



Effect of Reiki on the stress level of caregivers of patients with cancer: Qualitative and single-blind randomized controlled trial

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ABSTRACT

Objective: This study aimed to evaluate the effect of Reiki on stress levels of individuals caring for patients with cancer.

Methods: The study was conducted a pretest–posttest, single-blind randomized controlled trial and qualitative study using a semi-structured in-depth interview. In this study, women who were primary caregivers of patients with cancer treated in a university hospital were randomized to Reiki and sham Reiki groups. The Reiki group received Reiki to nine main points for 45 min, once a week for 6 weeks, while the sham Reiki group received the same points during the same period without starting energy flow. CSI scores and salivary cortisol levels were evaluated at baseline and at the end of the study, whereas systolic and diastolic blood pressure and pulse rate were evaluated before and after application every week. After the study, the opinions of the Reiki group on Reiki experience were collected by using a questionnaire consisting of semi-structured questions.

Results: The study was completed with a total of 42 caregivers. The sample size was calculated based on the difference in Caregiver Strain Index (CSI) scores before and after the intervention. According to the power analysis, with $\alpha = 0.05$ and $\beta = 0.20$, the effect size was 1.71 and the power 99 %. Post-intervention CSI scores declined in the Reiki group compared with that in the sham Reiki group ($p < 0.05$). No significant difference was found between the groups in terms of saliva cortisol levels ($p > 0.05$). According to the results of the general linear model repeated measure and Friedman tests, which were conducted to evaluate the change in systolic and diastolic blood pressure and pulse rate over a 6-week period, the values of these parameters decreased before and after each application compared with the caregivers in the sham Reiki group ($p < 0.05$). All caregivers stated that they found the caring process less stressful after the Reiki sessions and felt relieved compared with the pre-therapy period, and some of their physical complaints decreased.

Conclusion: Reiki reduces the stress levels of caregivers, is effective in regulating blood pressure and pulse rate, does not cause a significant change on saliva cortisol level, and provides relief to caregivers.

1. Introduction

If a family member is diagnosed with cancer, the primary caregiver should be prepared for and adapt to this new family situation.^{1,2} The increased burden of care overtime may increase the perceived stress level of the caregivers. Multiple stress loads, called allostatic load, have negative health effects on the caregiver. Chronic stress, for example, delays wound healing by affecting the immune system, increases the risk of developing cancer by increasing beta adrenergic activity that stimulates angiogenesis, and accelerates chromosomal aging, which indicates telomere shortening.³ In addition, there was an imbalance in autonomic

nervous system functioning, with increased sympathetic activity and decreased parasympathetic activity in the long-term care of patients with cancer. Attenuated hypothalamic–pituitary–adrenal response over time and functional glucocorticoid resistance have been associated with proinflammatory conditions, immune diseases, obesity, high cholesterol, insulin resistance, depressive disorders, and psychological stress, and continuous stimulation of sympathetic activity has been associated with cardiovascular conditions and high blood pressure.^{4–7}

Stress caused by late-identified and unmet needs of caregivers negatively affect the physical and emotional health of patients and caregivers as well as their compliance with treatment.^{8,9} Therefore, it is

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necessary to evaluate problems experienced by caregivers and to plan the number of attempts to reduce stress levels. In a meta-analysis involving 29 randomized controlled trials designed to support caregivers of patients with cancer, psychoeducation, skill training, and therapeutic counseling initiatives have reduced the caregiver's burden and stress and increased the self-sufficiency, quality of life, and coping ability of the caregivers.¹⁰ In a study by Weuve et al., caregivers who were given a detailed care management plan and directly related to the services have reported less burden and stress levels than the control group.¹¹

In recent years, complementary and integrated practices of managing stresses experienced by caregivers are increasingly preferred for many reasons.¹²⁻¹⁷ Reiki, as one of these integrative practices, is an energy therapy that involves the use of energy that flows naturally from the hands of the practitioner to the patient to strengthen the body's ability to heal itself and thereby increase well-being.¹⁸ When administered with standard therapy, Reiki is reported to be a low-risk, cost-free, easy-to-apply method that improves well-being in many areas, such as in reducing anxiety and stress and improving quality of life.^{19,20} Modified application of Reiki ensures that blood and lymph circulation is maintained properly, regulates blood pressure and pulse rate by stimulating the autonomic nervous system,²¹ increases comfort,²² and reduces depression and anxiety levels.²³ In this way, Reiki facilitates physical and mental relaxation, promotes health, and provides a positive interaction between the caregiver and the caretaker.^{8,18,24,25}

Although positive effects of Reiki on the body are mentioned in the literature, no randomized controlled and qualitative studies have tried to explain the effect of Reiki on stress levels of caregivers. In this context, this study aimed to investigate the effect of Reiki application on the stress levels of caregivers of patients with cancer by evaluating physiological indicators such as blood pressure, pulse rate, and cortisol level.

