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Comparison of Acupuncture Therapy and Warm Water Compress to Decrease WOMAC Score in Knee Osteoarthritis Case (ICD 10 CM.M17.9) in Jumantono Karanganyar

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ABSTRACT

Background: Knee osteoarthritis is a disease of the joints and bones in the form of damage and inflammation in the cartilage of the joints. Knee osteoarthritis can be intervened non-pharmacological with acupuncture or warm-water compresses. The WOMAC index was developed to assess pain in patients with knee and/or hip osteoarthritis.
Objectives: This study aims to determine the comparison of acupuncture and warm water compresses to the decrease in WOMAC score in cases of knee osteoarthritis.
Methods: This experimental study used a two-group pretest-posttest design. Group 1 was given acupuncture therapy at Xiyan (EX-LE5), Zusanli (ST36), and Sanyinjiao (SP6) points, while group 2 was given warm water compresses. The population in the study is the community in Duwetan Ngunut Jumantono, Karanganyar. A simple random sampling approach recruited 40 participants.
Results: There was a difference in WOMAC scores after the intervention between acupuncture therapy and warm water compresses ($p<0.001$). The average decrease in WOMAC score in cases of Knee Osteoarthritis after acupuncture therapy decreased more, namely 13.05 points (38.40 ± 4.24 vs 25.35 ± 3.92) compared to warm water compresses, which was 2.65 points (38.20 ± 4.60 vs 35.55 ± 4.54).
Conclusion: Acupuncture therapy was more effective in reducing the WOMAC scores in cases of Knee Osteoarthritis compared to warm water compresses.

Keywords: ***Acupuncture, Warm Compress, WOMAC Score***

INTRODUCTION

Knee osteoarthritis is a joint and bone disease in the form of damage and inflammation to the cartilage of the joints, blood vessels, nerves, ligaments, synovium accompanied by the process of forming osteocytes (new bone growth) in the subconcular area and bone edges[1]. Based on data from the World Health Organization (WHO), the incidence of knee pain with a history of Osteoarthritis from the world's population is approximately 70 years old is 40% and there are 9.6% of men and 18.0% of women over the age of 60 years who suffer from knee pain.[2] In Indonesia, the prevalence of knee osteoarthritis is 5% in the < 40 age category, 30% in the 40-60 year age category, and 65% in the > 61 age category. [3]

The Western Ontario and McMaster Osteoarthritis Index (WOMAC) is a highly reliable, self-reported, patient-centered health status questionnaire that quantitatively assesses pain, joint stiffness, physical activity, and other symptoms and functions in osteoarthritis patients to determine their overall level of disability. The WOMAC index was developed for patients with knee and/or hip osteoarthritis (OA), but it has been used in patients with a variety of conditions, including low back pain, rheumatoid arthritis, juvenile rheumatoid arthritis, systemic lupus erythematosus, and fibromyalgia.[4, 5]

Therapy for knee pain disorders, carried out on the principle of managing symptoms, reducing the scale of pain, and functional disorders (disability), improves and stabilizes the functional joints. Therapy can be done in the form of pharmacological and non-pharmacological therapy or a combination of both. Non-pharmacologically, knee pain cases can be intervened with physical exercise or manual therapy such as physiotherapy, surgery, acupuncture, moxibustion, and compresses (wet, hot or cold). Acupuncture therapy can be one of the non-pharmacological measures that can be used to reduce the scale of pain in cases of knee pain.[6, 7]

According to research conducted by Tian et al. (2023) reported that acupuncture can help lower or reduce the scale of pain in Osteoarthritis cases during the duration of the disease <8 years.[8] Meanwhile, research by Hannan et al. (2019) that there is an effect of warm compress therapy on reducing osteoarthritis joint pain in the elderly at the Pandian Sumenep Health Center elderly posyandu. Warm water compresses improve blood circulation, reduce pain, stimulate intestinal peristaltic movements, facilitate exudate exudate, and provide a feeling of comfort, warmth, and calming.[9]

This study aims to determine the comparison of acupuncture therapy and warm water compress to the decrease in WOMAC score in cases of knee osteoarthritis (ICD 10 CM.M17.9) in Duwetan Ngunut Jumantono, Karanganyar.

