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ORIGINAL RESEARCH

The Effects of Ginger Kidney Compress on Severity of Pain and Physical Functions of Individuals with Knee Osteoarthritis: A Randomized Controlled Trial

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Abstract:
Objective: This study was conducted in order to determine the effect of ginger kidney compress applied to the waist region for 30 minutes for seven days on the severity of pain and physical functions of individuals with knee osteoarthritis.
Material-Method: This is a randomized controlled trial study. The sample included 124 patients; 43 ginger kidney compresses, 41 hot compresses, and 40 control groups. The data were collected using Patient Information Form, Visual Analog Scale (VAS)–Pain, and WOMAC Osteoarthritis Index. The forms were administered at the beginning (first follow-up) and at the end (7th day, second follow-up) of intervention. The intervention-I group received a ginger kidney compress while intervention-II group received a hot compress and the control group received no intervention.
Results: In the first follow-up, there was no difference between the scores of the groups included in the study ($p > 0.05$), which were obtained from the VAS-Pain and WOMAC Osteoarthritis Index. In the second follow-up, a significant difference between the scores of the groups obtained from the VAS-Pain and WOMAC Osteoarthritis Indexes ($p<0.001$) was detected. According to the initial follow-ups, the scores of the individuals in the ginger kidney compress group at the final follow-up decreased significantly from the VAS-Pain and WOMAC Osteoarthritis Index compared to the individuals in the hot compress and the control group ($p<0.001$).
Conclusion: It has been determined that the application of ginger kidney compress is more effective than hot compress application and that it decreases the VAS-Pain and WOMAC Osteoarthritis Index scores.
Keywords: Knee Osteoarthritis, Pain, Physical Function, Ginger Kidney Compress, Nursing.

INTRODUCTION

Osteoarthritis (OA) is one of the most common rheumatic diseases in the world and Turkey. It is a degenerative joint disease that primarily affects the elderly population and has a high rate of morbidity and mortality. The knee joint is the most affected area by osteoarthritis (OA), which leads to impaired quality of life and economic loss as a result of the loss of function due to the disease [1-3]. Studies have shown that the prevalence of knee OA varies between 12.1% and 43.7% [4-7]. In Turkey, a study on individuals aged 50 and older with knee OA has determined the prevalence of symptomatic knee OA to be 14.8%, reporting it as 22.5% in women, and men as 8% [8]. The Turkey Health Research study conducted by the Turkey Statistical Institute (TSI) in 2019 on the other hand has expressed that OA is seen in 11.2% of the general population [9].

While the most common symptoms in individuals with osteoarthritis are the pain of different severity levels, stiffness in the morning, reduced mobility, tenderness in the affected joint, and atrophy and crepitation in muscles, the most common symptom in the world and the one that causes the most distress is the pain [10,11]. Pain caused by knee OA results in individuals not being able to perform physical functions such as walking on an even ground, going up or down the stairs, getting in or off the car, and standing up, preventing them from participating in daily life and social activities, and causing both physical and psychosocial inabilities. Therefore, pain is presented as the most important symptom that needs to be prioritized in the treatment of individuals with knee OA [10,12].

The aims of the treatment of knee OA are reducing pain, increasing joint mobilization and the functional capacity of the knee, preventing contractures, preserving and improving muscle strength, preventing injuries, treating concomitant diseases, preventing treatment complications, and improving the quality of life and reducing

dependency by educating the patient and his/her family [13-15]. Since only one treatment method is not sufficient in the treatment of knee OA, important clinical guidelines for treatment management generally recommend the use of non-pharmacological and pharmacological treatment methods together, therefore integrative methods [16-19].

Ginger, which is one of the methods used in the complementary treatment of osteoarthritis, has been an important ingredient in traditional Asian, Indian, and Arab treatments since ancient times and in many areas of traditional Chinese Medicine since the fourth century BC [20,21]. Ginger is reported to have been used internally and externally, usually as part of compresses, patches, or plasters, particularly for illnesses and complaints such as abdominal pain, headache, toothache, nausea, vomiting, diarrhoea, cholera, heart diseases, asthma, baldness, snake bites, rheumatic complaints, and seasonal colds, as well as to regulate bleeding [22-27].

