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INTERVENTIONS TO REDUCE PAIN IN STROKE PATIENTS

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ABSTRACT

Pain is a sensory experience caused by tissue damage. In stroke patients pain occurs due to paralysis or weakness where stroke patients can experience paralysis in the muscles so that it can cause pain. This study conducted a literature review on various interventions that can reduce pain in stroke patients. This literature review aims the latest information about interventions that are effective in reducing the pain of stroke patients. The research method uses PRISMA guidelines with a systematic approach and selection process. Library sources are searched using online databases such as PubMed, Scopus, and Ebsco. The selected articles include reputable journals published in Indonesian and English. After carrying out a screening process using PRISMA, 6 articles were found that were relevant and worthy of review. Based on a journal review, the results show that there are various types of interventions that are effective in reducing pain in stroke patients, including the use of drugs such as analgesics, then physical therapy such as traditional Thai messaging and shoulder management. Apart from that, there are non-pharmacological interventions such as providing functional electrical stimulation, kinesio tapping and dry needling therapy which can help reduce pain, although they must still be carried out by experts. Meanwhile, complementary therapies such as passive ROM exercises can be done by nurses to train muscle strength so that patients can do it independently to reduce post-stroke pain. This study can also provide important information for health workers in providing appropriate interventions, especially to reduce pain in stroke patients. However, further research is needed to identify the most effective interventions in reducing pain in stroke patients.

Keywords: Stroke, Intervention, Pain Management, Patient, Exercise

ABSTRAK

Nyeri merupakan sebuah pengalaman sensorik yang disebabkan oleh kerusakan jaringan. Pada pasien stroke nyeri terjadi akibat adanya kelumpuhan atau kelemahan dimana pasien stroke dapat mengalami paralisis pada bagian otot sehingga dapat menimbulkan rasa nyeri. Studi ini melakukan literature review tentang berbagai intervensi yang dapat mengurangi nyeri pada pasien stroke. Literature review ini bertujuan untuk menyajikan informasi terbaru tentang intervensi yang efektif dalam mengurangi nyeri pasien stroke. Metode penelitian ini menggunakan pedoman PRISMA dengan pendekatan dan proses seleksi yang sistematis. Sumber pustaka dicari menggunakan basis data daring seperti PubMed, Scopus, dan Ebsco. Artikel yang dipilih meliputi jurnal bereputasi yang diterbitkan dalam Bahasa Indonesia dan Inggris. Setelah dilakukan proses screening menggunakan PRISMA, ditemukan terdapat 6 artikel yang relevan dan layak untuk di review. Berdasarkan telaah jurnal didapatkan hasil bahwa ada berbagai jenis intervensi yang efektif yang dapat mengurangi nyeri pada pasien stroke. Diantaranya penggunaan obat-obatan seperti pemberian analgesic, kemudian terapi fisik seperti traditional thai message dan manajemen bahu. Selain itu ada intervensi non-farmakologi seperti pemberian functional electrical stimulation, pemberian kinesio tapping dan terapi dry needling yang dapat membantu mengurangi nyeri meskipun harus tetap dilakukan oleh ahlinya. Sedangkan terapi komplementer seperti Latihan ROM pasif dapat dilakukan oleh perawat untuk melatih kekuatan otot agar pasien dapat melakukannya secara mandiri untuk mengurangi nyeri pasca stroke. Studi ini juga dapat memberikan informasi penting bagi tenaga kesehatan dalam memberikan intervensi yang tepat khususnya untuk mengurangi nyeri pada pasien stroke. Meskipun demikian, diperlukan penelitian lebih lanjut untuk mengidentifikasi intervensi yang paling efektif dalam mengurangi nyeri pada pasien stroke.

Kata kunci: Stroke, Intervention, Pain Management, Patient, Exercise

INTRODUCTION

Stroke is a cerebrovascular condition affecting the blood vessels in the brain. It occcurs when brain fuction is disrupted due to damage or death of brain tissue caused by decrease or blockage in blood and oxygen flow to the brain (dr. Lili Indrawati et al., 2016).

Around 7.75 million people die from stroke worldwide. In 2020, the Centers for Disease Control reported that one person in the United States died from a stroke every four minutes. This is also reinforced by the statement by the that in 2015, 17.7 million people died from cardiovascular disease. This value shows that around 31% of all deaths worldwide are caused by cardiovascular disease, including ischemic stroke, which is included in the cardiovascular disease group (WHO, 2018).

