup satisfaction (**Figure S1**) [20], and the Cancer Patient Self-Efficacy Scale (**Table S2**) [21]. The nurse in charge explained the study to the patients, who then completed the questionnaire at each time point. The questionnaires were self-administered under the guidance of the nurse. This study was approved by the Research Ethics Committee of Oita University (No. B21-005).

Table 2. Patient characteristics.

Characteristic	N = 20 n (%)
Age, median (range)	63.5 (43 - 79)
Performance status	
0	13 (65)
1	7 (35)
Primary cancer lesion	
Gastrointestinal	12 (60)
Gynecological	7 (35)
Respiratory	1 (5)
Chemotherapy regimen	
5-fluorouracil included	12 (60)
Irinotecan included	9 (45)
Taxane included	10 (50)
Platinum included	14 (70)
Time of chemotherapy	
Past	0 (0)
Present	20 (100)
Skin adverse events due to chemotherapy	
Alopecia of eyebrows (Grade 0/1/2)	6/9/5
Alopecia of eyelashes (Grade 0/1/2)	5/9/6
Hyperpigmentation of the face (Grade 0/1/2)	2/16/2

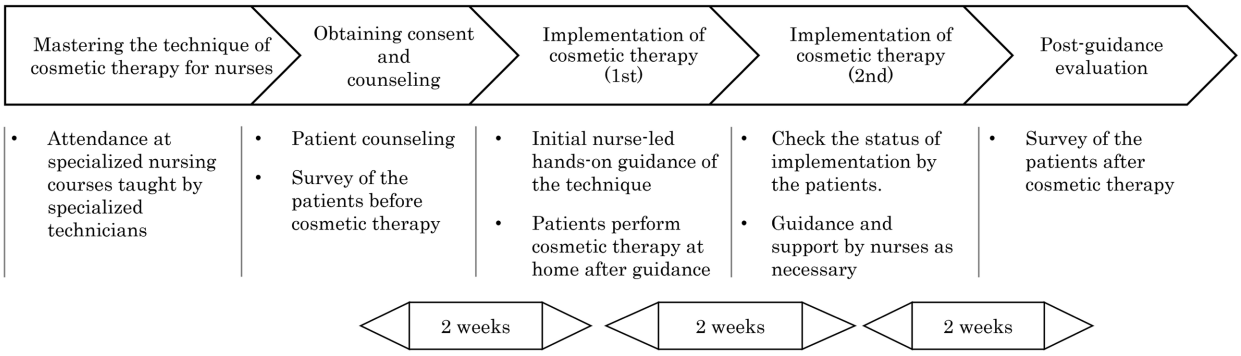

Figure 1. Intervention schedule. Patients received guidance on cosmetic therapy twice and could practice on their own at home.

Figure 2. Skin condition before and after cosmetic therapy. The facial skin is covered to achieve a natural appearance for pigmentation induced by chemotherapy.

3. Statistical Analysis

Categorical variables were analyzed by the Wilcoxon signed-rank test. A p-value < 0.05 was considered statistically significant. Statistical analyses were performed with the JMP software program, ver. 14 (SAS Institute Inc., Cary, NC, USA).

4. Results

Twenty-one patients were enrolled in this study, and 20 received cosmetic therapy counseling (Table 2). None of the patients discontinued chemotherapy due to adverse events at the time of enrollment. With the exception of one patient who required admission for surgery after counseling, all patients continued chemotherapy with or without dose modification during the cosmetic therapy period. The efficacy of cosmetic therapy was evaluated in 16 of these patients after the cosmetic therapy procedures (Figure 3). Their mean age was 63.5 (43 - 79) years, and the number of patients by primary cancer site was 12 with gastrointestinal cancer, 7 with gynecological cancer, and 1 with respiratory cancer. The number of cases by grade of chemotherapy-related adverse events were eyebrow alopecia grades 0/1/2 = 6/9/5, eyelash alopecia grades 0/1/2 = 5/9/6, and skin pigmentation grades 0/1/2 = 2/16/2, respectively. No adverse events attributable to cosmetic therapy were observed in the safety analysis of the study population. The Skindex-16 showed that the emotional subscale score improved from 31.0 before to 3.7 after cosmetic therapy ($p < 0.01$), and the total score combining symptom, emotional, and functional subscales improved from 18.3 to 2.7 ($p < 0.01$) (Figure 4).