One of the methods included in complementary and integrative nursing practices for pain management in osteoarthritis is ginger kidney compress application [26]. Ginger kidney compress application, which is based on the principle of putting ginger powder compresses on individuals' waist region in order to warm up the body, relieve pain, relieve physical and mental tension and fatigue, and to provide relief [26-28]. Studies conducted also indicate that ginger kidney compress application, as part of the management of pain caused by OA, creates heat, stimulation, anti-inflammatory and analgesic effects, and that with this application, gradual relaxation in pain, more comfortable and flexible joint mobility occurs, the patients' quality of life. As a result relaxation and stagnation in thoughts increase, and psychological disorders decrease [26,29-31]. While there is a limited number of studies on the use of ginger kidney compress in reducing the pain of individuals with OA abroad [26,29-31], there are no studies demonstrating the effects of ginger kidney compress in reducing the pain of individuals with OA in Turkey. In this study, which was planned on the basis of this fact, was aimed to determine the effect of ginger kidney compress application on the pain severity and physical functions of individuals with knee OA when applied to the waist for 7 days, 30 minutes (min) per day.

MATERIALS AND METHODS

Study design

This study is a randomized controlled study conducted to determine the effect of ginger kidney compress application on pain severity and physical functions of individuals with knee OA when applied to the waist region for 7 days, 30 minutes per day. It was registered at the archive of the Databases of the National Thesis Center of the Council of Higher Education (No: 390830).

Participants and setting

The population of the research consists of all the individuals who have been diagnosed with OA and subsequently been admitted to the Physical Therapy and Rehabilitation Center after seeking medical care at the Physical Therapy and Rehabilitation Clinic at the State Hospital of a city in Turkey. The collection of data was carried out between 11.03.-11.08.2013 with patients who met the inclusion criteria and was based on the Consolidated Standards of Reporting Trials (CONSORT) guideline.

Inclusion criteria: The scope of the study consists of individuals (a) aged 38 years and older, (b) who have been diagnosed with knee OA by a physician according to the American College of Rheumatology (ACR) criteria, (c) who have had knee pain for at least 6 months, (d) who have received at least 3 points or more from the Visual Analogue Scale (VAS), (e) are not using pain relieving drugs during treatment, (f) have no communication problems, (g) who have the cognitive abilities to be able to answer questions and (h) who have agreed to participate in the research.

Exclusion criteria: Considering that it may affect the results of the research, (a) patients who are pregnant, (b) have a large scar tissue in the lumbar region, (c) have any peripheral vascular disease, (d) a cardiac pacemaker, (e) have a predisposition to bleeding, (f) a history of malignancy, (g) appendicitis or pneumonia, (h) have a heat sensitivity or allergy, (ı) who have undergone physical therapy in the last 6 months, (j) who suffer from an inflammatory joint disease (Rheumatoid arthritis, Ankylosing spondylitis etc.), (k) who have undergone an operation on the abdominal region, and (l) whose VKI ≥ are over 30, were not included in the study.

Termination criteria: (a) Patients whose physical therapy program was changed, (b) who did not wish to continue applying compresses at any stage of the study, (c) who could not adapt to the treatment hours, (d) who could not be reached by phone during follow-ups, (e) who decided to continue treatment outside the city, and (f) who for various reasons, wanted be discharged early, were removed from the study.

Sample size and randomization

Since there is no study in the literature that fully corresponds to our study, there was no sample

Volume: 2 **Issue: 2**
Year: 2021
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International Journal of Traditional and Complementary Medicine Research

Publisher
Duzce University

calculation. In the study, biostatistics consultation was obtained and the sample size was planned to be at least 30 people in order to perform parametric tests in each group. Individuals, who were admitted to the Physical Therapy and Rehabilitation Center after being diagnosed with OA according to ACR criteria by the Physical Therapy and Rehabilitation Specialist, were assigned to study groups according to the chart prepared independently from the researcher, by a University's biostatistics unit using the Minitab 16.0 statistical package program, with a randomization method. Considering that there may be separations from the research group during the application process, a total of 135 people were included in the sample, consisting of 45 people in the ginger kidney compress group, 45 in the hot compress group, and 45 in the control group. The study was completed, as a result of two individuals being discharged early, with 43 individuals in the ginger kidney compress group, since one individual had difficulty lying on her back, one individual wanted to quit treatment at their own discretion, and two individuals could not comply with treatment, with 41 individuals in the group where hot compress was applied, and as a result of the fact that 4 individuals could not reached by phone, and that one person left the study voluntarily, with 40 individuals in the control group. At the end of the study, in the intervention, placebo and control groups, in all of the VAS Pain Scale and WOMAC scales, the first type error margin being 0.05, and the power was determined to be 100% (Figure 1).