In Indonesia , the prevalence of stroke increased from 7% in 2013 to 10.9% in 2018, according to the results of (Riskesdas, 2018). Overall, the 2018 stroke prevalence in Indonesia, based on doctors diagnoses in individuals aged 15 and older, was 10.9%, which is equivalent to an estimated 2,120,362 people. The highest prevalence of stroke was observed in the 55-64 age group at 33.3%, while the lowest prevalence was found in the 15-24 age group.

Stroke can happen all of a sudden, continuously and rapidly coming about in non-traumatic blood brain disorders. Clutters of the nerves that occur can cause a few side effects such as: loss of movement of the appendages and confront, vague and slurred discourse, visual unsettling influences, changes in awareness, and so on which have a high level of morbidity so that they can cause disability in a person (Siregar et al., 2019).

Pain is an uncomfortable sensory and emotional experience caused by actual or potential tissue damage. In clinical practice, it is common to encounter patients experiencing pain due to their illness. Pain may arise concurrently with the onset of a disease, during diagnostic tests, or as a result of treatment (SA et al., 2011).

Post-stroke pain is a common problem that occurs in post-stroke patients. This can occur immediately after stroke symptoms or can develop later in life. In stroke patients the symptoms commonly experienced are muscle and joint pain, headaches or painful sensations such as tingling, shoulder pain, central pain after a stroke, and various other conditions (Bahrudin, 2018). Pain can significantly affect a person's quality of life and emotional well-being. Because everyone feels pain differently and responds in their own way. (Stroke Association, 2012).

In stroke sufferers, pain occurs due to hemiplegia (paralysis) or hemiparase (weakness), where the patient experiences muscle paralysis and immobilization of body parts which will cause pain and limit daily activities (Hall & Guyton, 2014).

Pain management in stroke patients is a critical component of stroke care, as pain can greatly affect their quality of life and disrupt daily activities. Pain that is not managed properly can reduce the patient's motivation to participate in physical therapy and rehabilitation, thereby reducing the ability of stroke patients to carry out activities independently. In addition, prolonged pain can also cause long-term depression an can worsen the condition of stroke patients (Kleindorfer et al., 2021).

There are various interventions that can be used to reduce pain in stroke patients. Some of them are considered alternative or complementary therapies to conventional surgical interventions (Erol et al., 2014). This therapy has a number of documented clinical benefits, including using functional electrical stimulation (FES), using kinesio taping, shoulder management, performing massage, stretching, and hot/cold treatments, providing dry needling, and performing traditional Thai message (TTM).

Managing pain in post-stroke patients is crucial for speeding up their recovery. Implementing effective treatment strategies can significantly aid in this process (Dyer et al., 2020). It is proposed that non-pharmacological complementary therapies could not only support recovery and rehabilitation but also help prevent recurring pain, which can contribute to muscle stiffness and tension (Stroke Foundation, 2019).

METHODS

The research method follows the PRISMA guidelines, employing a systematic approach and selection process. Library sources were searched through national and international databases, including PubMed, Scopus, and EBSCO. The keywords used in the search included "intervention," "pain management," "patient," and "stroke."

This literature review aims to identify the types of interventions used to reduce pain in stroke patients. The inclusion criteria for this literature review are designed to determine if an article qualifies for inclusion. These criteria include: the relevance of the article's title, the types of nursing and complementary interventions for reducing pain in stroke patients, and the publication year of the journal, which must be between 2012 and 2022. The study population was stroke patients who experienced decreased muscle strength due to post-stroke pain, and the type of research article was quantitative research: quasi-experiment, randomized controlled trial (RCT), observational study.

While the exclusion criteria for this literature review were qualitative research, and respondents who were not stroke patients.
Research location: patients who are still receiving treatment in hospital & post-stroke patients who are undergoing rehabilitative treatment

RESULT AND DISCUSSION

The complete review consists of 166 articles. Searches conducted through the PubMed, Scopus, and EBSCO databases revealed that these publications are highly relevant to the evaluated themes

between 2012 and 2023. After removing duplicate articles, 153 publications with relevant titles and abstracts were selected. Inclusion and exclusion criteria set by the researchers were then applied to determine which studies proceeded to the next review stage. Six key studies were ultimately chosen for detailed analysis. A quality assessment was performed, and the findings were compiled into a final literature review report. Figure 1 illustrates the search and review process. The subsequent analysis includes details for each article, such as the researcher's identity, research title, type of intervention, field of research, research design, and a summary of search results, which are presented in Table 1.