However, the symptom and functional subscale scores themselves did not show significant improvement (symptom: 10.4 to 3.6, $p = 0.063$; functional: 7.0 to 0.8, $p = 0.055$). The VAS showed that satisfaction with skin condition improved from 35.6 to 58.9 ($p < 0.01$) and satisfaction with makeup improved from 44.5 to 80 ($p < 0.01$) before and after cosmetic therapy, respectively (Figure 5). No difference was found in the self-efficacy scale of the cancer patients (Figure 6).

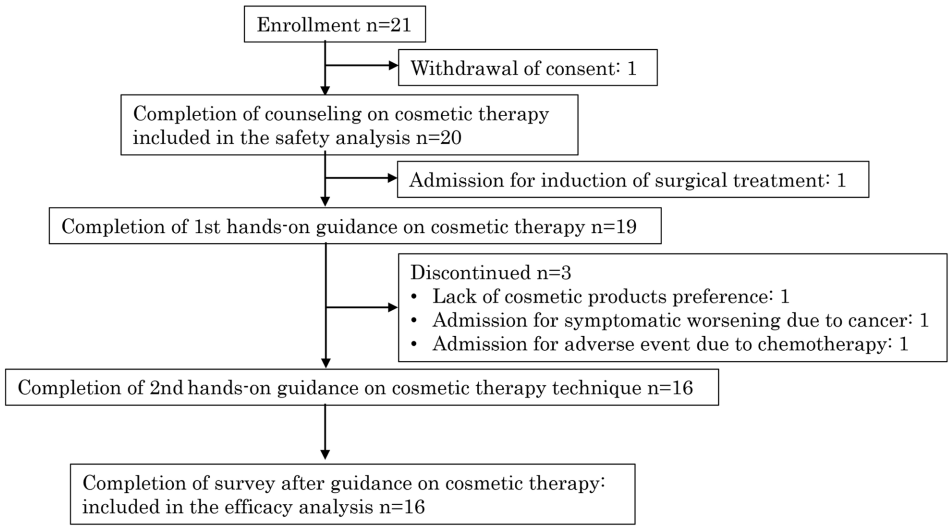

Figure 3. Consort diagram. The population included in the safety analysis consisted of patients who received at least counseling; the efficacy analysis consisted of patients who completed the survey after the second guidance.

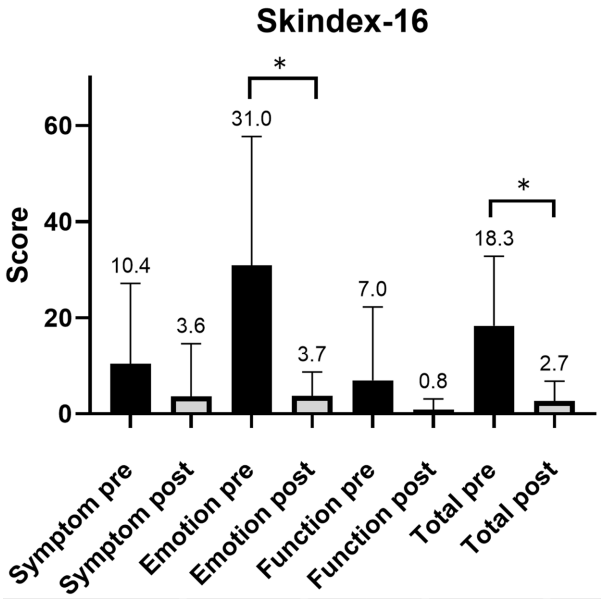

Figure 4. Scores of Skindex-16. Comparison of Skindex-16 scores before and after cosmetic therapy. Means and standard errors of the scores are shown as vertical lines and error bars, respectively. Total score indicates the mean score including symptom score, emotional score, and functional score. Higher scores indicate more negative aspects of QOL. Statistical analysis was performed using the Wilcoxon signed rank test (*$p < 0.01$).