METHODS

The design of this study is a quantitative research using an experimental design in the form of a two-group pretest-postest design. This study gave treatment to two groups. Group 1 was given acupuncture therapy at Xiyan (EX-LE5), Zusanli (ST36), and Sanyinjiao (SP6) points, while group 2 was given warm water compresses. The dependent variable is the decrease in WOMAC score. The independent variables were acupuncture therapy and warm water compresses.

The research location is in Duwetan Ngunut Jumantono Village, Karanganyar. Data collection was carried out in June 2023. The population in the study is all people suffering from knee osteothritis in Duwetan Ngunut Jumantono Village, Karanganyar. The sampling technique is the Sample Random Sampling technique totaling 40 samples. The research instrument is the WOMAC assessment carried out before and after the intervention

is given. The research analysis consisted of univariate analysis and bivariate analysis using the Wilcoxon and Mann Whitney tests with STATA software version 17.

RESULT

Table 1 Characteristics of the research subjects

Karakteristik	Mean±SD	Min-Maks
Age	57.18 ± 4.53	51 - 68
Skor WOMAC Pre Intervention Score	38.30 ± 4.36	30 – 50
Skor WOMAC Post Intervention	30.45 ± 6.64	21 – 48

Table 1 shows that the study subjects had an average age of 57.18 years. The average WOMAC score before the intervention was 38.30 points and the average WOMAC score after the intervention was 30.45 points.

Table 2 Distribution of Research Subject Categories

Variable	F	%
Gender		
Man	15	37.50
Woman	25	62.50
Work		
IRT	9	22.50
Farmer	20	50.00
Merchant	4	10.00
Employee	3	7.50
PNS	4	10.00
WOMAC Pre-Intervention Score		
Keep	36	90.00
Heavy	4	10.00
WOMAC Post Intervention Score		
Light	7	17.50
Keep	32	80.00
Heavy	1	2.50

Table 3 Frequency Distribution of WOMAC Scores in Research Subjects

Variable	WOMAC Knee Osteoarthritis Score						Total	
	Light		Medium		Heavy			
	F	%	F	%	F	%	F	%
Pre								
Acupuncture Therapy	0	0.00	18	90.00	2	10.00	20	100.00
Warm Water Compress	0	0.00	18	90.00	2	10.00	20	100.00
Post								
Acupuncture Therapy	0	0.00	19	95.00	1	5.00	20	100.00
Warm Water Compress	7	35.00	13	65.00	0	0.00	20	100.00

Table 2 shows the data on the characteristics of the research subjects, namely the majority of female as many as 25 respondents (62.50%) and more working as farmers 20 respondents (50.00%). The results of the WOMAC score assessment before the intervention action was given to the majority of the medium category were 36 respondents (90.00%), while after the action was given, the number of respondents in the medium category WOMAC score decreased to 32 respondents (80.00%).

Table 3 shows that before the intervention was given, the majority of WOMAC scores in the medium category in both groups were 18 respondents (90.00%) compared to the severe category. After the intervention, more study subjects experienced a decrease in WOMAC scores to the mild category as many as 7 respondents in the acupuncture therapy group.

Table 4 Comparison of Acupuncture Therapy and Warm Water Compress to Decrease WOMAC Score in Knee Osteoarthritis Cases

Variabel	WOMAC Score				*p-value*
	Pre		Post		
	Mean ± SD	Min – Maks	Mean ± SD	Min - Maks	
Acupuncture Therapy	38.40 ± 4.24	34 – 50	25.35 ± 3.92	21 – 38	0.0001
Warm Water Compress	38.20 ± 4.60	30 – 49	35.55 ± 4.54	29 – 48	0.0006
	p = 0.8803		p<0.001		

Table 4 shows that the results of the Wilcoxon test showed that there was a difference in the average decrease in WOMAC scores before and after the intervention in the acupuncture therapy group (p=0.0001) and the warm water compress group (p=0.0006). The results of the Mann-Whitney test analysis showed that before the intervention was carried out in the two warm water compress groups and the acupuncture therapy group, there was no difference in the average decrease in WOMAC score (p=0.8803). This happened because respondents in both groups had the same average WOMAC score when examined. However, after the intervention was carried out in both groups, there was a difference in the average decrease in WOMAC score (p<0.001). Based on the decrease in the average score, the WOMAC score showed that after the intervention, the average decrease in WOMAC score in the acupuncture therapy group was more, namely 13.05 points (38.40 ± 4.24 to 25.35 ± 3.92) compared to the warm water compress group, which was 2.65 points (38.20 ± 4.60 to 35.55 ± 4.54).