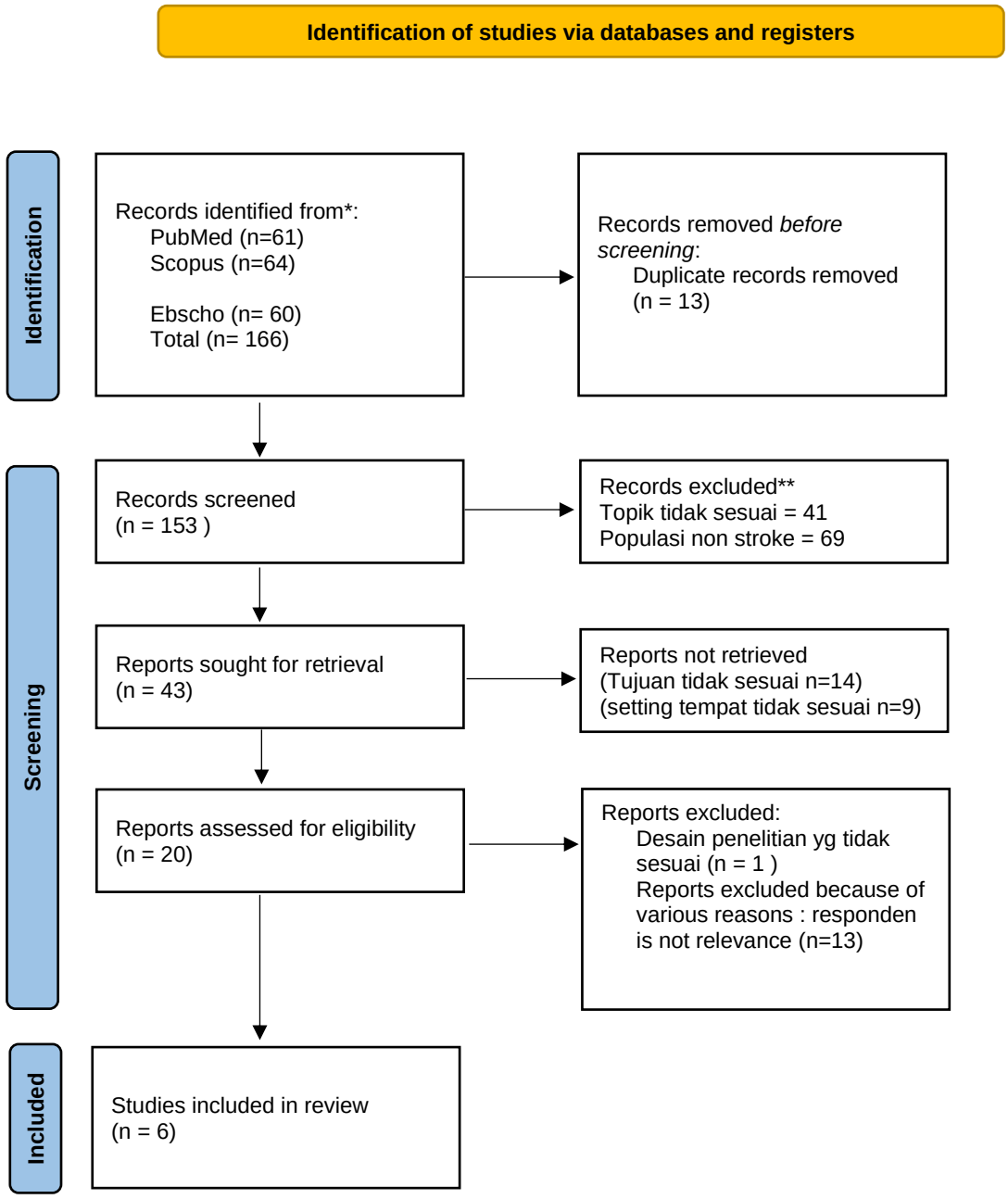

Figure 1. PRISMA Diagram

Table 1
Analysis includes details for each article, such as the researcher's identity, research title, type of intervention, field of research, research design, and a summary of search results