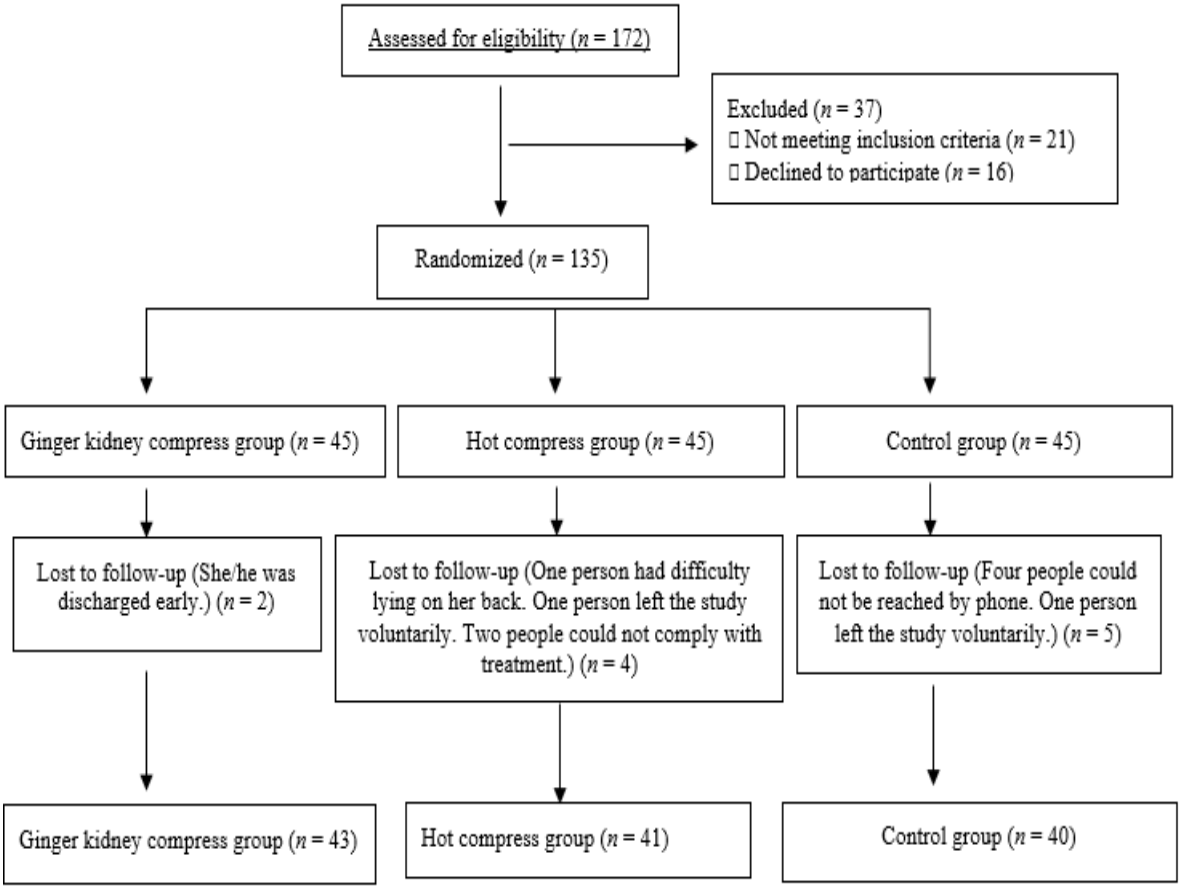

Figure 1. The CONSORT chart of the study.

Outcome measurement tools

In the study, data was collected using Patient Information Form, Visual Analogue Scale (VAS), WOMAC Osteoarthritis Index, Ginger Kidney Compress Application Protocol, Hot Compress Application Protocol, Ginger Kidney Compress Application Chart and Hot Compress Application Chart.

Patient information form

The patient information form, prepared by the responsible researcher by examining the related literature [19,26,27,29,30,32,33] consists of 'socio-demographic characteristics', 'information about the disease' and 'height and weight measurements' with which BMI calculations were made. The MBI was calculated with the following formula: BMI = Body

Weight (kg) / Height (m^2), and was evaluated according to the World Health Organization (WHO) BMI classification [34].

Visual Analogue Scale (VAS), developed by Price et al [35] in 1983, is a scale the beginning of which is -0- "no pain" and the end is -10- "very severe pain" and a scale where a numerical value is given to each cm at intervals of one centimeter (cm). It was explained to the individuals participating in the study that the number "0 " meant "I don't feel any pain at all," that as the numbers got bigger, the intensity of pain increased and that the number "10 " meant "I feel the most severe pain," and they were asked to mark the level of the severity of the pain they were feeling at the moment. The pain experienced by individuals was evaluated twice, once immediately before the procedure and once within the day following the end of the procedure.