2. Materials and methods

2.1. Study design

In this study, women who care for patients with cancer received Reiki to nine main points including seven chakras, as well as to the ankle and feet, for 45 min once a week for 6 weeks, to determine its effect on stress level. This study used a pretest–posttest randomized controlled single-blind design in the quantitative part and semi-structured in-depth interview method in the qualitative phase of the study.

2.2. Participants and setting

The study was conducted in the medical oncology unit of a university hospital in Turkey. The research population included women who care for patients with cancer. The data collection process started from August 2018 to April 2019 (NCT04461873) and was reported in accordance with the Consolidated Standards of Reporting Trials guidelines. The investigator evaluated the criteria for inclusion into the study by conducting a preliminary interview with the referred caregivers. Participants should meet the following criteria: age >18 years and being female, can communicate, is a family member-primary caregiver of patients with cancer receiving treatment, provides care to the patient for 8 h/day for at least 6 months, and had a CSI score ≥ 7 . Caregivers who provided care services for a fee, had another medical problem that prevented the measurement of pulse rate and blood pressure, had a variable pulse rate, were unable to give saliva sample due to other medical problems, used cortisol and derivative drugs, had a history of psychiatric disorders, were Reiki practitioners or trainers, had received energy therapies such as Reiki/therapeutic touch/healing touch, and used other complementary and integrated medicine practices were excluded from the study. All participants were explained of the voluntary nature of participation, and they were told about the manner of carrying out the interventions, possible benefits, risks, and their rights,

and informed consent was obtained. Caregivers were randomly assigned to the Reiki and sham Reiki groups.

2.3. Randomization and blinding

Patients who received care in accordance with the study criteria were assigned with numbers, and they were allocated to the Reiki and sham Reiki groups using the simple random sampling method by the nurse in charge of the chemotherapy unit. Thus, participants were blinded to the intervention (Reiki) and placebo (sham Reiki) groups. Four student nurses were trained by the investigator as interviewers to perform sham intervention (sham Reiki group) and to re-evaluate the participants of both groups using CSI during the last week of the study. CSI was administered through face-to-face interview by the investigator in the first interview and by the student nurses in the last interview to ensure that the investigator was blinded to the post-intervention stress scores.

2.4. Defining the sample size

Since no similar study in the literature investigated the effect of Reiki on the stress level of caregivers, a power analysis was conducted in line with the data of the sample group during the research. The first power analysis was carried out in November 2018 when the Reiki group reached 16 caregivers and the sham Reiki group reached 11 caregivers, and the research power was 99 % when differences between CSI scores were compared. After this date, data were collected from caregivers who met the inclusion criteria, and in April 2019, the effect size was 1.71 and the research power was 99 % based on the difference between the groups' pre- and post-intervention CSI scores. The study completed with a total of 42 caregivers, with the Reiki group and sham Reiki group having 21 participants each.

2.5. Outcome measurement tools

2.5.1. CSI

The CSI was developed by Robinson (1983), and this tool can be used to quickly identify families with potential care concerns.²⁶ The scale consists of 13 items, which are answered by "yes" or "no." The main issues are job status, financial situation, physical condition, social status, and time. The lowest score that can be obtained from the scale is "0" and the highest score is "13". The positive response to ≥ 7 items on the scale (≥ 7 points) indicates that stress is perceived as high by the caregiver. In his study, Robinson obtained a Cronbach's α value of 0.86. The validity and reliability studies of the Turkish version of the scale was performed by Uğur (2006), and Cronbach's α value of the scale was calculated as 0.75.⁸ In the present study, Cronbach's α coefficient was 0.66. According to the literature, this percentage is acceptable.^{27,28} In addition, the nominal nature of the scale used explains that our Cronbach's α coefficient is lower than the expected value.^{27,29} In this study, CSI was applied through face-to-face interview method by the investigator and interviewers in the first and last interviews, respectively, and the scale was administered at an average of 20 min.

2.5.2. Application monitoring form

The investigator created an Application Monitoring Form. This form contained data of the Reiki group and sham Reiki group, including cortisol levels analyzed from saliva samples collected and pulse rate and blood pressure values measured before and after Reiki/sham Reiki sessions. This form was used by the investigator in the Reiki group and by the student nurses in the sham Reiki group.

2.5.3. Form for caregiver's opinions on reiki experience

This form was created in line with the literature to gather information on the experience and opinions of the participants after Reiki sessions through an individual in-depth interview method.³⁰⁻³² This form

contains semi-structured questions, with the following titles: “Thoughts on the Reiki sessions,” “Thoughts on the Reiki sessions to patients they cared for to reduce stress level,” and “Thoughts on the Reiki sessions by the nurses to patients they cared for during their hospitalization”. While the questions were structured, an expert in sociology provided assistance in summarizing the themes created from the answers and in integrating the expressions. On average, the participants took 15 min to answer the questions.