No	Author, year	Title	Design, country	Setting	Characteristics of respondents	Outcome	Strength	Limitation
1	(Berampu et al., 2021)	The Effect of Giving Functional Electrical Stimulation on Shoulder Subluxation Pain Scale in Post-Stroke Patients at Grandmed Lubuk Pakam Hospital	Quasy experiment one group prepost & posttest, Indonesia	Patients suffering from post-stroke subluxation pain at the Grandmed Lubuk Pakam Hospital Physiotherapy Clinic	1.Gender 2.Pain Scale	Characteristics of respondents based on gender, the number of male respondents was 6 people (50%), the number of respondents based on gender was 6 people (50%), 12 people. The average pain scale felt by respondents before giving the intervention (FES) was 4 and the maximum was 8, while the pain scale felt by respondents after being given the Functional Electrical Stimulation (FES) intervention was 3 and the maximum pain was 7	Quasy experiment one group prepost & posttest	Do not use a control group as a comparison The total sample in this study was only 12 respondents There is no mention of pain measurement scales and how to use Functional Electrical Stimulation (FES).
2	(Polie et al., 2020)	The Effect of Kinesio Taping on Pain and Functional Ability in Post-Stroke Hemiplegic Shoulder Pain	Experimental Study with one pretest & posttest design, Indonesia	Patients who experienced a stroke either came alone or were referred to the Medical Rehabilitation	1. Gender 2. Age 3. Time of stroke	In this study, pain evaluation with pain NRS was carried out before and after treatment Functional evaluation with	Experimental Study with one pretest & posttest design	There is no distribution data available from the inclusion criteria regarding gender or age level.

				RSUP Prof. Dr. R.D Kandou		fugl-meyer was carried out before and after treatment		
3	(David et al., 2021)	The Effect of Shoulder Management on Shoulder Pain in Patients After Stroke	Pre-experiment study with one group pretest & posttest design, Indonesia	All patients who experienced stroke at Stella Maris Hospital Makassar	1. Gender 2. Age 3. Medical diagnosis	From the research results, the average shoulder pain before shoulder management intervention was given was at a moderate pain level (5.80). After being given intervention, the average pain decreased to a mild pain level of 3.05. Complaints felt by respondents during the study, such as aches, stiffness and pain from the shoulders to the hands and often feeling tingling, decreased after being given shoulder management exercises.	Pre-experiment study with one group pretest & posttest design The shoulder management exercise intervention taught by the researcher to stroke patients was carried out on the first day and on the following day assisted by the family accompanied by the researcher for a period of 6 – 7 days.	This study did not use a control group so there was no comparison Insufficient number of research respondents
4	(Mhangara et al., 2020)	The prevalence and management of central post-stroke pain at hospital in Zimbabwe	Quantitative design , descriptive study, Zimbabwe, South Africa	All stroke patients attending the clinic at the hospital have a history of stroke confirmed through MRI and CT scans for clinical diagnosis.	1. Gender 2. Marital status 3. Area of residence	The Assessment of Neuropathic Symptoms and Signs (LANSS) was employed to identify the presence of pain and to confirm its neuropathic nature	In this study, the determination of Central Post-Stroke Pain (CPSP) was made using screening questions to exclude patients with non-CPSP pain types and the LANSS	It does not explore in detail the type, frequency, or level of exercise utilized by patients with CPSP. The study did not explore in detail the

