

## The Effectiveness of Massage Therapy on Pain Reduction in Rheumatoid Arthritis Patients: Literature Review

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### Abstract:

Rheumatoid Arthritis is a chronic inflammatory disease that can cause bone damage and cause disability. The most common and dominant symptom is pain, especially swelling in the morning. There is a way to treat pain in rheumatoid arthritis patients with massage. Massage has the effect of reducing anxiety and muscle tension. This muscle massage stimulation is enriched to stimulate delta-A nerve fibers and C fibers and releases substance P in the afferent nerves, where there are mechanoreceptors (tactile apparatus: skin) as a defense mechanism, and in the central cortex, the descending nerves release endogenous opiates, namely endorphins produced by the pituitary as a pain reliever. So, it can block or reduce pain impulses. This study aims to determine the effect of massage on reducing pain intensity in rheumatoid arthritis patients. This research uses a literature review design using 2 databases, namely PubMed and Scopus. The results showed that in journal research, giving massage for  $\pm 15$  minutes every day resulted in reduced pain and anxiety. In the journal, rheumatoid arthritis sufferers had a decrease in the quality of pain using back massage therapy with  $p=0.05$ . The conclusion of this study shows that the use of massage therapy is effective for patients with rheumatoid arthritis who experience pain.

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## INTRODUCTION

Rheumatoid Arthritis is a chronic inflammatory disease that can cause bone damage and cause disability (Muliani et al., 2020). Rheumatoid Arthritis sufferers can develop and worsen over time and last for years. This will then result in chronic pain (Scotton, 2019). Rheumatoid Arthritis has clinical manifestations in the form of chronic pain in the joints, musculoskeletal system and also swelling or inflammation around the joints and tendons. Although this disorder mainly occurs in the joint area, Rheumatoid Arthritis can also affect extra-articular tissue (Zairin, 2016). Some types of inflammation in the joints also affect other parts of the body, such as the eyes, heart, lungs, skin, and kidneys (Scotton, 2019).

Based on the prevalence of pain in Rheumatoid Arthritis patients throughout the world it is around 0.24% which according to epidemiological data is more often experienced by women than men, with a lifetime risk of 3.6% in women compared to 1.7% in men (Jagmohan and Jandu, 2021). Rheumatoid Arthritis sufferers cannot yet be known for certain, but currently it is estimated that there are  $\pm 1.3$  million people who experience pain. Indonesia has a relatively high incidence of joint pain, around 1% to 2% of the total population (Ministry of Health of the Republic of Indonesia Research and Development Agency, 2013). East Java alone has a prevalence of joint

pain in people aged over 15 years and over as many as 75,490 thousand residents (Riskesdes, 2018).

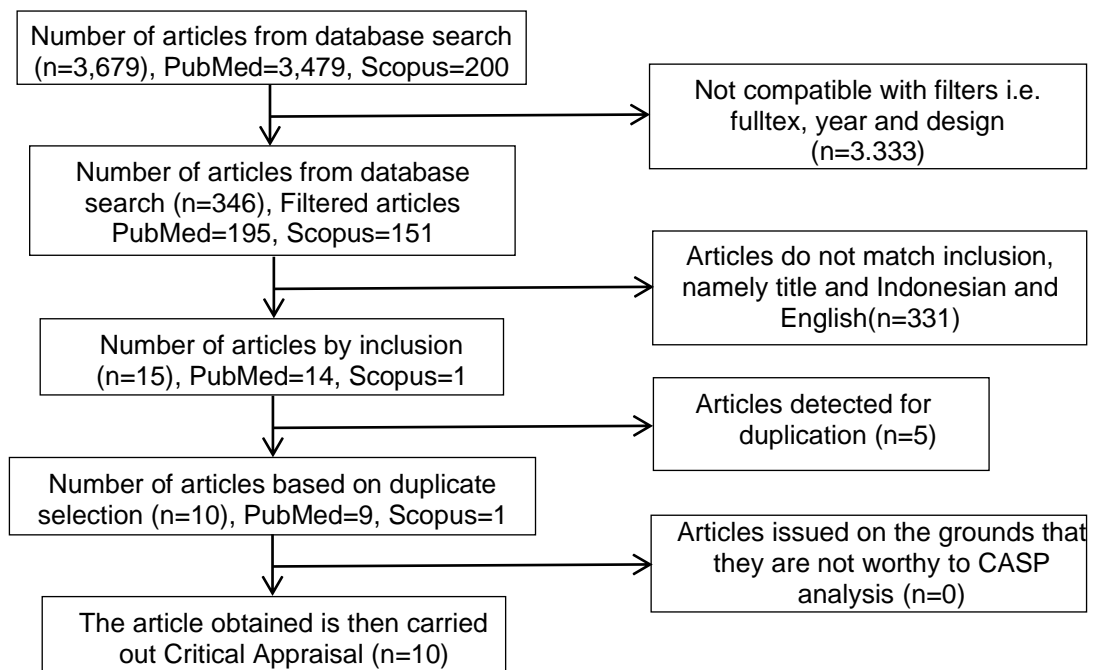
The etiology of pain in Rheumatoid Arthritis sufferers is still unknown. Still, it is known that there is an interaction between the two factors, namely genetic factors (endogenous) and environmental factors (exogenous), which cause this disease. This interaction can result in a cascade reaction, an immunological process estimated to last several years before clinical symptoms appear (Hidayat et al., 2021).