2.6. Intervention protocol

A personal information form and the CSI were used by the investigator in the first face-to-face interview and, to ensure blinding, the CSI was used by the student nurses in the final interview. After the 6-week period, training and counseling were given to both groups by the investigators to address problems that the participants encountered during the care process.

After the first interview, the first Reiki/sham Reiki session of caregivers randomized to the corresponding groups was carried out in the hospital, and subsequent sessions were performed during home visit due to the time differences between the chemotherapy sessions. In week 1, the caregivers in both groups were taken to the waiting rooms on different floors so that they do not have the chance to communicate with each other. During home sessions, the intervention was applied in the bed used by the caregiver for nighttime sleeping, with the curtains closed and without any noise.

2.6.1. Collection of saliva samples and evaluation of saliva cortisol

Saliva samples were collected by a saliva cortisol tube, and the amount of cortisol in the saliva was measured by electrochemiluminescence immunological test method using a specific device in the external laboratory. Since cortisol production peaks at early morning, the samples were collected between 06:00 a.m. and 10:00 a.m., and the reference value for this time interval was $<0.874 \mu\text{g/dL}$.^{33–36} To maintain the integrity and amount of cortisol in the saliva secretion, the caregivers were asked not to brush their teeth, smoke, or eat or drink anything other than water within two hours before the Reiki/sham Reiki session. For the final evaluation of saliva cortisol, samples of all caregivers were taken in home environments on the day of the sixth session. To prevent denaturation, saliva samples were kept refrigerated at $+4^\circ\text{C}$ with the tubes upright until they reached the external laboratory, and they were transferred with frozen ice blocks within the first 4 h after collection.

2.6.2. Measurement of blood pressure and pulse rate

Blood pressure and pulse rate were measured three times at 5-min intervals before and after each session, and the mean value of the three measurements was recorded to minimize variations between measurements. To control the effects of physical activity and fatigue, which may cause an error on values, blood pressure and pulse rate were measured after the caregivers have rested in the supine position for 20 min before each session for 6 weeks. Blood pressure and pulse rate were measured in accordance with the learning guide steps.^{37–39}

2.6.3. Reiki (intervention) group

At the first interview, home visit appointments for the next sessions were arranged. In week 1 and 6, saliva samples were placed in sterile collection containers. After the measurements were made, Reiki was performed in accordance with the Reiki Application Protocol (Appendix 1) by touching nine points and surrounding areas for 45 min, once a week for 6 weeks. Sessions of the Reiki group were conducted by the investigator. The investigator has completed Level II Reiki training according to the Usui method. At the end of the intervention period (week 6), saliva samples were collected again to assess cortisol levels, and the CSI was administered by the interviewers.

In the qualitative phase of the study, after the 6-week Reiki

intervention, all caregivers of the intervention group were asked about their experience and opinions regarding the sessions through an individual in-depth interview during home visit. Interview data were recorded with a voice recorder and took an average of 15 min.

2.6.4. Sham Reiki (Placebo control) group

Sham Reiki sessions were conducted by four student nurses. The student nurses were not trained in Reiki or attuned in the Reiki tradition. Before the sessions, the investigator trained the students about aura equalization, chakras, and points that should be touched. They imitated gestures and mimics, but did not actually give the caregivers Reiki energy. After the blood pressure and pulse rate measurements and saliva collection procedures, the student nurses performed sham Reiki sessions in line with the Reiki Application Protocol by touching nine points for 45 min, once a week for 6 weeks. The student nurses ensured that they do not give Reiki energy. The investigator accompanied the students during the sessions. On week 6, saliva samples were collected again to assess cortisol levels and CSI was applied by the student nurses.

3. Statistical analysis

Statistical analysis of quantitative data was performed using the Statistical Package for Social Science 22.0 program. Compliance of data with normal distribution was determined by Shapiro–Wilk and Kolmogorov–Smirnov test. Independent sample *t*-test and Mann–Whitney *U* test were used to compare the two groups. In the evaluation of repeated measurements in the same group, paired *t*-test and Wilcoxon signed ranks test were used. General linear models repeated measure test and Friedman test were used to evaluate changes in blood pressure and pulse rate measurements of the groups for 6 weeks. The level of significance was set as $p < 0.05$. Descriptive and content analysis methods were used to evaluate qualitative data.

4. Ethical considerations

The study was carried out in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of Clinical Research of a University (05/07/2017-E.12379). Institutional permission was also obtained from the hospital. After explaining about the study, informed consent was obtained from each participant.

5. Results

5.1. Quantitative findings

Of the 86 caregivers, 61 were eligible for inclusion, but only 51 caregivers agreed to participate in the study. Since a caregiver in the Reiki group could not give a saliva sample, she left the study on the first application day, while four caregivers did not continue their appointment after the first week; Four of the caregivers in the sham Reiki group left the study, stating that they did not want to continue from week 2 because of the deteriorating prognosis of the patients they cared for. The study was completed with a total of 42 caregivers [Fig. 1](#). The distribution of the descriptive characteristics of the caregivers in both groups is presented in [Table 1](#). No statistically significant difference was found between the groups in terms of the descriptive characteristics ($p > 0.05$).