WOMAC osteoarthritis index

Various revisions and changes were made in the WOMAC index, which was originally developed in 1982. The latest version is WOMAC 3.1 The validity and reliability study of the Turkish version of the WOMAC Osteoarthritis Index was made by Tüzün et al[36,37]. The index consists of three sub-scales and 24 questions in total: pain (5 questions), stiffness (2 questions), difficulties faced while doing daily physical activities (17 questions). The Turkish version of the WOMAC OA Index is evaluated on a 5-point Likert scale. These are as following: 0 = none, 1 = mild, 2 = moderate, 3 = severe, 4 = very severe. The highest score on the Likert scale is 20 points for pain, 8 points for stiffness and 68 points for difficulties faced during daily activities.

A high score in the index indicates worse or more symptoms, and the highest level of physical limitation [37]. In this study, WOMAC OA Index pain, stiffness and physical function sub-scales cronbach alpha values were respectively 0.85, 0.59 and 0.95 before application and 0.96, 0.87 and 0.98 after application

Ginger kidney compress application protocol

It is the protocol created with the revision of the relevant literature by the responsible researcher [27,38,39] and formed based on the instructions for application of the ginger kidney compress used in the ginger kidney compress training at The Filderklinik Community Hospital in Stuttgart, Germany and at the Ita Wegman Clinic in Basel, Switzerland. It is the protocol applied to the ginger kidney compress group. The protocol includes information about the pre-application preparation phase, materials used, application procedure and the frequency of application.

Hot compress application protocol

It is the protocol created to be applied to the placebo control group, adhering to the ginger compress application protocol prepared by the researcher. The protocol includes information about the pre-application preparation phase, materials used, application procedure and the frequency of application.

Ginger kidney compress application schedule

In the application chart prepared by the researcher, the information about the name and surname of the individuals who were included in the ginger kidney compress group, the starting date of the application, time of the application, duration of the application and the positive/negative effects developed are included.

Hot compress application schedule

In the schedule prepared by the researcher, the information given includes the names and surnames of the individuals included in the hot compress group, the starting date of the application, the time of the application and the positive / negative effects that develop during the application.

Data collection

The responsible researcher in this study has received theoretical and practical training and a certificate on ginger kidney compress at the ARCIM Institute, in collaboration with the Filderklinik Community Hospital and Tübingen University in Stuttgart, Germany for three days, at the Ita Wegman Clinic in Basel, Switzerland for five days. In order to carry out the research on a regular basis, how the patients were to be admitted and where the application was to be made were discussed with physicians of the Physiotherapy and Rehabilitation Center, where the study was to be conducted, as well as with the other healthcare team. Moreover, the staffs were informed about the purpose, scope and method of application, and a physical arrangement was made regarding the place of application. During the study, there was no interference with the routine treatment of patients in the ginger kidney compress, hot compress, and control groups. The individuals were randomized according to the schedule prepared by the University's Biostatistics Unit and were assigned to three groups as ginger kidney compress group, hot compress group and control group. Randomized patients were taken to the physical therapy room between 08.00-12.00, and ginger or hot compresses were applied.

Procedures applied to the ginger kidney compress group

In the first follow-up of the patients in the ginger kidney compress group (first interview - before

starting ginger compress application) Patient Information Form, VAS Pain Scale, and WOMAC Index information were collected by the researcher through the face-to-face interview technique. While calculating the BMI, one of the criteria for inclusion, the tape measure was used for the height measurement of the individuals, and scale was used for the weight measurement.

Afterwards, ginger kidney compress application was applied to each patient in the ginger kidney compress group for 30 minutes per day (7 days) at the same time, in line with the application protocol prepared by the researcher. After one week of application, VAS Pain Scale and WOMAC OA Index were applied again during the day (during the second follow-up of individuals) by meeting face to face with the patients. Patients were informed about the application of the VAS Pain Scale, and were asked to mark the VAS Pain Scale themselves before and after the application. During the course of the study, patients were advised by their doctors not to use any drugs with analgesic properties, and none of the patients used drugs with analgesic properties.

Procedures applied to hot compress group

In the first follow-up of the patients in the hot compress group (first interview - before starting hot compress application) Patient Information Form, VAS Pain Scale, and WOMAC Index information were collected by the researcher through the face-to-face interview technique. While calculating the BMI, one of the criteria for inclusion, tape measure was used for the height measurement of the individuals and scale was used for the weight measurement.

Afterwards, hot compress application was applied to each patient in the hot compress group for 30 minutes per day (7 days) at the same time, in line with the application protocol prepared by the researcher. After one week of application, VAS Pain Scale and WOMAC OA Index were applied again during the day (during the second follow-up of individuals) by meeting face to face with the patients. Patients in the placebo group were informed about the application of the VAS Pain Scale, and were asked to mark the VAS Pain Scale themselves before and after the application. None of the patients used any drugs with analgesic properties during the study.