Rheumatoid Arthritis pain must be treated so that worse impacts do not occur, such as increased disability, swelling in the morning, joints feeling painful if there is pressure or movement; and other impacts due to progressive disability are chronic pain, poor quality of life, many patients experience depression. (Jagmohan and Jandu, 2021). Therapy, such as massage therapy, is done to reduce pain (PPNI, 2018). Massage is a technique for treating the body by pressing and stroking using body parts such as elbows, fingers, hands, or other tools on the surface of the body to provide a relaxing and stimulating effect, thus improving the lymph circulation system and blood circulation system. and strengthening other body systems to improve fitness and health (Riskesdes, 2018).

According to research conducted in America, massage with moderate pressure for  $\pm 15$  minutes every day causes reduced pain and anxiety and increased grip strength (Arthritis Foundation, 2017). Massage has the effect of reducing anxiety and muscle tension. This muscle massage stimulation is enriched to stimulate delta-A nerve fibers and C fibers. It releases substance P in the afferent nerves, where there are mechanoreceptors (tactile apparatus: skin) as a defense mechanism, and in the central cortex, the descending nerves release endogenous opiates, namely endorphins produced by the pituitary as a pain reliever. So it can block or reduce pain impulses (Siahaan et al., 2017). This lesson aims to determine the effect of massage therapy on reducing pain intensity in patients experiencing Rheumatoid Arthritis.

## METHOD

The method used in research to achieve this goal is a literature review. Searching for data sources used in the Scopus and Pub Med electronic databases begins by using keywords (AND, OR, NOT) to broaden the search, making it easier for authors to choose the journal to use. The keywords used are Massage AND Rheumatoid Arthritis; Rheumatoid Arthritis AND pain; Rheumatoid Arthritis AND Sweden; Rheumatoid Arthritis AND Massage. In the initial search, 3,679 were found (PubMed n=3,479, Scopus=200) then searches that did not match full text, year, and design (n=333), the search was filtered (PubMed n=195, Scopus n=15). Articles that were not appropriate for inclusion included titles in Indonesian and English (n=331), then articles that were based on inclusion (PubMed n=14, Scopus n=1). Articles that detected duplication (n=5), articles based on duplication resolution (n=10) from (PubMed n=9, and Scopus n=1). After going through the selection and quality assessment process, 10 articles met the requirements, 8 articles used the JBI assessment list or checklist with a randomized controlled trial type design, 1 article used a cohort study and 1 article used a cross sectional. The results of the breakdown of article selection can be seen in Picture. 1.



Picture 1. Literature Search Flow Diagram

## RESULT

Table 1. Literature Analysis

No	Author	Year	Jurnal/ Volume/No	Title	Method	Research Result
1.	Davood Hekmatpou, PhD, Sepideh Mortaji, MD, Masoud Rezaei, BSN & Millad Shaikhi, BSN	2018	Clinical Conculation	The Effectivenes s of Olive Oil in Controlling Morning Inflammatory Pain of Phalanges and Knees Among Women With Rheumatoid Arthritis: A Randomized Clinical Trial  Q2	Design: Randomized Control Trial Sample: 60 patients suffering from rheumatoid arthritis Variables: Independent variables: massage Dependent variable: rheumatoid arthritis Intervention: foot massage Analysis: T test, Kruskal- Wallis test, Friedman test	1. Significant difference ( $p \leq 0.001$ ) between the mean of Disease Activity Score 28 in the group using olive oil for massaging. Results also showed that there are significant differences ( $p \leq 0.001$ ) among the mean of Visual Analogue Scale rates 2. Mean pain score before group, intervention group $5.5 \pm 1.78$ 3. Mean score after massage for the treatment group was $3.75 \pm 0.75$