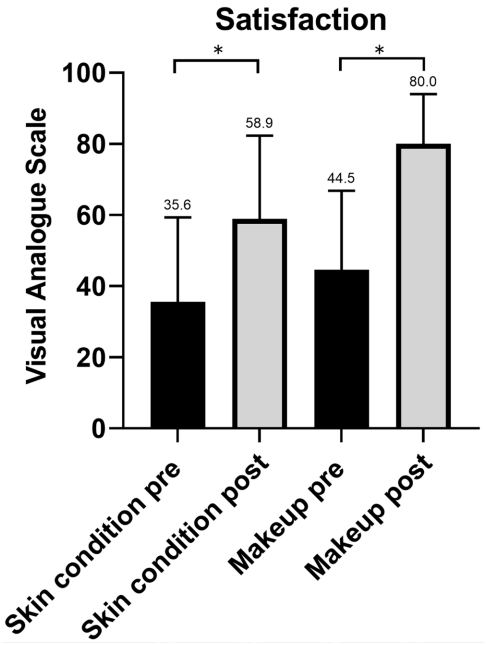

Figure 5. Scores of VAS for skin and makeup satisfaction. Comparison of VAS scores before and after cosmetic therapy. Means and standard errors of the scores are shown as vertical lines and error bars, respectively. Higher scores indicate more positive aspects of QOL. Statistical analysis was performed using the Wilcoxon signed rank test (*p < 0.01).

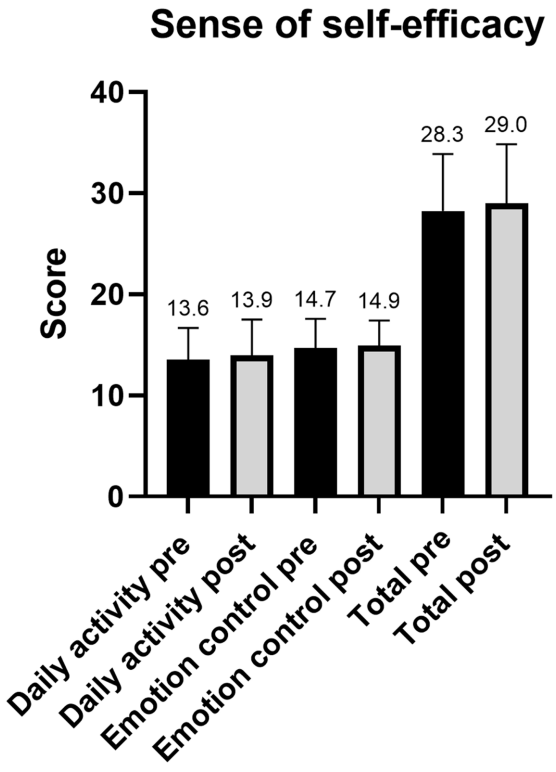

Figure 6. Scores of sense of self-efficacy. Comparison of sense of self-efficacy scores before and after cosmetic therapy. Means and standard errors of scores are shown as vertical lines and error bars, respectively. Higher scores indicate more positive aspects of QOL. Statistical analysis was performed using the Wilcoxon signed rank test (*p < 0.01).

5. Discussion

In recent years, the need for appearance care for cancer patients has been widely recognized. Cosmetic therapy includes the concept of conventional skin camouflage therapy in addition to the care of sensitive skin in skin diseases, using products specially prepared to conceal skin diseases and surface changes, with the aim of temporarily giving the skin a normal appearance. Cosmetic therapy provides immediate relief from various dermatologic disorders, especially those affecting the visible areas. It is known to have significant psychosocial effects. Despite several reports of its psychological benefits, its clinical use is still limited, and its usefulness for skin appearance changes caused by side effects of cancer treatment is not yet clear. In this study, we found that cosmetic therapy reduced the emotional distress caused by appearance-related side effects, improved dissatisfaction with skin condition, and increased satisfaction with makeup in patients with eyebrow and eyelash alopecia or skin pigmentation caused as a side effect of chemotherapy, suggesting that cosmetic therapy can improve the QOL of cancer patients.