						in participants experiencing post-stroke pain.	questionnaire to accurately identify the neuropathic nature of CPSP.	type, frequency, or level of exercise used by patients with Central Post-Stroke Pain (CPSP).
5	(Sugiharto et al., 2020)	The Effectiveness of Dry-Needling on Spasticity, Range of Motion, and Pain Intensity in Post-Stroke Patients at Dr. RSUP. Mohammad Hoesin Palembang	A randomized controlled trial (RCT) with an add-on method, double-blind, conducted in Indonesia.	All post-stroke spasticity sufferers who went to the RSMH Palembang neurology clinic and met the inclusion criteria. The inclusion criteria were first stroke stroke sufferers with upper extremity spasticity, aged 18-79 years, and limited ROM in the elbow and wrist joints.	1.Gender 2.Age 3.Type of stroke 4.Comorbid • Hypertension • Dyslipidemia • Heart disease • Diabetes Melitus	Both bunches experienced standard restorative restoration treatment and the treatment bunch gotten 4 sessions of DN treatment, once per week. The results of this study indicated improvements in MMAS, ROM, UEFI, and NRS in the treatment group during post-intervention evaluations conducted weekly up to week 4, with these improvements continuing until week 8 (4 weeks after the intervention). In this study, ROM was also assessed which was measured in degrees using a goniometer. Based on statistical analysis of elbow flexor and wrist	Evaluation is performed by assessing the patient's Modified Ashworth Scale (MMAS), Range of Motion (ROM), Upper Extremity Functional Index (UEFI), and Numeric Rating Scale (NRS).	The total sample size was only 20 respondents The results in the control group were not significant

						flexor ROM, significant differences were seen at week 8.		
6	(Thanakiatpinyo et al., 2014)	The efficacy of traditional Thai massage in decreasing spasticity in elderly stroke patients	Randomized controlled trial (RCT), Thailand	50 stroke patients, each experiencing spasticity in the elbow or knee muscles with a grade of ≥ 1+ on the Modified Ashworth Scale, and who were at least 50 years old and able to communicate.	1. Gender 2. Age 3. Level of Education 4. muscle strength level 3	At week 6, the percentage of MAS scores (muscle tension) decreased after intervention in the TTM group (intervention) than in the PT group (control).	Patients received interventions from IMA-certified therapists who performed massages standardized according to Thai massage organizations throughout the study. The therapist applies a consistent procedure to the hemiplegic side for one hour per session. The treatment focuses on basic massage lines and primary signal points, using only the thumbs and hands to apply pressure, without any traction or stretching. Basic massage lines are held under pressure for 10 seconds, while each main signal point is pressed for 30 seconds. The massage points targeted in this study are located on the legs, back, abdomen, and arms.	The study had a small sample size, with many patients excluded due to factors like communication challenges, mild spasticity, a desire to avoid discomfort, or reluctance to alter their current treatment regimen. Additionally, only outpatients were recruited for this study.

DISCUSSION

1. Characteristics of Stroke Patients

Based on the results of the review, there are 6 articles which state that the gender that experiences the most pain in stroke patients is men compared to women (Berampu et al., 2021; David et al., 2021; Mhangara et al., 2020; Polie et al., 2020; Thanakiatpinyo et al., 2014). The results of this study are also in line with previous research conducted by (Alchuriyah & Wahjuni, 2017) which showed that the majority (55%) of men suffered more strokes.

2. Gender

Stroke is the main cause of death in men. Stroke is also leading cause of long-term disability, and men under 44 are more likely to be hospitalized for certain types of stroke than women in the same age group. Meanwhile, in women, stroke is the fifth largest cause of death. However, women also higher death rate from stroke than men (Rexrode et al., 2022).
Many men suffer strokes at a younger age. Meanwhile, wome are more likely to suffer strokes at an older age. Symptoms that arise are usually hemiplegia/hemiparesis, aphasia, and facial paralysis (Lee et al., 2017). In men, some risk factors including smoking and alcohol consumption. Smoking can damage the lining of blood vessels, impairing blood flow to the brain and increasing the risk of stroke (Abdu & Seyoum, 2022). Meanwhile, the risk of stroke in women is influenced by factors related to pregnancy, such as preeclampsia, the use of contraceptives and hormonal therapy, and migraines. However, there are no gender differences in stroke-related death rates. (Kuriakose & Xiao, 2020).

3. Age

Based on the review results, four articles indicate that the majority of respondents who experienced a stroke were over 50 years old (David et al., 2021; Polie et al., 2020; Sugiharto et al., 2020; Thanakiatpinyo et al., 2014). This is consistent with the research conducted by Gofar (2018) which states that stroke sufferers are generally aged ≥ 55 years (59%). This age is the age at which all the body's organs experience a decline in function, such as the blood vessel system. Blood vessels thin and become brittle. The older you are, the greater the risk of having a stroke (Susilawati & SK, 2018). Those aged ≥ 55 years have a tendency to suffer 2 (two) strokes, because with old age the blood vessels become thinner and become brittle, making it easier for trauma to occur at the same time as atherosclerosis, so that the stroke area becomes wider (Ghani et al., 2016).

