

Sports Massage Therapy to Overcome Fatigue Problems in Nurses: a Literature Review

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ABSTRACT

Objective: Workers often ignore the various aspects that can affect their work, health, and comfort caused by physical and mental fatigue. Hospital nurse fatigue is associated with lower nurse satisfaction, higher turnover, and poor patient outcomes. Fatigue is a common problem for nurses, with 82% of nurses experiencing mild to severe physical fatigue. There are many ways to combat fatigue symptoms and speed recovery after exercise, including massage techniques. It is believed that sports massage supplies oxygen to the muscles. As it circulates in the blood, lactic acid is converted to pyruvic acid, generating ATP, and activating muscle metabolism. This study aims to identify appropriate sports massage therapy to treat caregiver fatigue issues. **Method:** A literature review was used in this study. Article searches were performed in his six journal databases: PubMed, JSTOR, Taylor, Willey Online, Sage, and Google Scholar. Eight articles that met the inclusion criteria were found. **Result:** The results of this review indicate that sports massage techniques can be used as an alternative to reduce caregiver fatigue when providing community health services. **Novelty:** This study shows the effectiveness of sports massage therapy in overcoming and treating caregiver fatigue issues.

INTRODUCTION

Work is a human activity to fulfill the needs of life. Working people try to achieve a situation thbetter or more satisfying situation revious situation. Work usually has many demands, including stress. This stress can be caused by physical fatigue or mental fatigue. Physical fatigue is generally caused by activities that exceed your physical capabilities (Steege & Rainbow, 2017; Ambarawati et al., 2021). This can cause organ dysfunction. Clinically, the function of the body's organs is disturbed by fatigue.

Fatigue is a common problem among nurses, with 82% of nurses experiencing mild to severe physical fatigue (Yoder, 2010; Hooper et al., 2010). Fatigue can be considered physical, psychological, and emotional (Jason et al., 2015). The impact of nurses' physical fatigue is felt by nurses and patients who will receive nursing services. Nurse fatigue is closely related to the decline in the quality of nursing services. It is important to prevent burnout to improve the quality of nursing services (Poghosyan et al., 2010; Saputro, 2017). Physical fatigue is caused by a graded training pattern (intensity, frequency, duration) which causes periods of lack of energy and a buildup of lactic acid levels due to the body's metabolism. Lactic acid accumulation above 19.5 mmol/L can cause fatigue (Jarrar et al., 2021; Hossain & Clatty, 2021). Based on Purnomo's previous research, an increase in blood lactate occurs after 5 minutes of maximal exercise. Lactic acid in the muscles interferes with enzyme function and interferes with chemical reactions within the muscles. In this situation, muscle contraction is hindered, weakening the muscles and

resulting in muscle fatigue (Ayudi, 2022; Vasconcelos et al., 2018; Moghadam & Ganji, 2019). Physical fatigue that is often caused by a buildup of lactic acid is muscle fatigue.

Muscle fatigue is a feeling of tiredness that occurs in the body's muscles due to a lack of energy or muscle strength. Muscle fatigue is a term used to describe a temporary decrease in a muscle's ability to function during physical activity (Harahap et al., 2018; Shalfawi et al., 2019). Another meaning of muscle fatigue is a decrease in maximum strength or muscle strength capacity. Most activities carried out in providing nursing services can cause nurses to experience muscle fatigue. A review of the existing literature shows that nurse burnout has been the subject of much research (Hassan et al., 2019; Coleman et al., 2012) and recent research highlights the importance of preventing burnout. A small number of studies have examined the effects of various psychological and physical measures (Florin et al., 2021; Fortney et al., 2013) such as relaxation or recovery (Hevezi, 2016; Hartono et al., 2019) and corrective exercise (de Freitas-Swerts & Robazzi, 2014) during work to reduce nurses' fatigue, stress, pain, and flexibility.

Fatigue recovery can be achieved due to muscle fatigue causing loss of the muscle's ability to contract to produce force. Apart from that, muscle fatigue also causes a reduction in muscle explosive power, muscle speed, muscle endurance, flexibility, speed, agility, and very fast reaction speed (Samantha & Almalik, 2019; Mooren et al., 2012; Bloomer et al., 2007). Lack of recovery can lead to chronic fatigue and has been suggested as a possible transition between shift work and the frequently reported adverse impacts of shift work on health and wellbeing. Fatigue can be minimized by optimizing recovery. Recovery allows the body to replenish energy, reduce lactic acid, and reduce fatigue in the central nervous system (Nunes et al., 2016; Bakar et al., 2015).