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No	Author	Year	Jurnal/ Volume/No	Title	Method	Research Result
2.	Ingrid Thyberg, Örjan Dahlström, Mathilda Björk, Birgitta Stenström & Jo Adams	2017	Disability and Rehabilitation	Hand pains in women and men in early rheumatoid arthritis, a one year follow-up after diagnosis. The Swedish TIRA Project  Q1	Desain: Cohort Study Sample: 373 Rheumatoid arthritis patients Variable: Independent variables: Massage Dependent variable: rheumatoid arthritis Intervention: Swedish Analysis: Not explained	1. Out of the 373 patients that were included, the 251 women (mean 56 years, SD 15) were on aver age 6 years younger than the 122 men (mean age 62 years, SD 13), p=000,1 2. Mean pain score before group, intervention group 5.5 3. The mean score after massage for the treatment group was 2.0
3.	Tyler Bahra, Kathryn Allred, Devin Martinez, Damian Rodriguez, Paul Winterton	2018	Complementary Therapies in Clinical Practice/Vol.33	Effects of a massage- like essential oil application procedure using Copaiba and Deep Blue oils in individuals with hand arthritis Q1	Desain: Randomized Control Trial Sample: 36 rheumatoid arthritis patients Variable: Independent variables: massage Dependent variable: Rheumatoid arthritis Intervention: Massage hand Analysis: one-way ANCOVA	1. Participants treated with the essential oil preparation required significantly less time to complete dexterity tasks and showed about 50% decrease in pain scores, increased finger strength, and significantly increased angle of maximum flexion compared to subjects treated with coconut oil. With p-value 0,001 2. Mean pain score before group, intervention group 3.2 3. The mean score after massage for the treatment group was 1.7
4.	Ingiäld Hafström, Sofia Ajeganova, Maria LE Andersson, Sidona-Valentina Bala, Stefan Bergman, Ann Bremander, Kristina Forslind, Karina Malm, Björn Svensson	2019	Open Access Rheumatology: Research and Reviews	A Swedish register- based, long- term inception cohort study of patients with rheumatoid arthritis – results of clinical Relevance  Q3	Desain: Randomized Control Trial Sample: 2873 rheumatoid arthritis patients Variable: Independent variables: Massage Dependent variable: Rheumatoid arthritis Intervention: Swedish Analysis: Not explained	1. A register-based study like BARFOT has provided a basis for optimal longterm management of patients with RA. In addition, the register has made it possible to perform a diversity of studies of RA addressing various issues of major relevance to the patients. P-value 0,000 2. Mean pain score before group,

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No	Author	Year	Jurnal/ Volume/No	Title	Method	Research Result
5.	Deepali Ghungrud, Arti Raut, Ranjana Sharma and Ruchira Ankar	2021	Journal of Pharmaceutical Research International	Effectiveness of Mechanical Hydrotherapy on Pain Management among Patients with Arthritis Pain  Q3	Design: Randomized Control Trial Sample: 70 patients Variables: Massage independent variable Dependent variable : Rheumatoid arthritis Intervention: not explained Analysis: The Paired T-Test	1. p-value of experimental group was PubMed 2. Significantly <0.05 as compared to control group i.e. 0.75 not significant i.e. > 0.05 3. Mean pain score before group, control group 7.51±1.46 and intervention group 7.51±1.46 3. 4. Mean score after massage for control group 7.97 ± 1.27 and treatment 1.81 ± 1.07
6.	Tor Olofsson, Johan K. Wallman, Anna Jö ud, Maria E. C. Schelin, Sofia Ernestam, Ronald van Vollenhoven, Saedis Saevarsdottir, and Jon Lampa	2021	Arthritis Care & Research	Pain Over Two Years After Start of Biologic Versus Conventional Combination Treatment in Early Rheumatoid Arthritis: Results From a Swedish Randomized Controlled Trial Q1	Design: Randomized Control Trial Sample: 258 rheumatoid arthritis patients Variables: Independent variable: massagee Dependent variable : Rheumatoid arthritis Intervention: Swedish Analysis: an intent-to-treat (ITT) approach	1. In the crude setting reported unacceptable pain at randomization, declining to 29% at 21 months (p<0.001) 2. Mean pain score before, intervention group 5.9 ± 2 3. The mean score after massage for the treatment group was 4.6 ± 2.4
7.	Nouf Al Hammadi, Shadi Ahmad Abdullah Alamri, Mofareh Ahmed Mofareh Asiri, Nejad Mubasher Mohammed Alnaem, Abdullah Omar Musleh Alqarni, Saud Abdullah Awadh Alqahtani, Abdulbari Ahmed Alzahrani, Mohammed Mushabab Al-Mudhi, Abdussalam Mohammed A Alqhtani, Nasser Abdullah N. AlGhris,	2022	Bahrain Medical Bulletin/Vol.44 /No.1	Non- Pharmacologi cal Methods for Relieving Joint Pain In the Asir Region of Kingdom of Saudi Arabia Q3	Design: Cross-sectional Sample: 582 rheumatoid arthritis patients Variables: Independent variables: massage Dependent variable: Rheumatoid arthritis Intervention: not explained Analysis: descriptive statistics	1. An informed consent was obtained from each of the participants. After collection of data, they were coded and entered in the SPSS ver.20 software p value 0,000 2. Mean pain score before the intervention group was 4.97 ± 0.669 3. The mean score after massage for the treatment group was 3.27 ± 0.868