[Table 2](#) shows the distribution of the CSI scores and saliva cortisol level (SCL) of the caregivers in the Reiki and sham Reiki groups for the first week and sixth week.

No significant difference in the scores in week 1 before the intervention in the Reiki and sham Reiki groups ($p > 0.05$). At week 6, the Reiki group had significantly lower CSI scores than the sham Reiki group ($p < 0.001$).

The CSI scores in the Reiki group were significantly reduced at week 6 compared with that at week 1, while post-intervention CSI scores in the sham Reiki group increased compared with that at week 1 ($p <$

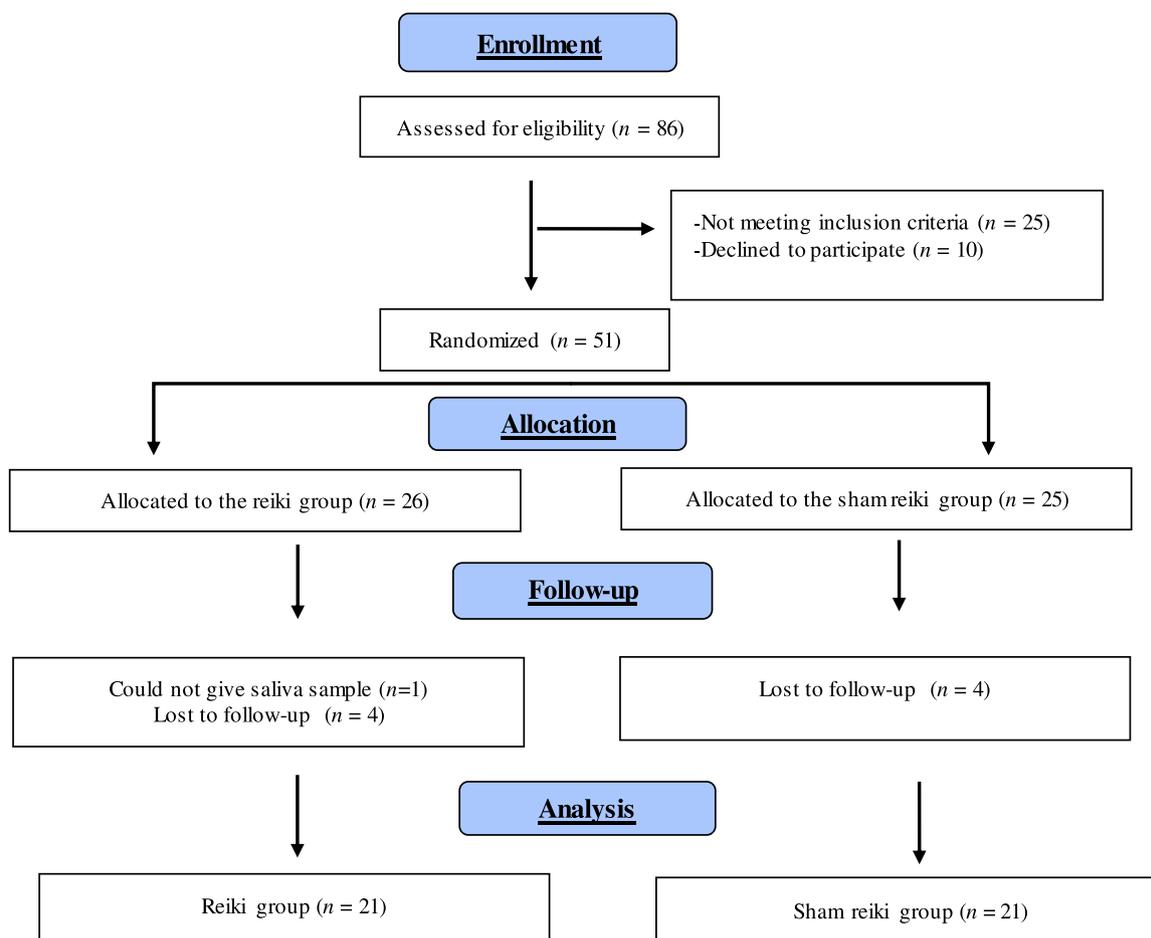


Fig. 1. The CONSORT chart of the study.

0.05).

The participants in the Reiki and sham Reiki groups had similar SCL scores at baseline ($p > 0.05$). The post-intervention SCL in both groups was low compared with the pre-intervention levels, but no significant difference was found between the groups ($p > 0.05$).

Table 3 shows the distribution of the mean systolic and diastolic blood pressures and pulse rate of the participants in the Reiki and sham Reiki groups before and after intervention according to the week of follow-up.