DISCUSSION

Characteristics of Research Subjects of Knee Osteorthritis Cases in Jumantono Karanganyar

The average age of the respondents in this study was 57.18 years. The incidence and prevalence of knee osteoarthritis is reported to be 10 times higher in the age group of 30 to 65 years compared to the younger age group. [10] The results of this study are consistent with previous findings by the study Ji et al. (2023) which reported that the average age of women with knee osteoarthritis pain was 58.53 years. [11]

Most of the respondents in this study were female, with a total of 25 respondents (62.50%). This is in line with the research of Liew et al. (2024) which stated that women experience knee osteoarthritis more often than men After the age of 50, there is a sharp increase in the incidence of osteoarthritis in women compared to men, caused by various factors, including lifestyle factors. [12]

For example, it was the differences in physical activity between men and women that contributed to variations in association strength. [13]

Respondents in the study mostly worked as farmers (50.00%). Jobs in agriculture that require a lot of knee flexion increase the risk of meniscus damage, which can ultimately increase the risk of knee osteoarthritis. [14] This is in line with the research of Verbeek et al. (2017) which concluded that work involving kneeling, squatting, lifting, and climbing has a high risk of developing knee osteoarthritis. [15]

Effect of Acupuncture Therapy on Decrease in WOMAC Score

This study showed that acupuncture therapy had a significant influence in lowering WOMAC scores in patients with knee osteoarthritis in Jumantono Karang Anyar (p=0.0001), with an average WOMAC score (38.40 ± 4.24

vs 25.35 ± 3.92). These results are in line with Astini & Riberto's (2023) research that acupuncture is an effective conservative rehabilitation strategy to reduce pain and improve the quality of life of osteothritis patients, where the WOMAC score (74.7 ± 12.7 vs 45.7 ± 22.1). [16] Acupuncture, as an important part of traditional Chinese medicine (TCM), is an effective alternative therapy for pain relief and has fewer side effects compared to conventional medicine.[17, 18]

The mechanisms of acupuncture in reducing pain and improving functional recovery in patients with Knee Osteoarthritis involve: (1) inhibition of overexpression of inflammatory factors such as IL-1β, IL-6, and TNF-α; (2) suppression of the activity of several signaling pathways, including the MAPK pathway[19, 20] (3) stimulation of antioxidant release; and (4) inhibition of hypertrophic differentiation of chondrocytes. [21]

The selection of Xiyan (EX-LE5), Zusanli (ST36), and Sanyinjiao (SP6) points in this study is in line with previous research by Novitasi (2024) that Xiyan (EX-LE 5), Xuehai (SP 10), Yanglingquan (GB 34) point acupuncture therapy has an effect on reducing pain in knee pain patients in Tegalombo Village, Kalijambe, Sragen. Xiyan point (EX-LE 5) is a local point in the knee area which is an indication of local tissue abnormalities in the knee, so it can reduce pain. [22] The research of Wei et al. (2024) describes the acupuncture of Yuyao (EX-LE4), Xiyan (EX-LE5), Yanglingquan (GB34), and Zusanli (ST36) in combination with standard treatment can effectively relieve symptoms and improve knee joint function. [23] Research (2022) explained that acupuncture therapy and the addition of Sanyinjiao points (SP6) significantly reduced the pain of Osteoarthritis of the lumpus compared to the pain at the beginning (0.1 ± 0.4 vs 7.67 ± 2.02, P <0.001). The addition of SP6 acupoints can reduce plasma ESR and hs-CRP levels, as well as an increase in anti-inflammatory cytokines, such as IL-4, IGF, IL-10, and TGF-ÿ. Then it decreases the elasticity of the inflamed joints so that it causes a decrease in joint pain in knee osteoarthritis. [24]

In addition, the research of Tian et al. (2023) explained that acupuncture therapy lasting for 6 to 13 weeks (n = 1541, SMD = −0.16, 95% CI: -0.26, -0.06), I2 = 0%) was also proven to be effective. The frequency of acupuncture is an important component of treatment and affects its effectiveness. Determining the right frequency of acupuncture can improve the effectiveness of treatment and save on healthcare costs. [8] Thus, acupuncture therapy with the right duration and frequency can effectively reduce knee osteoarthritis pain as measured by WOMAC score, through specific neurophysiological mechanisms such as endorphin release, modulation of pain transmission, or anti-inflammatory effects.