In terms of emotional impact, using the Skindex-16 score, this study found that patients' emotional scores improved significantly with the implementation of cosmetic therapy. This suggests that appearance changes associated with cancer treatment may affect patients' psychological distress. As an emotional support for changes in appearance, cosmetic therapy has been shown to have a positive impact on patients' feelings. The Skindex-16 was developed as a dermatology-specific QOL scale consisting of 16 questions in three subscales: symptom, emotional, and functional. It has been validated as an accurate assessment to determine the extent to which a person is affected by a specific skin condition [19]. Improvement in the emotional score is a function of the patient's QOL. Improvements in emotional scores are simply the result of reduced appearance concerns such as embarrassment, anxiety, and disgust due to camouflaged appearance changes such as pigmentation and alopecia, which can lead to improvements in mood when depressed. The psychosocial and emotional impact of skin disease on patients can be significant enough to interfere with work, interpersonal and social relationships, and leisure activities, and can even cause depression, anxiety, and suicidal ideation [22]. Female patients also tend to experience greater social distress than male patients. The percentage of patients who refuse chemotherapy has been reported to be 48.7% in depressed breast cancer patients compared to 8% in non-depressed breast cancer patients [23]. Interventions to ameliorate such depression may be important in advancing cancer treatment.

The introduction of cosmetic therapy also significantly improved satisfaction with skin conditions and makeup as indicated by the VAS score. Although the cosmetics themselves have no specific pharmacological effects, since the Skindex-16 also showed a tendency for symptom improvement with cosmetic therapy, the improvement in satisfaction with skin condition may be due to the most important advantage of cosmetic therapy: its immediate effect. Particularly, for conditions with less surface irregularities, such as alopecia and hyperpigmentation,

which were the subjects of this study, cosmetic therapy can immediately mask skin changes and provide a natural appearance to the patient and others, which may have contributed to the favorable satisfaction results. It has also been noted that chemotherapy can lead to a decrease in skin barrier function and skin tolerance to cosmetics. Moisturization with specialized hypoallergenic cosmetics may be more effective than conventional cosmetics in reducing chemotherapy-induced xerosis by binding moisture to the stratum corneum and moisturizing the skin surface [24]. Cosmetic therapy using specialized cosmetics has been shown to be unlikely to adversely affect anticancer drug-induced skin conditions. The improvement in makeup satisfaction also suggests that the process of teaching and mastering cosmetic therapy techniques was appropriately conducted. These findings suggest that the use of appropriate skin care and makeup as a countermeasure to the skin damage and appearance changes associated with cancer treatment can help improve patients' self-esteem and confidence in their appearance.

However, there was no significant improvement in the self-efficacy ratings of these cancer patients after undergoing cosmetic therapy, and improvements in Skindex-16 functional scores were not evident. This suggests that because cosmetic therapy is primarily an appearance-focused intervention, it does not directly affect patients' daily living behaviors or their self-efficacy in general emotional control, but only affects appearance-related factors, which may be a limitation of cosmetic therapy in cancer patients. Because cancer patients undergoing treatment have not only skin symptoms but also a variety of other problems to face, such as symptoms of the cancer itself, other treatment side effects, and social restrictions associated with treatment, cosmetic therapy may not even affect the actions and behaviors of cancer patients.

This study has several limitations. First, it is a single-center study with a small number of subjects and lack of control group. Second, all patients are women, the cancer diseases and chemotherapy regimens are not uniform, and differences in disease course, cancer treatment and concurrent medications including corticosteroids are also factors that can appreciably affect patients' QOL. Third, this study assessed QOL only two weeks after the intervention. Follow-up assessments at later time points (e.g., 3 months, 6 months) would provide valuable information about the durability of cosmetic therapy's impact.

This study suggests that cosmetic therapy for cancer patients could have a positive impact on self-assessment of appearance and emotional health. Cosmetic therapy may be a tool that can be introduced to support the changes in appearance associated with cancer treatment and help improve QOL. Although further large-scale comparative trials are needed, it is worth considering cosmetic therapy as part of a comprehensive cancer treatment plan to improve patients' physical and mental health and well-being.

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Authors' Contributions

Masafumi Inomata, Yohei Kono, and Shizuyo Tominaga planned this study. Hiromi Ueno, Masako Kariu, Mina Yawata, Miyuki Murata, Mika Fujiwara, and Akiko Hatanaka performed technical guidance and collected data. Akiko Hatanaka and Yohei Kono took the lead in writing the manuscript. Satoshi Otsu, Yasushi Kawano, Masao Ogata, Masako Kariu, Mina Yawata, Miyuki Murata, Mika Fujiwara, and Yutaka Hatano recruited subjects. Takahiro Hiratsuka, Yuiko Nagasawa, Kaoru Okame, Ikuyo Arakane, and Chiho Tomimatsu analyzed the data. All authors supported the research and manuscript.