In both groups, the systolic and diastolic blood pressures before the first intervention were comparable ($p > 0.05$). Within six weeks, the mean systolic and diastolic blood pressure levels of both groups decreased after each intervention, and the difference between the pre- and post-intervention measurements within each group was significant ($p < 0.05$). In the analysis of the post-intervention values, a statistically significant difference was found between the two groups starting from week 2 ($p < 0.05$).

In the Reiki group, considering the change in the pre-intervention values over time in the 6-week repeated measurements of systolic and diastolic blood pressures, the mean values significantly decreased before each intervention compared with the values in the previous week ($p < 0.05$). In the sham Reiki group, the mean systolic and diastolic blood pressure increased with each week. No significant difference was found in the pre-intervention values of the systolic blood pressure over time ($p > 0.05$).

The pulse rates of both groups were comparable at baseline ($p > 0.05$). The mean pulse rate of both groups decreased within 6 weeks after each intervention, and this difference between pre- and post-measurements was significant in each group ($p < 0.05$). In the

analysis of post-intervention values, a significant difference was observed between the groups starting from week 2 ($p < 0.05$).

In the Reiki group, considering the change in the pre-intervention values over time in the 6-week repeated measurements of pulse rate, the mean pulse rate significantly decreased before each intervention compared with the value at the previous week ($p < 0.05$). In the sham Reiki group, the means increased significantly with each week ($p < 0.05$).

5.2. Qualitative findings

Data obtained by the individual in-depth interviews were discussed under the themes of “symptoms that have improved with Reiki sessions,” “experiences with Reiki,” “caregiver’s assumptions that Reiki would benefit their patients,” “Reiki may help reduce stress levels in patients, too,” and “Reiki as a routine practice”.

“Symptoms that have improved with Reiki sessions”

Individuals have experienced signs of improvement in their bodies and various emotional complaints after the sessions and their stress levels decreased. Sample statements are shown below:

“Even after the first session, my complaints of constipation that continued for days have decreased. After the fourth session, my menstrual period returned after two months. I have never been so surprised at anything in my life!” (31-year-old housewife)

“If you remember, I said that my neck was stuck because I did not sleep while I was waiting at the bedside of my patient at night. Now, there is none. I have abnormal blood pressure. Basically, my systolic blood pressure would not be lower than 140 mmHg. I am surprised

Table 1
Descriptive features of the participants in the pranayama and relaxation groups.

	Reiki group (n = 21)	Sham reiki group (n = 21)	p
Age of caregivers (years) (Mean ± SD)	44.33 ± 13.60	39.33 ± 14.76	0.285 ^a
Age of patients (years) (Mean ± SD)	59.57 ± 9.87	54.62 ± 15.60	0.228 ^b
Education n (%)			
Primary school	4 (19.0)	5 (23.8)	0.380 ^c
High school	6 (28.6)	10 (47.6)	
University	11 (52.4)	6 (28.6)	0.275 ^c
Marital status n (%)			
Married	16 (76.2)	14 (66.7)	0.495 ^c
Single	5 (23.8)	7 (33.3)	
Degree of intimacy with the patient n (%)			
Mother/ father	6 (28.6)	7 (33.3)	
Doughter/son	4 (19.0)	6 (28.6)	0.783 ^c
Wife/husband	9 (42.9)	6 (28.6)	
Brother/sister	2 (9.5)	2 (8.5)	
Caring period n (%)			
6–12 month	8 (38.1)	9 (42.9)	
13–24 month	6 (28.6)	4 (19.0)	0.517 ^c
25–36 month	3 (14.3)	1 (4.8)	
37 month and more	4 (19.0)	7 (33.3)	
Is there another caregiver to help you? n (%)			
Yes	9 (42.9)	7 (33.3)	0.525 ^c
No	12 (57.1)	14 (66.7)	
Stage of disease n (%)			
1 st	1 (4.8)	3 (14.3)	
2 nd	5 (23.8)	4 (19.0)	
3 th	7 (33.3)	11 (52.4)	0.233 ^c
4 th	8 (38.1)	3 (14.3)	

Note: SD: Standard deviation.

^a Obtained from the Mann Whitney U test.

^b Obtained from the independent-samples t-test.

^c Obtained from the chi-square test.

that it dropped and remained low with each session.” (58-year-old retired civil servant)

“I have been relieved since we started this. My father collapses day by day, but now, I look at the issue from another side, without being stressed. I am not fighting him, when he does not listen to me, so I do not know, as if I am not the same person before and after the session. I am sleeping now; what could be better than this.” (39-year-old nurse)

“Experiences with Reiki”

The participants explained their feelings during the therapy, with the following sample statements:

“I felt a positive flow of energy in my body, in my thoughts, and in my mind. Reiki made me think positively and calmly.” (52-year-old accountant)

“I see myself walking barefoot in a green forest during practice. As I step on the ground, I am at peace. In the meantime, I feel warmer.” (52-year-old retired individual)