4. Type of Stroke

Based on a prior review, it was determined that pain was predominantly reported in patient with ischemic stroke rather than those with hemorrhagic stroke (David et al., 2021; Sugiharto et al., 2020). Ichemic stroke arises from embolism or blockage in the brain’s blood vessels. Over time, atherosclerosis devepelops, leading to the accumulation of fatty deposits on arterial walls that eventually form plaques. These plaques can obstruct blood vessels, leading to a reduced oxygen supply to brain tissue (Mabruri et al., 2020).

5. Risk Factors

Other factors can affect the risk of stroke, with hypertension being a primary one. Often referred to as the "silent killer," hypertension significantly increases the risk of stroke because it can damage blood vessel walls, leading to blockages and a higher risk of vessel rupture (Laily, 2017).

6. Types of Interventions to Reduce Pain in Stroke Patients

In this literature review, the interventions used as a reference by the author include providing functional electrical stimulation (FES), providing kinesio taping, traditional Thai massage (TTM), providing dry needling, managing central post stroke pain using analgesic therapy where the focus is non-therapy-pharmacological, specifically the approach involves providing a combination of massage and stretching interventions to reduce pain and manage shoulder issues (Berampu et al., 2021; David et al., 2021; Mhangara et al., 2020; Polie et al., 2020; Sugiharto et al., 2020; Thanakiatpinyo et al., 2014).

Functional electrical stimulation (FES) is a clinic-based system designed to use electrical stimulation, which can be used on muscles that are weak or paralyzed after a stroke. This method is usually used for major joint movements in the upper limbs, shoulders, elbows, radio-ulnar joints and wrists, which can be controlled using FES. The results of the study stated that the average pain scale felt by respondents before giving the intervention (FES) was 4 and a maximum of 8, while the pain scale felt by respondents after being given the Functional Electrical Stimulation (FES) intervention was 3 and the maximum pain was 7 (Berampu et al., 2021). In other research conducted by (Silva et al., 2018) showed that FES was applied to patients with shoulder subluxation who experienced both acute and chronic strokes for six weeks. Improvement in shoulder subluxation was observed only in patients with acute stroke. However, other studies have demonstrated that FES can also reduce subluxation in chronic stroke cases. Therefore, it can be concluded that FES, when combined with functional movements, is effective in reducing the degree of shoulder joint subluxation and alleviating pain in hemiparetic patients with glenohumeral subluxation following chronic stroke.

According to (Polie et al., 2020), kinesio taping therapy can reduce pain in post-stroke patients with hemiplegic shoulder pain. In this study, pain evaluation with pain NRS was carried out before treatment and at the end after treatment. Assessment of functional ability in sufferers with hemiplegic shoulder pain (HSP) can use the Fugl-Meyer assessment. In this case, research on stroke patients focuses on HSP. Significant improvements in pain and functional status in post-stroke patients with hemiplegic shoulder pain were observed after 30 days of kinesio taping therapy in the shoulder area. Meanwhile, in research conducted by (Tan et al., 2022) showed that kinesiotaping was effective in relieving shoulder pain, increasing upper extremity flexibility and ROM, and reducing shoulder subluxation in stroke survivors, as assessed by the modified Ashworth scale. Therefore, kinesiotaping can significantly increase the range of shoulder flexion and abduction. However, researchers did not observe functional improvements in hemiplegic patients after kinesiotaping (Tan et al., 2022).

In research conducted by (David et al., 2021) it was stated that there were several shoulder management exercise interventions for patients after stroke. Intervention is carried out by carrying out movements on the scapula which are carried out once a day for a week for 15 minutes. The intervention provided by the researcher to stroke patients was conducted on the first day and continued the following day, with the family assisting and the researcher present for a period of 6-7 days. This exercise was carried out every morning and evening for five minutes and after 7 days the pain level was measured using a tool. measure the Visual Analog Scale observation sheet. The average value of shoulder pain before being given shoulder management intervention was at a moderate pain level (5.80), then after being given the intervention the average pain decreased to a mild pain level of 3.05 (David et al., 2021). It has been proven that doing shoulder exercises can reduce symptoms of shoulder pain or reduce shoulder pain in post-stroke patients.