Ethics Approval and Consent to Participate

This prospective study (approval number: B21-005) was approved by the Ethics Committee of Oita University School of Medicine and performed following the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. Written informed consent was obtained from all patients.

Authorship Declaration

This manuscript has not been published and is not under consideration for publication elsewhere. All of the authors have read the manuscript and have approved this submission.

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Conflicts of Interest

All authors declare no conflicts of interest.

References

[1] Nozawa, K., Shimizu, C., Kakimoto, M., Mizota, Y., Yamamoto, S., Takahashi, Y., *et al.* (2013) Quantitative Assessment of Appearance Changes and Related Distress in Cancer Patients. *Psycho-Oncology*, **22**, 2140-2147. https://doi.org/10.1002/pon.3268

[2] Hackbarth, M., Haas, N., Fotopoulou, C., Lichtenegger, W. and Sehouli, J. (2008) Chemotherapy-Induced Dermatological Toxicity: Frequencies and Impact on Quality of Life in Women's Cancers. Results of a Prospective Study. *Supportive Care in Cancer*, **16**, 267-273. https://doi.org/10.1007/s00520-007-0318-8

[3] Yorulmaz, A., Dogan, M., Artuz, F. and Zengin, N. (2017) Comparison of Pigmentary Side Effects of Taxanes and Anthracyclines: An Onychoscopic Evaluation. *Cutaneous and Ocular Toxicology*, **36**, 135-139. https://doi.org/10.3109/15569527.2016.1173698

[4] Lacouture, M. and Sibaud, V. (2018) Toxic Side Effects of Targeted Therapies and Immunotherapies Affecting the Skin, Oral Mucosa, Hair, and Nails. *American Journal of Clinical Dermatology*, **19**, 31-39. https://doi.org/10.1007/s40257-018-0384-3

[5] Choi, E.K., Kim, I., Chang, O., Kang, D., Nam, S., Lee, J.E., *et al.* (2014) Impact of Chemotherapy-Induced Alopecia Distress on Body Image, Psychosocial Well-Being, and Depression in Breast Cancer Patients. *Psycho-Oncology*, **23**, 1103-1110. https://doi.org/10.1002/pon.3531

[6] Choi, Y., Lee, J.H., Kim, Y.H., Lee, Y.S., Chang, H., Park, C.S., *et al.* (2014) Impact of Postthyroidectomy Scar on the Quality of Life of Thyroid Cancer Patients. *Annals of Dermatology*, **26**, 693-699. https://doi.org/10.5021/ad.2014.26.6.693

[7] Holme, S.A., Beattie, P.E. and Fleming, C.J. (2002) Cosmetic Camouflage Advice Improves Quality of Life. *British Journal of Dermatology*, **147**, 946-949. https://doi.org/10.1046/j.1365-2133.2002.04900.x

[8] Tanioka, M., Yamamoto, Y., Kato, M. and Miyachi, Y. (2010) Camouflage for Patients with Vitiligo Vulgaris Improved Their Quality of Life. *Journal of Cosmetic Dermatology*, **9**, 72-75. https://doi.org/10.1111/j.1473-2165.2010.00479.x

[9] Matsuoka, Y., Yoneda, K., Sadahira, C., Katsuura, J., Moriue, T. and Kubota, Y. (2006) Effects of Skin Care and Makeup under Instructions from Dermatologists on the Quality of Life of Female Patients with Acne Vulgaris. *The Journal of Dermatology*, **33**, 745-752. https://doi.org/10.1111/j.1346-8138.2006.00174.x

[10] Hayashi, N., Imori, M., Yanagisawa, M., Seto, Y., Nagata, O. and Kawashima, M. (2005) Make-Up Improves the Quality of Life of Acne Patients without Aggravating Acne Eruptions during Treatments. *European Journal of Dermatology*, **15**, 284-287.