“I see lights, and the lights change along the Reiki, like white with hands on head and orange on the knee, but sometimes, it’s purple.” (31-year-old hairdresser)

“Caregiver’s assumptions that Reiki would benefit their patients”

As shown in the following statements, caregivers who received Reiki stated that it would be effective to apply Reiki, which they experienced its positive effects, in their patients to reduce the stress caused by the disease and treatment:

“I think, if you could provide Reiki to him, he would surely calm down, and unnecessary stress may be relieved.” (45-year-old lecturer)

“We need such relaxing practices because we care for them 24 h a day, but believe me, since they are the ones who suffer, I think their need for Reiki is greater.” (48-year-old retired civil servant)

“Now that my mother’s treatment is over, I will take care of her. I find her both tired and nervous again. I wish that she will receive Reiki. It allows us to think differently and let our views change, making our life easier.” (23-year-old student)

“Reiki may help reduce stress levels in patients, too”

Caregivers who received Reiki stated that it may be beneficial to apply Reiki to patients admitted to the hospital to help reduce their stress, regardless of whether they have cancer or not, as in the following sentences:

“I would like trained people to apply this practice to everyone regardless of disease type.” (33-year-old housewife)

“My mother’s treatment takes 4 h. Applying Reiki by just 45 min can change a lot...” (31-year-old housewife)

“That warmth will spread to his body as we have, his muscles will relax, and he will learn to stop thinking, so he will experience such an unspeakable, spiritual maturity. This is also the case for any disease. I think it should be tried. I think Reiki should be part of the treatment.” (40-year-old teacher)

“Reiki as a routine practice”

Some of the caregivers have stated, in the following sentences, that Reiki can be a routine nursing practice for reducing stress in everyday life or for health control when admitted to the hospital. Sample statements are as follows:

“Because of the stress caused by my profession and family responsibilities, I often experienced headaches, foot aches, and palpitations. Now, my complaints are relieved with Reiki. As the practice

Table 2
Comparison of changes in CSI and SCL outcomes within and between the Reiki and sham Reiki groups.

	Reiki group (n = 21)		Within- group p-value	Sham reiki group (n = 21)		Within- group p-value	Pretest between groups p-value	Posttest between groups p-value
	Before Reiki	After Reiki		Before Reiki	After Reiki			
Caregiver Strain Index (Mean ± SD)	10.09 ± 1.76	6.90 ± 1.55	<0.001*	9.40 ± 1.73	9.80 ± 1.20	0.345*	0.210**	<0.001**
Saliva Cortisol Level (Mean ± SD)	0.39 ± 0.31	0.36 ± 0.22	0.539*	0.29 ± 0.21	0.27 ± 0.20	0.739*	0.182***	0.110**

Note. SD: Standard deviation.

* Obtained from the paired t-test.

** Obtained from independent-samples t-test.

*** Obtained from Mann Whitney U test. Bold p values are statistically significant (<0.05). For Caregiver Strain Index Power of test:0.99.

Table 3

Comparison of changes in Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP) and Heart Rate (HR) outcomes within and between the Reiki and sham Reiki groups.

	Reiki group (n = 21) (Mean ± SD)		Within- group p-value*	Sham Reiki group (n = 21) (Mean ± SD)		Within- group p-value**	Pretest between groups p-value***	Posttest between groups p-value****
	Before	After		Before	After			
SBP								
1st week	124.66 ± 8.87	121.05 ± 9.61	0.001	127.76 ± 12.94	124.61 ± 13.80	0.004	0.372	0.302
2nd week	123.33 ± 9.90	116.09 ± 11.26	<0.001	128.95 ± 12.40	126.52 ± 12.06	<0.001	0.113	0.008
3rd week	121.57 ± 8.98	112.42 ± 11.40	<0.001	126.80 ± 13.16	123.90 ± 13.01	<0.001	0.141	0.003
4th week	119.57 ± 7.64	109.47 ± 10.38	<0.001	128.28 ± 12.17	125.71 ± 12.10	0.001	0.009	<0.001
5th week	116.90 ± 8.53	116.90 ± 8.53	<0.001	128.85 ± 12.26	124.90 ± 12.73	<0.001	<0.001	<0.001
6th week	113.09 ± 8.56	102.71 ± 9.53	<0.001	129.42 ± 10.80	126.14 ± 11.46	<0.001	<0.001	<0.001
p #	<0.001	<0.001		0.315	0.205			
DBP								
1st week	81.80 ± 9.01	76.00 ± 6.45	<0.001	81.95 ± 13.34	80.19 ± 12.40	0.038	0.968	0.177
2nd week	79.71 ± 10.21	72.52 ± 10.53	<0.001	87.38 ± 12.97	85.00 ± 11.65	0.009	0.040	0.001
3rd week	79.57 ± 6.81	73.52 ± 8.09	<0.001	82.24 ± 13.32	80.28 ± 12.55	0.015	0.144	0.045
4th week	77.38 ± 8.81	70.57 ± 7.88	<0.001	85.00 ± 10.95	81.42 ± 9.62	0.010	0.017	<0.001
5th week	75.23 ± 7.64	68.09 ± 7.22	<0.001	88.42 ± 8.21	84.80 ± 8.08	<0.001	<0.001	<0.001
6th week	72.71 ± 7.43	63.71 ± 5.46	<0.001	89.09 ± 5.84	85.14 ± 6.98	<0.001	<0.001	<0.001
p #	<0.001	<0.001		0.145	0.082			
HR								
1st week	75.00 ± 14.04	71.52 ± 11.14	0.029	78.47 ± 11.05	73.47 ± 10.43	<0.001	0.968	0.561
2nd week	75.09 ± 11.38	70.71 ± 10.24	<0.001	79.33 ± 10.03	75.61 ± 10.30	<0.001	0.040	0.007
3rd week	74.38 ± 9.74	69.28 ± 9.57	<0.001	81.66 ± 11.02	77.90 ± 10.20	<0.001	0.540	<0.001
4th week	72.76 ± 8.44	66.62 ± 8.13	<0.001	82.71 ± 10.15	79.52 ± 9.87	<0.001	0.017	<0.001
5th week	70.90 ± 8.61	64.47 ± 8.05	<0.001	83.38 ± 9.46	79.19 ± 8.87	<0.001	<0.001	<0.001
6th week	65.00 ± 15.26	61.66 ± 7.16	<0.001	85.95 ± 10.21	81.57 ± 8.90	<0.001	<0.001	<0.001
p #	<0.001	<0.001		<0.001	<0.001			