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No	Author	Year	Jurnal/ Volume/No	Title	Method	Research Result
8.	Nadica Laktasic Zerjavic, Emina Hrkic, Iva Zagar, Valentina Delimar, Kristina Kovac Durmis, Sanda Spoljaric Carevic, Marta Vukorepa, Andreja Matijevic, Nikolino Zura, Porin Peric	2021	Psychiatria Danubina/Vol. 33/No.4	Local Cryo Therapy Comparison Of Cold Air And Ice Massage On Pain And Handgrip Strength In Patients With Rheumatoid Arthritis  Q3	Design: Randomized Control Trial Sample: 30 rheumatoid patients Arthritis Variables: Independent variable: massage Dependent variable: Rheumatoid arthritis Intervention: Massage hand Analysis: Samples T-test	1. In both groups pain was significantly lower immediately after, 30 and 60 minutes after the treatment compared to the baseline (p=0.001) 2. Mean skor nyeri sebelum kelompok intervensi 5,33±2,44 3. Mean skor sesudah massage kelompok perlakuan 2,67±2,28
9.	Zehra Gok Metin, Research Assistant, PhD, RN and Leyla Ozdemir, Associate Professor, PhD, RN	2017	Pain Management Nursing	The Effects of Aromatherapy Massage and Reflexology on Pain and Fatigue in Patients with Rheumatoid Arthritis: A Randomized Controlled Trial  Q1	Desain: Randomized Control Trial Sampel: 51 pasien rheumatoid arthritis Variabel: Variabel bebas : massage Variabel terikat : Rheumatoid arthritis Intervensi : reflexiologi Analisis: frequency and Chi- square comparisons.	1. Pain and fatigue scores significantly decreased in the aromatherapy massage and reflexology groups compared with the control group (p<.05) 2. Mean pain score before the intervention group was 5.33 ± 2.44 3. The mean score after massage for the treatment group was 2.67 ± 2.28
10.	Ercan Bakir, Sevgin Samancioglu Baglama,Savas Gursoy	2018	Complementar y Therapies in Clinical Practice/Vol.31	The effects of reflexology on pain and sleep deprivation in patients with rheumatoid arthritis: A randomized controlled trial  Q1	Desain: a randomized controlled study Sample: 60 respondents (30 intervention group, 30 control group) Variables: Independent Variable: Massage Dependent variable: Rheumatoid arthritis Intervention: Reflexology Massage Analysis : Kolmogrov Smirnov Test, Non Parametric test	1. This study found that the pain scores of the experimental group were statistically significantly more than those of the control group (p < 0.01). 2. Mean pain score before intervention: Treatment group 7.4 ± 1.13 Control group 8.1±1.24 3. Mean rheumatoid arthritis score after intervention: Treatment group 5.4 ± 0.89, control group 8.1±1.02



Table 2. Distribution of Average Pain Scale Ratings Before Implementation of Therapy Massage