[11] Haley, A.C., Calahan, C., Gandhi, M., West, D.P., Rademaker, A. and Lacouture, M.E. (2011) Skin Care Management in Cancer Patients: An Evaluation of Quality of Life and Tolerability. *Supportive Care in Cancer*, **19**, 545-554. https://doi.org/10.1007/s00520-010-0851-8

[12] Amiel, P., Dauchy, S., Bodin, J., Cerf, C., Zenasni, F., Pezant, E., *et al.* (2009) Evaluating Beauty Care Provided by the Hospital to Women Suffering from Breast Cancer: Qualitative Aspects. *Supportive Care in Cancer*, **17**, 839-845. https://doi.org/10.1007/s00520-009-0620-8

[13] Titeca, G., Poot, F., Cassart, D., Defays, B., Pirard, D., Comas, M., *et al.* (2007) Impact of Cosmetic Care on Quality of Life in Breast Cancer Patients during Chemotherapy and Radiotherapy: An Initial Randomized Controlled Study. *Journal of the European Academy of Dermatology and Venereology*, **21**, 771-776. https://doi.org/10.1111/j.1468-3083.2006.02080.x

[14] Wakeda, T., Okamura, T., Kawahara, T. and Heike, Y. (2020) Camouflage Makeup Improves Quality of Life in Cancer Patients with Treatment-Related Skin Changes. *Tumori Journal*, **106**, 95-100. https://doi.org/10.1177/0300891619867844

[15] Sibaud, V., Lebœuf, N.R., Roche, H., Belum, V.R., Gladieff, L., Deslandres, M., *et al.* (2016) Dermatological Adverse Events with Taxane Chemotherapy. *European Journal of Dermatology*, **26**, 427-443. https://doi.org/10.1684/ejd.2016.2833

[16] Deutsch, A., Leboeuf, N.R., Lacouture, M.E. and McLellan, B.N. (2020) Dermatologic Adverse Events of Systemic Anticancer Therapies: Cytotoxic Chemotherapy, Targeted Therapy, and Immunotherapy. *American Society of Clinical Oncology Educational Book*, **40**, 485-500. https://doi.org/10.1200/edbk_289911

[17] Rayner, V.L. (1995) Camouflage Therapy. *Dermatologic Clinics*, **13**, 467-472. https://doi.org/10.1016/s0733-8635(18)30093-7

[18] Higaki, Y., Kawamoto, K., Kamo, T., Horikawa, N., Kawashima, M. and Chren, M. (2002) The Japanese Version of Skindex-16: A Brief Quality-of-Life Measure for Patients with Skin Diseases. *The Journal of Dermatology*, **29**, 693-698. https://doi.org/10.1111/j.1346-8138.2002.tb00205.x

[19] Chren, M., Lasek, R.J., Sahay, A.P. and Sands, L.P. (2001) Measurement Properties of Skindex-16: A Brief Quality-of-Life Measure for Patients with Skin Diseases. *Journal of Cutaneous Medicine and Surgery*, **5**, 105-110. https://doi.org/10.1177/120347540100500202

[20] Fayers, P.M. and Machin, D. (2007) Quality of Life. Wiley, John Wiley & Sons, Ltd. https://doi.org/10.1002/9780470024522

[21] Tsukamoto, N. (1998) Construction of a Self-Efficacy Scale for Cancer Patients. *Japanese Journal of Nursing Research* (*Kango Kenkyu*), **31**, 198-206.

[22] Tuckman, A. (2017) The Potential Psychological Impact of Skin Conditions. *Dermatology and Therapy*, **7**, 53-57. https://doi.org/10.1007/s13555-016-0169-7

[23] Colleoni, M., Mandala, M., Peruzzotti, G., Robertson, C., Bredart, A. and Goldhirsch, A. (2000) Depression and Degree of Acceptance of Adjuvant Cytotoxic Drugs. *The Lancet*, **356**, 1326-1327. https://doi.org/10.1016/s0140-6736(00)02821-x

[24] Fluhr, J.W., Miteva, M., Primavera, G., Ziemer, M., Elsner, P. and Berardesca, E. (2007) Functional Assessment of a Skin Care System in Patients on Chemotherapy. *Skin Pharmacology and Physiology*, **20**, 253-259. https://doi.org/10.1159/000104423

Supplemental

Table S1. Skindex-16.