Procedures applied to the control group

In the first follow-up of the patients included in the control group (first interview - patients coming to make a physical therapy appointment) Patient Information Form, VAS Pain Scale and WOMAC OA Index information were collected by the researcher through the face-to-face interview technique. During the first interview, the patients in the control group were informed about the application of the VAS Pain Scale, and it was ensured that they marked the VAS Pain Scale themselves. While calculating the BMI, tape measure was used for the height measurement of the individuals and scale was used for the weight measurement. On the day (in the second follow-up of the patients) at the end of a week (seven days), the VAS Pain Scale and WOMAC OA Index were re-applied and recorded by the researcher by interviewing the patients via phone. During the first follow-up, the VAS Pain Scale, which was to be used during the second follow-up, was given to the patients, and they were asked during the phone call as well to disclose the value they marked. During the study period, the patients were advised not to use any drugs with analgesic properties and they did not use drugs.

Statistical analysis

The data were evaluated using IBM SPSS Statistics 21.0 and SigmaStat 3.5 statistical software. Independent variables of the study are socio-demographic characteristics of the patients such as age, gender and education level. Dependent variables of the study are the VAS Pain Scale and the WOMAC Index scores. Summary statistics were given as unit number (n), percent (%), mean ± standard deviation, median, 25th and 75th percentile value [(M (Q_1-Q_3)]. The distribution of numerical variables was evaluated by the Shapiro-Wilk normality test. Since the data did not show normal distribution, comparisons between groups were made with the Kruskal-Wallis Variance Analysis, and the Dunn test was used as multiple comparison test.

The Wilcoxon test was used to evaluate the consecutive measurements. Exact method of the Chi-square analysis was used to compare categorical variables and p value <0.05 was considered statistically significant.

Ethical considerations

Before starting the application, Ethics Committee Approval from the University Clinical Research Ethics Committee **(Decision Number: 2012/460),** and written permission from the Chief Physician State Hospital, where the research was conducted (**Number: 97396145/1554**) were taken. After the volunteers were informed about the research and it was stated that their identity would not be disclosed in any way, verbal and written consents were taken, and the informed consent form was signed.

Volume: 2 **Issue: 2**
Year: 2021
DOI: 10.53811/ijtcmr.972187

International Journal of Traditional and Complementary Medicine Research

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Duzce University

Limitations of the study

In the research, the blanking method was planned. However, this could not be achieved because of the difficulties in finding suitable working conditions and practitioners for the blanking. In addition, evaluation of individuals over a period of more than 7 days was not possible since in the routine treatment of the clinic, spending more than 7 days without physical therapy and medication was not allowed.

RESULTS

The descriptive features of the participants in the ginger kidney compress, hot compress, and control groups are presented in Table 1. Individuals in the ginger kidney compress, hot compress, and control groups are similar in terms of identifying features except for marital status and smoking status ($p > 0.05$) (Table 1)

The disease features of the participants in the ginger kidney compress, hot compress, and control groups are presented in Table 2. It was observed that individuals in the ginger kidney compress, hot compress, and control groups were similar, except for the presence of OA in the family, in terms of other disease characteristics ($p > 0.05$) (Table 2).

Table 1. Descriptive features of the participants in ginger kidney compress, hot compress and control groups

	Groups						*p*
	Ginger kidney compress group (*n*=43)		**Hot compress group** (*n*=41)		**Control group** (*n*=40)		
	n	**%**	***n***	**%**	***n***	**%**	
Sex							
Female	34	79.1	32	78.0	32	80.0	1.000*
Male	9	20.9	9	22.0	8	20.0	
Age							
50-70 age	25	58.1	28	68.3	25	62.5	0.628*
71 age and above	18	41.9	13	31.7	15	37.5	
Median of Age (25% - 75%)	67.0 (60.5-76.75)		65.0 (60.0-73.0)		67.0 (58.5-78.0)		0.725**
Marital status							
Married	32	74.4	36	87.8	25	62.5	0.034*
Single	11	25.6	5	12.2	15	37.5	
Education							
Not literate	19	44.2	22	53.7	21	52.5	
Literate	17	39.5	13	31.7	11	27.5	0.781*
Primary school	7	16.3	6	14.6	8	20.0	
VKI Average ($\boldsymbol{Mean \pm SD}$)	27.5 ± 3.02		27.57 ± 2.45		27.69 ± 2.38		0.576***
Economic Status							
Good	8	18.6	10	24.4	12	30.0	0.480*
Middle	35	81.4	31	75.6	28	70.0	
Profession							
Housewife	30	69.8	28	68.3	29	72.5	
Retired	8	18.6	7	17.1	6	15.0	0.985*
Farmer	5	11.6	6	14.6	5	12.5	
Residence place of family							
City center	17	39.5	15	36.6	18	45.0	
Countryside	12	27.9	10	24.4	14	35.0	0.463*
Village	14	32.6	16	39.0	8	20.0	
Cigarette							
Never smoked	27	62.8	26	63.4	35	87.5	
He/she smoked, quit smoking	16	37.2	15	36.6	5	12.5	0.020*