Note: SD: Standard deviation.

* Obtained from the Wilcoxon Signed Ranks test.

** Obtained from the paired t-test.

*** Obtained from independent-samples t-test.

**** Obtained from Mann Whitney U test. p # Obtained from General Linear Model Repeated Measures ANOVA test. Bold p values are statistically significant (< 0.05).

will end, my need will continue. In fact, we need it in everyday life.” (32-year-old police)

“Especially if the disease is a stressful one and if it is difficult, like cancer, it should definitely be applied. My suggestion is to start Reiki treatment as soon as these diagnoses are made.” (56-year-old retired individual)

“My husband sometimes stays in the service for 3–5 days due to side effects. I think, at least, his approach to the events will be lightened once he received once or twice each time we stayed.” (52-year-old shopkeeper)

6. Discussion

This study investigated the effect of Reiki on the stress levels of caregivers of patients with cancer, and the baseline stress level of both groups was moderate. After the intervention, the Reiki group had significantly lower stress scores than the sham Reiki group, and the difference in the pre- and post-intervention CSI scores was significantly

lower in the Reiki group than in the sham Reiki group. Stress scores in the Reiki group decreased by 32 % compared with the pre-intervention score.

Studies conducted in different sample groups support our study findings. Shore applied Reiki by touching for 6 weeks, which had significantly reduced the stress symptoms, and differences were evident at 1 year later.⁴⁰ Kundu et al. have reported that 88 % of the caregivers observed that their patients’ comfort and relaxation level increased after Reiki sessions.⁴¹ Kurebayashi et al. have reported that stress scores decreased by 24 % after Reiki sessions compared with baseline.⁴² Bukowski had noted that stress scores based on posttest data were lower than pretest scores.⁴³ A study, which could provide data on caregiver burnout, reported that the parasympathetic nervous system was affected in the group of nurses who received Reiki.⁴⁴

In our study, the SCL was within normal limits in both groups both before and after Reiki/sham Reiki interventions. Although the participants in the Reiki group showed a decrease compared with the pre-intervention levels after 6 weeks of sessions, this decline was not

significant. Wardell and Engebretson reported that Reiki did not cause a significant difference on SCL, similar to our study finding.⁴⁵ Moreover, although Reiki had positive effects on well-being and perceived health status, Bowden et al. found no significant difference in SCL.⁴⁶ Although no significant change was noted in the SCLs in the present study, some physical complaints of the caregivers in the Reiki group due to care process stress decreased; therefore, their statements about increased well-being, feeling relaxed, and being calm compared to pre-intervention status is noteworthy. Salivary cortisol has been used frequently for more than 20 years to evaluate HPA activity and stress response, since it is completely similar to plasma free cortisol level.⁴⁷ However, it is known that the natural fluctuation process of cortisol can be easily overridden by various external factors, including caffeine intake, recent infections, surgical interventions, antibiotic intake, amount of activity shortly before measurement, and situational events such as negative affect. In line with this information, although reiki was not found to be effective on SCL and factors such as eating and drinking, caffeine-theine intake, smoking, brushing teeth that could stimulate salivary cortisol were taken under control in our study, it can be thought that it may be related to other emotional stimuli that the caregivers might have encountered on the days when the samples were collected.