Massage is currently considered the most effective way to relieve fatigue or pain after activities. Being healthy and fit requires many services, including the massage (Nurvitasari et al., 2023). Massage uses knowledge about the human body, including anatomy, physiology, and movement science (kinesiology). Among the various types of massage offered, two types of massage have the same massage goals, namely sports massage and Swedish massage. Another study determined that sports massage was more effective in fatigue recovery than Swedish massage in workers (Masruro, A. & Rahman Hidayat, 2020; Yeun, 2017). Sports massage is a type of massage therapy that stimulates blood and lymph circulation. Sports massage is necessary for athletes (professional and amateur) and for people who participate in non-sports activities but require a lot of energy on the body (Park et al., 2017; Benjamin et al., 2005).

Many attempts have been made to remove lactate through sports massage. Sports massage benefits athletes, and people who engage in anaerobic activities can also benefit from sports massage. Sports massage is believed to provide muscles with oxygen that circulates in the blood so that muscle metabolism runs well, namely lactic acid is converted into pyruvate to form ATP (Hilfiker et al., 2018; May et al., 2017; Liu et al., 2021). The main question is whether physical massage can assess its impact on caregiver fatigue. Through research carried out previously, the researcher wants to summarize and

present the results for further research. Next, researchers will analyze differences in muscle fatigue recovery and lactic acid levels during sports massage interventions.

RESEARCH METHOD

A literature review was used to summarize relevant studies on appropriate sports massage therapy to treat caregiver fatigue problems. The Center for Review and Dissemination and Joanna Briggs Institute criteria and the PRISMA checklist were used to assess study quality. A Population, Intervention, Comparison, Outcome and Study Design (PICOS) approach will be used to determine inclusion and exclusion criteria. Inclusion and exclusion criteria are shown in Table 1 and were used to select articles retrieved by the search strategy.

Table 1. Inclusion and exclusion criteria with PICOS

Criteria	Inclusion	Exclusion
Population	Sample with fatigue problems	Sample non-fatigue problems
Intervention	Sport massage treatment	Not relevant with sports massage treatment
Comparisons	No comparisons	No comparisons
Outcome	Sports massage therapy that influence fatigue problems	Not relevant with sports massage therapy to overcome fatigue problems
Study design	All method of of research involving male and female subject using sport massage intervention	Systematic or literature reviews
Publication years	2012-2022	Pre 2012
Language	English/ Indonesian	Non-English/ Indonesian Language

This study uses a literature review to collect and summarize previous research data for critical analysis. This method focuses on the effectiveness of sports massage recovery methods by extracting the results of previous research. Research data is processed through processing, organization, analysis, and dissemination. The articles are from several databases such as JSTOR, PubMed, Taylor, Sage, Willey Online, and Google Scholar. Search engines use his MeSH terminology. (“sports massage” [MeSH] and “fatigue” [MeSH]) and “lactic acid level” [MeSH]) and “athlete” [MeSH] or “nurse” [MeSH].