Note. SD. Standard deviation. * Fisher chi-square exact test for rxc tables ,** Kruskal-Wallis Analysis, *** One way analysis of variance

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Table 2 . Disease features of the participants in ginger kidney compress, hot compress and control groups

	Ginger kidney compress group (*n*=43)		Hot compress group (*n*=41)		Control group (*n*=40)		p
	n	%	*n*	%	*n*	%	
Duration of disease (years)($Mean \pm SD$)	6.25 ± 5.63		6.41 ± 6.08		5.32 ± 4.35		0.748*
Presence of OA in the family							
Yes	13	30.2	23	56.1	13	32.5	0.031**
No	30	69.8	18	43.9	27	67.5	
Additional disease							
Yes	37	86.0	32	78.0	29	72.5	0.312**
No	6	14.0	9	22.0	11	27.5	
Control Frequency							
The complaint is quite	43	100.0	41	100.0	40	100.0	-
Regular Use of Drugs							
Yes	33	76.7	34	82.9	31	77.5	0.753**
No	10	23.3	7	17.1	9	22.5	
Regular Use of Exercise							
Yes	7	16.3	5	12.2	6	15.0	0.864**
No	36	83.7	36	87.8	34	85.0	
Hospitalization in the Last One Year							
Yes	13	30.2	12	29.3	15	37.5	0.687**
No	30	69.8	29	70.7	25	62.5	
Number of Hospitalizations	(*n*=13)		(*n*=12)		(*n*=15)		
One time	8	61.5	7	58.3	9	60.0	0.987**
Twice	5	38.5	5	41.7	6	40.0	
Perform Prayer							
Yes	37	86.0	35	85.4	33	82.5	0.894
No	6	14.0	6	14.6	7	17.5	
How to Pray	(*n*=37)		(*n*=35)		(*n*=33)		
Standing	16	43.2	16	45.7	14	42.4	0.960
Seated	21	56.8	19	54.3	19	57.6	
Using Auxiliary Tools							
Yes	12	27.9	7	17.1	10	25.0	0.501
No	31	72.1	34	82.9	30	75.0	
Heating Type of the House							
Heater	23	53.5	13	31.7	19	47.5	0.117
Stove	20	46.5	28	68.3	21	52.5	
Wearing of Heels Shoes	(n=34)		(*n*=32)		(*n*=32)		
No	34	100.0	32	100.0	32	100.0	-

Note. **One way analysis of variance, ** Fisher chi-square exact test for rxc tables*

Before the application, the VAS score of the individuals in the ginger kidney compress group was determined as 8.0, the VAS score of the individuals in the hot compress group was determined as 8.0 and the VAS score of the individuals in the control group was determined as 7.0. This difference between the groups in terms of pre-application VAS scores is not significant ($p > 0.05$). It was found that compared to pre-application, there was a significant difference between the VAS scores of the ginger kidney compress group, the hot compress group, and the control group after the application ($p<0.001$). In the analysis, it was determined that the VAS pain score of individuals in the ginger kidney compress group decreased more than the individuals in the hot compress and control groups, that there was an increase in pain in the individuals in the control group and that the difference between the groups was significant ($p<0.001$) (Table 3).

Table 3. VAS Pain Points Pretest and Post-test Application of Groups

	Groups			
VAS	**Ginger kidney compress group** (*n*=43) *M(Q1-Q3)*	**Hot compress group** (*n*=41) *M(Q1-Q3)*	**Control group** (*n*=40) *M(Q1-Q3)*	***p****
Pretest	8.0 (7.0-8.75)	8.0 (7.0-9.0)	7.0 (6.0-8.0)	0.064
Post-test	3.0 (3.0-4.0)^a	7.0 (6.0-8.0)^b	8.0 (7.0-9.0)^b	**<0.001**
Odds	4.0 (3.0-5.0)^a	1.0 (0-1.0)^b	-1 (-1-0)^c	**<0.001**
p**	**<0.001**	**<0.001**	**<0.001**	

Note. ^{a,b,c}*: It shows the difference between the groups in the study groups. There are different characters in different groups. *Kruskal-Wallis Analysis, **Wilcoxon test*