Author	Control Group		Intervention Group	
	Before	Interpretation	Before	Interpretation
<b>Hekmatpou et al., 2020</b>	not explained	not explained	5.5±1.78	moderate pain
<b>Thyberg et al., 2017</b>	not explained	not explained	5.5	moderate pain
<b>Bahr et al., 2018</b>	not explained	not explained	3.2	mild pain
<b>Hafström et al., 2019</b>	not explained	not explained	not explained	not explained
<b>Ghungrud et al., 2021</b>	7.51±1.46	severe pain	7.51±1.46	severe pain
<b>Olofsson et al., 2021</b>	not explained	not explained	5.9±25.5	moderate pain
<b>AlHammadi et al., 2022</b>	not explained	not explained	4.97±0.669	moderate pain
<b>Zerjavic et al., 2021</b>	not explained	not explained	5.33±2.44	moderate pain
<b>Gok Metin &amp; Ozdemir, 2017</b>	5.37±0.827	moderate pain	6.35 ± 2.1	moderate pain
<b>Bakir et al., 2018</b>	8.1±1.24	severe pain	7.4 ±1.13	moderate pain

Table 2. Distribution of Average Pain Scale Ratings After Implementation of Therapy Massage

Author	Control Group		Intervention Group	
	Before	Interpretation	Before	Interpretation
<b>Hekmatpou et al., 2020</b>	not explained	not explained	3.75±0.75	mild pain
<b>Thyberg et al., 2017</b>	not explained	not explained	2.0	mild pain
<b>Bahr et al., 2018</b>	not explained	not explained	1.7	no pain
<b>Hafström et al., 2019</b>	not explained	not explained	3.4±1.075	mild pain
<b>Ghungrud et al., 2021</b>	7.97±1.27	severe pain	1.81±1.07	no pain
<b>Olofsson et al., 2021</b>	not explained	not explained	4.6±2.4	moderate pain
<b>AlHammadi et al., 2022</b>	not explained	not explained	4.97±0.669	moderate pain
<b>Zerjavic et al., 2021</b>	not explained	not explained	2.67±2.28	mild pain
<b>Gok Metin &amp; Ozdemir, 2017</b>	4.41±1.79	moderate pain	1.88±1.18	mild pain
<b>Bakir et al., 2018</b>	8.1±1.24	severe pain	5.4±0.89	moderate pain

Based on tables 1 and 2, it is obtained the distribution of pain scale assessments before and after massage therapy from each research article was obtained before therapy, in the control group of moderate pain scale 33%, and severe 77%, while in the intervention group, mild pain 11%, moderate pain 77%, and severe pain 11%, Then after the intervention with results in the control group pain 33% moderate, 77% severe pain, compared to the intervention group no pain 20%, mild pain 50%, moderate pain 30% and no severe pain.

Table 3. Distribution of the Effectiveness of Massage Therapy in Reducing Pain Based on Statistical Test Results

Author	Test Result Value	interpretation
<b>Hekmatpou et al., 2020</b>	p=0.014	there is influence
<b>Thyberg et al., 2017</b>	p=0.000	there is influence
<b>Bahr et al., 2018</b>	p=0.001	there is influence
<b>Hafström et al., 2019</b>	p=0.000	there is influence
<b>Ghungrud et al., 2021</b>	p=0.001	there is influence
<b>Olofsson et al., 2021</b>	p=0.010	there is influence
<b>AlHammadi et al., 2022</b>	p=0.000	there is influence
<b>Zerjavic et al., 2021</b>	p=0.001	there is influence
<b>Gok Metin &amp; Ozdemir, 2017</b>	p=0.001	there is influence
<b>Bakir et al., 2018</b>	p=0.001	there is influence

Based on tables 3. the distribution of the effectiveness of massage therapy to increase pain scales based on statistical test results from all journal articles has been significant, which is entirely

below the p-value  $<0.05$  which means that massage treatment has an influence on pain in rheumatoid arthritis patients.

## DISCUSSION

Massage therapy techniques used to reduce pain in rheumatoid arthritis mostly use Swedish massage with a percentage of 30% of the data in accordance with Netchanoc's theoretical study, (2012) Swedish massage is reported to relieve chronic low back pain by improving physical function; provides pain relief, increases disability and range of motion, improves psychological functioning; reduces anxiety and improves mood.