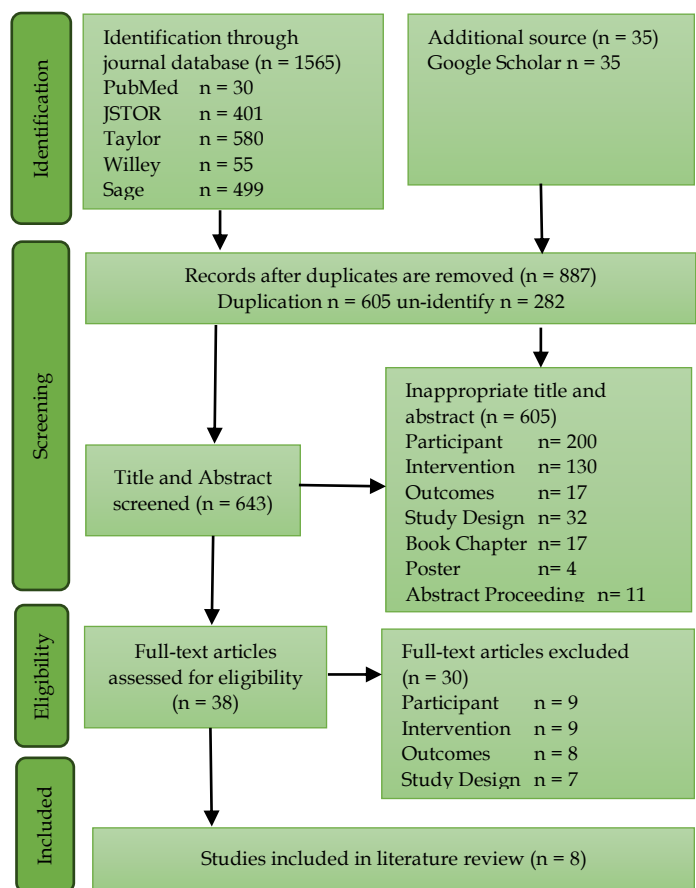


Figure 1. Identification procedures by Prisma analysis

We set inclusion criteria to include articles published in fully accessible English or Indonesian versions from 2012 to 2022. The authors also used exclusion criteria: book chapters, posters, or process summaries. Additionally, the authors performed an analysis process for each of these techniques. The identification procedure using prism analysis is shown in Figure 1.

RESULTS AND DISCUSSION

Results

The main purpose of the literature review was to analyze the potential of body massage to promote fatigue recovery after physical activity. Fatigue is a decrease in physical performance caused by performing an activity. Work fatigue is a decrease in the quality and quantity of work related to performance. Although nurses report fatigue, they have different views on the importance of addressing fatigue, given the challenges faced by other health systems. Fatigue negatively impacts nurse satisfaction and may serve as a mediator between practice conditions and negative nurse outcomes (Cheraghbeigi et al., 2019; Atashi et al., 2014; Dall’Ora et al., 2015).

Table 2. Characteristic of the Study

Author (year)	Method	Findings
Steege and Rainbow (2017)	<p>Objective: is to investigate barriers and facilitators to nurse coping and fatigue in hospital nurse work systems.</p> <p>Design: Qualitative Exploratory Study</p> <p>Sample: 22 nurses working in intensive care and medical-surgical units</p> <p>Intervention: In-depth and focused interview</p> <p>Instrument: Semi-structured with questions to address Interview Guide Issues where participants should be asked for their views on the level of fatigue in caregivers, the effects of fatigue, and barriers to combating fatigue</p>	<p>Most nurse leaders experience burnout; Nurse managers reported higher levels of chronic fatigue. The results show that there are many causes of burnout, including 24-hour responsibilities and high role expectations, as well as the use of a combination of the terms health, recovery, social support, and gender to address burnout.</p>
Afrasiabifar <i>et.al</i> (2018)	<p>Objective: To investigate the effect of trunk stabilization exercise on nurses' fatigue</p> <p>Design: Field experimental study</p> <p>Sample: 46 qualified nurses</p> <p>Intervention: nurses in the experimental group Core stability exercise performed 3 times a week for 6 weeks</p> <p>Instrument: Multidimensional Fatigue Inventory</p>	<p>Physical exercise in the experimental group significantly reduced physical and mental fatigue compared to the control group. Core stability exercises were able to reduce nurses' fatigue, particularly mental and physical fatigue.</p>
Ambarawati <i>et.al</i> (2021)	<p>Objective: Study of sports news treatment is more effective than active rest in reducing lactate levels</p> <p>Design: Similar Experimental Study with Subject Design (Treatment with Subject Design)</p> <p>Sample: 18 Indonesian water skiers</p> <p>Intervention: Period I received sports massage treatment, period II received active rest treatment, 3 between treatments. The study was conducted for 5 days with a break of 1 day.</p> <p>Equipment: Lactate was measured by taking a blood sample and using a tool that accurately measures lactate concentrations.</p>	<p>Sports massage treatment is more effective in decreasing the level of lactic acid rather than active resting. Both sports massage and active resting can reduce the lactic acid level, however, sports massage is more effective than active resting.</p>
Shalfawi <i>et.al</i> (2019)	<p>Objective: To investigate the acute effects of fascial tissue rolling on endurance performance and recovery using a novel mechanical self-induced multibar rolling massager.</p>	<p>Rolling the fascial quadriceps with a roller massager resulted in higher fatigue blood lactate concentration scores and increased blood lactate clearance 10 minutes after performing the fatigue test (both $p < 0.05$)</p>