Reiki includes stimulation of the sympathetic nervous system, which presents a physiological stress response to emotional stress, high blood pressure, and increased pulse rate. Studies have shown that Reiki balances systolic and diastolic blood pressure and pulse rate by stimulating parasympathetic activity^{45,48,49}. In our study, the systolic and diastolic blood pressures and pulse rate decreased significantly more than the sham Reiki group values after each session and after week 2 in the Reiki group. The significant decrease of these values after each session compared with the average measurements before starting the intervention can be due to the relaxing effect of physical rest on the autonomic nervous system. However, to distinguish the effects of relaxation and rest on indicators such as blood pressure and pulse rate from the effect of Reiki, the caregivers were allowed to rest for 20 min before each session, and the systolic/diastolic blood pressure and pulse rates of the groups were significantly improved in the Reiki group during the 6-week intervention detection of a decrease, indicating that the long-term effect of Reiki endures regardless of rest. In addition, the change in the pulse rate of the sham Reiki group within 6 weeks showed a significant increase in the direction of increase. Considering that the mean CSI scores of the sham Reiki group increased in the last week of intervention, this situation might be due to the increase in caregiver stress over time.

Similar to our findings, many studies conducted in different sample groups^{45,46-51} have reported that individuals in the Reiki group have significantly lower systolic and diastolic blood pressure and pulse rate than the control groups. On the contrary, Díaz-Rodríguez et al. have applied a 30-min session of Reiki to 18 nurses diagnosed with burnout syndrome and sham Reiki to the control group. Moreover, they have observed a decrease in the diastolic blood pressures of the nurses who received Reiki compared with the control group, while no significant difference was noted in the systolic blood pressures.⁴⁴ Midilli and Eser found no difference in blood pressure or pulse rate between the Reiki group and the control group.⁵²

In the quantitative findings of CSI evaluating the stress level of caregivers, the average post-intervention scores in the Reiki group significantly decreased compared with that in the control group. In the qualitative phase of the study, the caregivers stated that as the intervention weeks progressed, they felt better, their muscle tension decreased, they slept better, and they were calmer of the behaviors of their patients that may cause arguments. These expressions of the caregivers in the Reiki group support the significant decrease in stress scores. In addition, the systolic and diastolic blood pressures and pulse rates of the Reiki group were significantly lower than that of the sham Reiki group. Since some caregivers stated that they have low blood pressure levels, the change in this physiological marker reflects the effects of stress on the autonomic nervous system, due to the decrease in

stress level. To our knowledge, no study has investigated the effect of Reiki on the stress level of caregivers of patients with cancer. However, the Reiki experiences of nurses who provided day-long care support our study findings. For example, Vitale has stated that nurses gained a clearer view on a subject after self-Reiki applications; thus, they felt less stressed, more energetic, and calmer.⁵³ In a study by Brathovde, a nurse said, "I can approach to my patients more loving because I have reduced stress with Reiki," and another nurse said, "I am less judgmental and aware of everything".⁵⁴ In a study by Keawpimon, when one of the individuals was asked to what the Reiki changed, the response was "I don't have a headache anymore. I feel my thoughts clearer. Also, I am able to manage relaxing now".⁵⁵

In our study, women who received Reiki expressed that they wished that their patients, whose tensions had increased during the illness and treatment process, could receive Reiki sessions to help them relax. Similar to our study, McManus reported that patients with cancer and their family members caring for them overcame the illness and treatment process, which they described initially as "stressful and fearful" which became "less traumatic," thanks to Reiki.⁵⁶ Fleisher et al. have reported that patients with cancer demonstrated decreased emotional distress, including stress, anxiety, and muscle tension after Reiki application by touching.⁵⁷

7. Conclusion

Reiki, administered to caregivers who cared for patients with cancer for 6 weeks, once a week for 45 min, decreased the stress level as well systolic and diastolic blood pressure and slowed the pulse rate, but did not lead to a significant difference in SCL. In this study, qualitative data supported quantitative data. Based on this finding, Reiki reduces the stress and subsequent physical complaints of individuals who received Reiki. The caregivers experienced less conflict with their patients, and the insights of caregivers changed. The caregivers stated that applying Reiki to their patients could be beneficial, and they recommend integrating Reiki should be integrated into the health system in all disease processes and considering it as a routine nursing practice.

8. Limitations of the study

This study took considerable time because the sessions lasted 6 weeks, opinions of the caregivers about the sessions and their answers were taken after the interventions, and the student nurses were given training on conducting Reiki sessions in the sham Reiki group and they were accompanied throughout the sessions. In addition, interventions after the first week were continued at the participant's home.

Author statement

Ulviye Özcan Yüce: Conceptualization, Methodology, Formal analysis, Validation, Investigation, Writing original draft, Reiki intervention.

Sultan Taşçı: Conceptualization, Methodology, Formal analysis, Writing- review & editing.

Declarations of Competing Interest

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.ctim.2021.102708>.

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