Effect of Warm Water Compress on Decrease in WOMAC Score

This study showed that warm water compresses had a significant effect on the decrease in WOMAC scores in patients with knee osteoarthritis in Jumantono Karang Anyar (p=0.0006), with the average WOMAC score of 38.20 ± 4.60 decreasing to 35.55 ± 4.54. This finding is in line with the research of Damor et al., (2023) that warm compress therapy is effective in reducing the WOMAC score of osteoarthritis cases with a WOMAC score of 47.47 ± 11,178 to 31.90 ± 11,874 (p<0.001). [25] Warm compresses are a non-pharmacological method that can help relieve pain, stiffness, and muscle spasm**.** **[9]**

Heat compresses work by increasing the local tissue temperature, reducing afferent nerve stimulation, and helping to control swelling and reduce pain. The heating effect of the heat compress penetrates the skin barrier, directly reaching and working on the

affected area[26]. In addition, heat compresses can improve blood circulation, activate the motor cortex, and aid in the recovery of adhesions and atrophy of muscles and soft tissues around the knee joint[27]. Heat compresses are also more effective at improving functional performance through capillary expansion, improved blood circulation, and reduced muscle tension[28]. Therefore, the application of warm water compresses of appropriate duration and frequency can effectively lower knee osteoarthritis pain according to WOMAC score measurement. This warm water compress can also be done independently at home.

Comparison of Acupuncture Therapy and Warm Water Compress to Decrease in WOMAC Score

This study showed that there was a significant comparison after giving acupuncture therapy and warm water compresses to a decrease in WOMAC score in cases of knee osteorthritis in Jumantono Karanganyar ($p<0.001$). The average WOMAC score of knee osteoarthritis cases with acupuncture therapy decreased by 13.05 points, more than warm water compresses only experienced an average decrease of 2.65 points. This shows that acupuncture is superior in the management of knee osteoarthritis pain.

The authors assume that acupuncture works by stimulating acupuncture points that trigger complex neurological responses, including the release of endorphins and modulation of the central nervous system, while warm water compresses work through mechanisms of vasodilation, muscle relaxation, increased blood flow, and inhibition of pain impulses. According to Torres-Rosas et al. (2014), Acupuncture reduces systemic concentrations of pro-inflammatory cytokines and has anti-inflammatory effects[29]. Acupuncture also lowered serum levels of lipopolysaccharide (LPS) induced TNF-α cytokine and monocytokyl protein (MCP-1), with anti-inflammatory mechanisms mediated by sciatica and vagus nerves. Warm water compresses work through a warming effect that has been shown to slightly improve pain, functional performance, and quality of life in the elderly with osteoarthritis. [30]

Acupuncture therapy has shown long-term effectiveness in reducing knee osteoarthritis pain[31], with benefits lasting up to 8 weeks[32]. In contrast, the effect of a warm water compress tends to be shorter. Acupuncture aims to eliminate neutrophils caused by injured muscle tissue and inhibit the release of inflammatory factors, thereby reducing pain, improving muscle recovery[33]. Applying heat for 15–20 minutes causes vasodilation of blood vessels, which increases blood flow. This increase in blood flow will decrease blood viscosity and local metabolism as oxygen is carried to the tissues. [34] Therefore, both acupuncture therapy and warm water compresses can reduce pain intensity in knee osteoarthritis patients according to WOMAC score measurements. However, acupuncture therapy is more effective in the long term than warm water compresses.

CONCLUSIONS

There was a decrease in the mean WOMAC score before and after acupuncture therapy (p=0.0001) and warm water compresses (p=0.0006). Meanwhile, based on the comparison of acupuncture therapy and warm water compresses, there was a difference in WOMAC scores before and after the intervention ($p<0.001$). The average WOMAC score of knee osteoarthritis cases in the acupuncture therapy group decreased more, namely 13.05 points compared to the warm water compress group, which was 2.65 points.

This research can be used as one of the references or literature review materials of health sciences in the treatment of knee osteoarthritis pain. Health service agencies can collaborate with Acupuncture therapists in preventive and curative

services to the community. People can be motivated to do acupuncture independently or with the help of others on the elderly regularly, because acupuncture is very effective and relatively does not cause side effects.

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