Author (year)	Method	Findings
	<p>Design: The is a randomized crossover design with repeated measurements.</p> <p>Sample: Eight national-level junior and neo-senior speed skaters.</p> <p>Intervention: underwent a 10-minute fascial quadriceps roll, before and 15 minutes after he performed an incremental cycling test until fatigue, and subsequently he underwent a Wingate performance test.</p> <p>Equipment: Maximal oxygen uptake (VO₂peak), respiratory exchange ratio (RER), blood lactate concentration and performance measurements.</p>	
Ayudi <i>et.al</i> (2022)	<p>Objective: To determine the effectiveness of Swedish massage and sports massage on fatigue recovery in workers and coolies</p> <p>Design: Experimental method</p> <p>Sample: 22 people, objective sample</p> <p>Intervention: In-depth intensive interviews</p> <p>Instrument: a-work Work Fatigue Questionnaire in the form of a Fatigue Questionnaire Swedish massage was effective in relieving fatigue among workers and coolies.</p>	Sports massage is effective in relieving fatigue among workers and coolies. Sports massage is better than Swedish massage for fatigue recovery for workers and coolies
Nunes <i>et.al</i> (2016)	<p>Objective: To determine whether massage therapy can reduce pain and fatigue</p> <p>Design: Randomized controlled trial with concealed allocation, intention-to-treat analysis, and blinded outcome assessors</p> <p>Sample: 74 triathletes</p> <p>Intervention: Experiment The experimental group received a quadriceps massage for post-competition recovery, the control group rested with a sitting pressure algorithm, and the experimental group received a visual analogue scale for pain and fatigue.</p>	Scores were significantly lower than the control group. Massage therapy was more effective than no intervention in helping long-distance triathletes recover from post-race pain and fatigue.
Prastowo and Arovah (2014)	<p>Objective: comparison of the effectiveness of circulo massage and sports massage in overcoming work fatigue</p> <p>Design: pre-experimental research with a treatment by subjects design</p>	A comparison between work fatigue in the effectiveness of circulo massage and sports massage resulted in a p-value: of 0.0287. It can be concluded that sports massage is more effective than circulo massage in overcoming

Author (year)	Method	Findings
Saputro (2017)	<p>Sample: 15 male employees, purposive sampling</p> <p>Intervention: Subjects were given two treatments, namely circulo massage and sports massage with an interval of + 1 week</p> <p>Instrument: work fatigue questionnaire that has been tested and declared valid and has a reliability coefficient</p> <p>Objective: The difference in the influence of Swedish massage and sports massage on the recovery of lactic acid levels after maximum activity</p> <p>Design: experimental method with a 2x2 factorial design.</p> <p>Sample: 11 male players, purposive random sampling</p> <p>Intervention: maximum exercise of running 6 x 35 meters, given Swedish massage manipulation. 11 male players did maximum training running 6X35 meter and given sports massage manipulation. 11 female players did the maximum exercise of running 6X35 meters and were given Swedish massage manipulation. 11 female players did the maximum training of running 6X35 meters and were given sports manipulation massage.</p> <p>Instrument: latest tool with the Accutrend Plus brand and test strip with units of mMol/liter</p>	<p>work fatigue in male employees of Gadjah Mada Medical Center</p> <p>There is a significant difference in effect between Swedish massage and sports massage on lactic acid levels. Sports massage is better than Swedish massage. Men decrease lactic acid levels more quickly than women. There is a significant interaction effect between the provision of Swedish massage and sports massage methods and gender. Sports massage is more suitable for reducing lactic acid levels in men and Swedish massage is more suitable for reducing lactic acid levels in women after maximum activity.</p>