It is known that in the 10 most implementation old journal articles used by the majority authors, the overall duration of implementation is 30 minutes, 2 - 3 times. These data are in accordance with theoretical studies according to TreatwellUK, (2022) which can be done for 5 minutes and massage can be done for 30 minutes, foot massage is done 1 time a day in the morning with a duration of 20 minutes for 5 consecutive days, according to Muliani et al., (2020) and reflexology itself can be done for 30 minutes to reduce pain by warming the feet done with hands with certain movements, lifting and lowering the feet using both hands and doing backward bending movements, bending the feet, twisting outwards and inwards, as well as some movements on the heels. Stimulation of massage recovery points is carried out with the fingers of the hand using a sweeping motion with a pressure of about 0.5 cm (Sadeghi et al., 2020).

The assessment tool used in the 10 majority articles is the visual analogue scale. The use of these instruments is related to ease of use and high effectiveness as explained by Iohom, (2006) (VAS) is the simplest and most commonly used scale and has effectiveness in assessing scores higher than the Numeric Rating Scale. The majority of the highest pain scale before massage therapy was the control group with a moderate pain scale of 33%, and severe 77%, while the intervention group, mild pain 11%, moderate pain 77%, and severe pain 11%. These data are in accordance with the theory of Muliani et al., (2020) Rheumatoid arthritis is an inflammation due to an autoimmune reaction in synovial tissue involving the phagocytosis process. In the process, enzymes are produced in the joints, which will further break down collagen resulting in edema, synovial membrane proliferation and finally pannus formation. Inflamed pannus will destroy cartilage and cause bone erosion, giving rise to a clinical picture of pain. Before the foot massage procedure, it was found that the elderly experienced knee joint pain. The nature of pain is subjective, the pain felt by individuals varies and can only be described by the individual experiencing the pain itself.

Based on the age of respondents and in 10 articles, the majority of respondents involved in the research were over 52 years old, this went according to the theory of Heni Rispati et al., (2021). In this study it was found that patients aged 46-55 years (early elderly) who experienced rheumatoid arthritis pain, and the World Health Organization (WHO) said that the elderly were classified from the age of 60 years and over. The elderly are also an age group that has entered the final phase stage in their lives (Ginting, 2020). Arthritis in the elderly is due to a decrease in body function and reduced joint ability (Putri et al., 2020).

Although the elderly are susceptible to rheumatoid arthritis, some respondents who have not been included in the elderly have also been affected by rheumatoid arthritis, which is contained in the article Sadeghi et al., (2020) found several respondents under 46 years old. This is due to family history, gender, smoking history and obesity (Cleveland Clinic, 2020).

The majority of respondents were women with a percentage of 59% of the data in accordance with the theoretical study of Muliani et al., (2020) the gender was obtained by most



elderly women experiencing rheumatoid arthritis as a result of the involvement of the hormone estrogen. This hormone is a balancer in the body, and if women lose or have menopause, estrogen will decrease and stimulate autoimmune which causes mechanism failure so that lymphocytes can no longer distinguish self and non-self Barus (2019), causing rheumatoid arthritis.

Therefore, the authors assume women experience hormonal RA. Although not all respondents are mostly men as in the article (Sadeghi et al., 2020), it is known that most mention the hormone estrogen as the cause of many women affected by rheumatoid arthritis, the hormone that causes autoimmune so that women are easily affected by rheumatoid arthritis 2-3x than men.

While RA can occur in men related to age factors where a person will experience degeneration, especially in the physical As explained by Siahaan et al., (2017), and obesity is also one of the factors why men can also get rheumatoid arthritis, because the fat that accumulates in the body will aggravate and inhibit activity, especially in the joints so that it is easier to get rheumatoid arthritis (Susarti and Romadhon, 2020).

### CONCLUSION

Most massage duration that can provide massage therapy is 30 minutes, 2 times and 3 times face-to-face and for 7 days. People with RA found decreased pain scales measured using the Numeric Rating Scale and Visual Analogue Scale. In the absence of severe pain after the intervention. Massage therapy was proven effective to reduce pain with the results of statistical tests all p-value <0.05 which means the significance of massage on pain reduction in rheumatoid arthritis patients.

This Literature Review is expected to add one of the interventions for nurses, namely massage therapy in pain cases in Rheumatoid Arthritis patients. This literature review is also expected to be preliminary data in future studies on pain reduction in rheumatoid arthritis patients using music therapy. The results of this literature review can be used as an option in conducting therapy in rheumatoid arthritis patients to reduce pain that is being experienced as much as 30 minutes per session, done 2 times and 3 times face-to-face and for 7 days.

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