Volume: 2 **Issue: 2**
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Comparison of the WOMAC OA scale sub-scales scores before and after the application of the groups included in the research are included. The WOMAC-Pain sub-scale score of individuals in the ginger kidney compress group before the application was determined as 15.0 (12.0-17.0), the WOMAC-Stiff sub-dimension score as 5.0 (4.0-7.0), the WOMAC-Physical Function sub-dimension score as 52.0 (48.25-61.0); the WOMAC-Pain sub-scale score was determined as 16.0 (13.75-18.0), the WOMAC-Stiffness sub-scale score as 6.0 (5.0-6.0), the WOMAC-Physical function sub-scale score as 58.0 (44.0-61.0) and the WOMAC-Pain of control group sub-scale score as 14.0 (13.0-16.5), the WOMAC-stiffness score as 5.0 (4.0-5.5), and the WOMAC-Physical Function sub-scale score as 51.0 (46.5-59.5). While there was a significance in the WOMAC-Stiffness sub-scale between the groups before the application (p<0.05), this difference between the groups was not significant in terms of the WOMAC-Pain sub-scale and the WOMAC-Physical Function sub-scale scores (p> 0.05). On the other hand, compared to pre-application, in the individuals the ginger kidney compress group, the hot compress group, and the control group, there was a highly significant difference between the WOMAC-Pain sub-scale, WOMAC-Stiffness sub-scale and the WOMAC-Physical Function sub-scale after the application p<0.001). In the analysis, it was determined that the WOMAC-Pain sub-dimension, WOMAC-Stiffness sub-dimension, and WOMAC-Physical function sub-dimension scores of individuals in the ginger kidney compress group decreased more than the individuals in the hot compress and control groups, and that there was an increase in pain in the control group and that the difference between the groups was significant. (p<0.001) (Table 4).

Table 4. WOMAC OA index sub-dimensions points pretest and post-test application of groups

WOMAC OA Index Sub-Dimensions	**Groups**			***p****
PAIN	**Ginger kidney compress group** (n=43) *M(Q1-Q3)*	**Hot compress group** (n=41) *M(Q1-Q3)*	**Control group** (n=40) *M(Q1-Q3)*	
Pretest	15.0 (12.0-17.0)	16.0 (13.75-18.0)	14.0 (13.0-16.5)	0.155
Posttest	7.0 (4.25-8.0)[a]	15.0 (13.0-17.0)[b]	16.0 (15.0-17.0)[b]	<0.001
Odds	9.0 (6.0-10.0)[a]	1.0 (0-2.0)[b]	-1.5 (-2-0)[c]	<0.001
p**	<0.001	<0.001	<0.001	
STIFFNESS				
Pretest	5.0 (4.0-7.0)	6.0 (5.0-6.0)	5.0 (4.0-5.5)	0.021
Posttest	3.0 (2.0-3.0)[a]	5.0 (4.0-6.0)[a,b]	6.0 (5.0-6.0)[a]	<0.001
Odds	2.0 (2.0-4.0)[a]	1.0 (0-1.0)[b]	-0.5 (-1-0)[c]	<0.001
p**	<0.001	<0.001	<0.001	
PHYSICAL FUNCTION				
Pretest	52.0 (48.25-61.0)	58.0 (44.0-61.0)	51 (46.5-59.5)	0.413
Posttest	29.0 (24.0-31.0)[a]	53.0 (44.0-59.25)[b]	57.5 (53.0-61.0)[b]	<0.001
Odds	29.0 (20.0-34.0)[a]	3.0 (0-4.0)[b]	-4 (-6-0)[c]	<0.001
p**	<0.001	<0.001	<0.001	

Note .[a,b,c]: *It shows the difference between the groups in the study groups. There are different characters in different groups. *Kruskal-Wallis Analysis, **Wilcoxon test*

DISCUSSION

In our study in which we examined the effect of ginger kidney compress application applied on the waist region of individuals with knee OA for 7 days, 30 minutes a day, on the pain severity and physical functions of individuals. Ginger kidney compress application was aimed to be evaluated with the hot compress and control groups. As a result of the study, it has been determined that the application of ginger kidney compress on individuals with knee OA is effective in reducing the severity of pain and that it increases the physical function capacity of individuals.

In our study, it was observed that the VAS-pain score and the WOMAC-Pain sub-scale, the WOMAC-Stiffness sub-scale, and the WOMAC-Physical function sub-scale scores of individuals knee OA were high in all groups before the application and that after the application, the VAS-Pain score, the WOMAC-Pain sub-scale, WOMAC-Stiffness sub-scale and WOMAC-Physical function

sub-scale scores of the individuals in the ginger kidney compress group decreased after 7 days of application more than those of the individuals in the hot compress and control groups. It is stated that the application of ginger kidney compress causes increased circulation with vasodilation in the region where it is applied and that it helps to remove from the region the metabolic residues that increase the pain by joining blood circulation, that it blocks the sensation of pain by stimulating the afferent and efferent nerves, that it reduces the stiffness and stimulates the organs. In addition, it has effects such as relaxing, heating the body, relieving fatigue, and improving fitness in the individuals treated [26,27,29-31,38,39]. The findings of a limited number of studies in the literature evaluating the effect of ginger kidney compress application applied on individuals with knee OA on the waist region on pain severity and physical functions of individuals are similar to the findings of this study [26,29,30,40].