In the past week, how often were you bothered by the following? For each item, please choose from a scale of 0 (did not bother you at all) to 6 (always bothered you)		
Symptom subscale	**Emotional subscale**	**Functional subscale**
1. Skin itching	6. Worry that the skin condition will get worse, spread further, or leave a scar	12. Socializing with others has changed because of the skin condition
2. Burning or stinging sensation on the skin	7. Worry about the appearance of the skin condition	13. Difficulty in joining a group of people because of the skin condition
3. Painful skin	8. Frustration about skin condition	14. Difficulty in showing affection or acting out because of the skin condition
4. Irritation of the skin	9. Embarrassment about skin condition	15. The skin condition interferes with daily life
5. Prolonged or recurrent worsening of skin symptoms	10. Annoyed about skin symptoms	16. The skin condition makes it difficult to work or enjoy leisure time
	11. Feeling depressed because of skin condition	

Table S2. Self-efficacy scale for cancer patients.

How much do the following items apply to you? For each item, please choose from a scale of 0 (do not apply to you at all) to 4 (apply very much to you)		
Efficacy of daily activities	1	I can play a full role in the home
	2	I am confident in my physical strength
	3	I can live life on its own terms
	4	I can lead a normal daily life
	5	I can complete tasks at work and at home
Efficacy of emotional control	6	I can manage my feelings well at all times
	7	I can think positively even when difficulties arise
	8	I can maintain good relationships with people who are important to me
	9	I can spend my time calmly
	10	I can observe my physical condition calmly

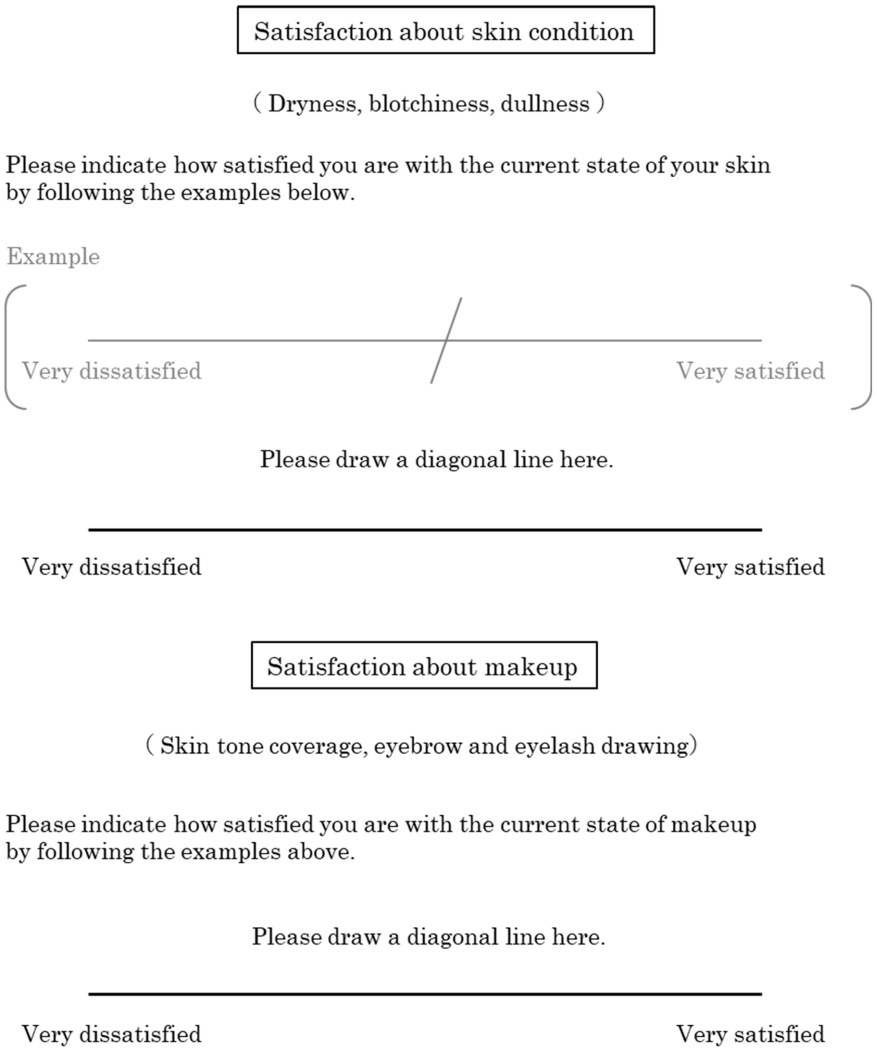

Figure S1. Visual analogue scale for satisfaction about skin condition and makeup.