Other interventions can also be seen in the research of (Mhangara et al., 2020), although it focuses on analgesic treatment, it also uses interventions such as massage, stretching, and hot/cold treatments as interventions to reduce post-stroke pain. This means that it is our focus that nursing interventions in

the form of non-pharmacological measures are also very, very important in helping patients to reduce pain.

According to (Sugiharto et al., 2020), in their research, stroke patients were randomly divided into 2 groups, namely the control group (sham needling) and the DN intervention group. The number of samples using the Pocock formula obtained 10 samples per group. The DN group was given standard medical rehabilitation therapy and DN intervention using disposable stainless steel needles (0.30 mm x 40 mm) on the upper extremity elbow flexor muscles (m. Biceps and m. Brachioradialis) and wrist flexors (m. Flexor Carpi Ulnaris and m. Flexor Carpi Radialis) on the side of the body experiencing hemiparesis one session per week for four weeks. The needle is inserted along the muscle belly of the muscles that have been determined using the anterior-posterior manipulation technique, then the needle remains in the muscle for 15 minutes. The sham needling group was given standard medical rehabilitation therapy and sham needling one session per week for 4 weeks. Rehabilitation therapy provided to both groups included unilateral arm training, Bobath therapy, strength training, repetitive task training, muscle stretching, and positioning. The assessment standard uses the Numeric Rating Scale as the patient's subjective assessment of pain which is measured using a numerical scale ranging from 0, which means no pain, to 10, which is very severe pain. The statistical analysis results show a significant decrease in the treatment group during weekly evaluations, while the decrease in the control group, although present, was not significant. Additionally, the difference in NRS scores between the two groups was significant at 8 weeks post-intervention. The research is also in line with research conducted by (Valencia-Chulián et al., 2020) which found that there was an improvement in flexibility, pain intensity, and range of motion (ROM) after the use of dry needling (DN), either alone or in combination with other interventions, in stroke patients.

In a study conducted by (Thanakiatpinyo et al., 2014), patients were randomly assigned to receive Traditional Thai Massage (TTM) twice weekly for six weeks. Five certified therapists administered the massages, adhering to standardized procedures from Thai massage organizations. Each one-hour session focused on the hemiplegic side, utilizing basic lines and key signal points, with pressure applied using only thumbs and hands, without any traction or stretching. The basic lines were pressed for 10 seconds, and the main signal points were held for 30 seconds each. The massage targeted various areas, including the legs, back, abdomen, arms, shoulders, and neck. By the sixth week, there was no statistically significant difference in the percentage of patients whose modified Ashworth Scale scores decreased by at least one degree between the TTM and physical therapy (PT) groups. Both groups demonstrated significant improvements in functional ability and quality of life (QoL), with no significant differences observed between them (Thanakiatpinyo et al., 2014). This finding is consistent with (Sibbritt et al., 2012), who reported that a stroke rehabilitation program incorporating Traditional Thai Massage, herbal treatments, and physical therapies led to significant improvements in daily activities, mood, pain, and sleep patterns, as well as a reduction in pain intensity over time.

CONCLUSIONS

Based on the analysis through the literature review that has been carried out, it can be concluded that both men and women have high risk factors for stroke. More men suffer from strokes under the age of 45 years, while more women suffer from stroke over the age of 45 years. One of the risk factors that can influence the occurrence of stroke is hypertension. However, there are other external factors that influence, namely habits such as smoking dan drinking alcohol.
The most effective intervention that can be carried out to reduce pain in stroke patient is Traditional Thai Message because the area being massage almost covers all partsof the body, namely the legs, back, stomatch, and arms. Apart from that, dry needling is also effective in reduce pain intensity although it must still be done by an expert.

There are several recommendations that can be made for further research related to the most effective interventions to reduce pain in stroke patients, such as hot/cold therapy, relaxation, the family involvement in the care program for pain management in stroke patients. The there is also an evaluation of complementary therapy in the context of nursing to reduce pain stroke patient. In addition to helping in the rehabilitation process, it can aso increase muscle strength. Passive ROM exercise can also be taught so that patients are able to do them independently so that they can reduce pain after a stroke.

LIMITATION

This article uses only search sources from six databases and some of the literary sources obtained in this search in Indonesian and English. The interventions carried out also still limited so comparing the most effective interventions for reducing post-stroke pain is still lacking.

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