In the pilot study evaluating the effectiveness of ginger kidney compress and ginger patch product by Therkleson, it was observed that there was a decrease in the pain levels of both ginger compress and ginger patch group in patients' 21-day pain scores (30% decrease in VAS-Pain scale), and that in the Modified Health Assessment Survey results in the score before the application was 1.85, and it was reduced 0.95 in the ginger patch group, and in the ginger group, it decreased from 1.75 to 1.1. After twenty-four weeks, a 73% reduction in pain, 76% in fatigue, 72% in global impact, and 63% in the functional state were achieved [31]. In parallel with the results obtained from our study, it was determined that ginger kidney compress was effective in decreasing the level of pain and increasing functional capacity, but that comparisons with other methods were needed. In our study, in order to compare the effectiveness of ginger kidney compress application, a hot compress group was also included, and therefore it was compared with another method. Furthermore, in our study, the patients informed the practitioner that they felt increasing warmth that spread throughout the body during and after the application of ginger kidney compress, creating a pleasant comfort, loosening their muscles, that from the first application their pain began to decrease and they sleeping more comfortably at night. About WOMAC-Pain sub-scale components, they expressed having less difficulty walking, waking up fewer times due to pain while sleeping at night, not feeling pain while resting, and being able to stand up longer. About the WOMAC-stiffness sub-scale components, they expressed that they experienced less rigidness and stiffness during the first walk in the morning and while lying down during the day. About the WOMAC-Physical function sub-scale, they stated that they had less difficulty especially when climbing and going down the stairs, putting on and taking off socks and that it created a more flexible joint mobility.

Hot applications, by activating the gate control mechanism, stimulating the touch receptors, reducing ischemic pain with vasodilation, removing metabolic residues, increasing the release of endorphins, eliminating muscle spasm, reducing the effects of the changes in the viscoelastic properties of tissues such as pressure, strain, and hypoxia, increasing pain tolerance, and by sedating and creating relief for the patient, reduces or relieves pain [41-43]. In our study, the reason for the decrease, albeit small, in the VAS-Pain score and WOMAC-Pain sub-scale, WOMAC-Stiffness sub-scale, and WOMAC-Physical function sub-scale scores of the individuals in the hot compress group at the end of the 7-day application, is thought to be conditions such as increased circulation by vasodilation due to the effect of the temperature in the area where heat was applied, decreased pressure and tension on nerve endings, reduced pain, and relaxed muscles as a result of removing metabolic residues that cause pain from the region. No studies conducted on the waist region as an application area for reducing pain in knee OA were encountered in the literature, only studies on the application on the knee region have been identified [33,44-48].

In our study, it was found that the VAS-Pain and the WOMAC-Pain sub-scale, the WOMAC-Stiffness sub-scale, and the WOMAC-Physical function sub-scale scores of the individuals in the control group increased even more after 7 days. It should not be ignored that pharmacological methods also play an important role in the treatment of knee OA. However, since the average age of the individuals included in our study is 65 years old and above, it is required to be careful in the use of drugs in OA. The increase in the number of drugs used by elderly individuals causes an increase in drug-related side effects. Therefore, along with changes that occur with aging in the elderly and that may affect drug metabolism in the organism, drugs that are inconvenient or risky to use in this age group, drug interactions, and non-pharmacological methods that can be used should also be known [49-52]..

CONCLUSION

The results of this research have determined that the ginger kidney compress application when applied to

pain compared to hot compress application, and the waist region of individuals with knee OA for 30 minutes a day for 7 days reduces the severity of knee decreases the symptoms caused by pain, and thus making it less difficult for individuals to fulfil their physical functions, and that ginger kidney compress can be an independent integrative nursing practice that can be used easily by nurses in reducing pain symptoms of individuals with knee OA. In order to increase the level of evidence in line with these results, repeating the study as a double-blind randomized controlled study, applying the study to groups of patients who use drugs in order to establish whether it decreases the rate of drug use in reducing pain, that complementary methods such as ginger kidney compress which reduce the severity of pain and increase the quality of life of individuals with knee OA being included in physical therapy programs and their use with pharmacological methods in clinics being extended may be suggested.

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