Discussion

In a study conducted by Steege & Rainbow (2017), all nurses (in their sample) reported experiencing fatigue, but their views on the importance of combating fatigue differed. Several participants stated that fatigue was "part of care," suggesting that this phenomenon was generally accepted. This is consistent with the values of the supernurse professional culture identified in this study, but also with fundamental features of a safety culture that require recognition of fatigue and consistent reporting of associated risks and hazards is contradictory (Cantarero-villanueva et al., 2011; Grygus & Yevtukh, 2018; Steege & Rainbow, 2017). Fatigue at work causes physiological and psychological fatigue. Physiological fatigue can be caused by a decrease in muscle strength due to exhaustion and an increase in metabolic waste, for example, lactic acid (Golovin et al., 2018; Schilz et al., 2020). The clinical impact of fatigue can include muscle pain, soreness, muscle stiffness, muscle weakness, decreased speed, and discomfort. Psychological fatigue can reduce motivation, accuracy, and speed of problem-solving. Repetitive physical exercise can cause muscle damage, inflammation, and pain (Nosaka, 2010;

Dupuy et al., 2018; Laar et al., 2021; Fern & Mielgo-ayuso, 2020). symptoms may appear for 4 to 7 days and pain peaks 24 hours after exercise (Hung et al., 2021; Zeng et al., 2023).

The results of the literature review show that the massage therapy techniques used are more effective in recovering from pain and fatigue than after running long distances without doing anything (Elextrat et al., 2014). Direct evidence supports the use of massage to restore endurance in triathletes after long-distance endurance competitions. Research on massage therapy applied at the end of competition is important. This is because this technique is so widespread that greater effects can be seen by increasing the amount of massage, for example (Nunes et al., 2016; Type, 2022; Pinar et al., 2012). Among the different types of massages offered, there are two that have the same purpose: sports massage and Swedish massage (Putra & Syampurma, 2023; Khalique & Siddiqui, 2017). This may be true, although Swedish massage has a different lactic acid reduction effect than sports massage. Further analysis showed that post-workout sports massage was more effective at lowering lactic acid levels than Swedish massage (Dawson & Zee, 2005; Buchheit, 2017; Joly et al., 2019). Sports massage is very helpful in relieving pain, relaxing muscles and relieving player fatigue. Sports massage includes the main operating sequences and techniques (Mika et al., 2007; Joly et al., 2019). In particular, more tapping and release is required in the target area, and the applied pressure must be strong enough and applied arbitrarily at the beginning of the massage to cause a shock and stimulate relaxing endorphins. Those that show activity in the lactic acid decomposition stage (Rinder & Sutherland, 1995; Lubis et al., 2021).

The same study by Saputro (2017) states that sports massage can help relieve pain, relax muscles, and heal fatigue experienced by players. Sports massage has one main sequence and manipulation technique that is more needed in the target area: tapotement and effleurage. The pressure applied must be strong enough and targeted immediately after the beginning of the massage to cause a shock and stimulate the release of endorphins that act during the lactic acid reduction phase (Saputro, 2017; CARUSO & CODAY, 2008; Terada & Nakatani, 2018). Other research results show that sports massage is more effective than Swedish massage in reducing fatigue levels in wearers and workers. Sports massage suits active employees with a lot of work and physical activity. These vigorous activities cause poor blood circulation and muscle tension. This problem can be overcome with sports massage, since sports massage aims to improve blood circulation, reduce muscle tension and elasticity, reduce nerve tension and relieve pain (Novita Intan Arovah, 2015; Sabry Attia Hassan et al., 2023).

Sports massage is a type of massage that is used as an alternative to relieve fatigue and fatigue. This is because sports massage is designed to promote blood circulation, especially venous blood or venous blood to the heart to restore and process the rest of metabolism and relax muscles and nerves (Jo et al., 2018). Because that's the purpose. In sports massage, the most important manipulation techniques are effleurage, petrissage, shaking, tapotement, friction, walking, effleurage and vibration (Ayudi, 2022; Millet et al., 2006). Physiologically, sports massage is very helpful in relieving pain, relaxing muscles and curing fatigue for athletes after participating in sports activities. According to other researchers, sports massage is very helpful in strengthening and improving blood circulation, reducing nervous tension caused by excessive physical activity, and is suitable for use in professional activities (Masruro, A. & Rahman Hidayat, 2020; Ganesha

& Nicosia, 2022). In this case, we believe in the theory that physical massage can reduce fatigue. Additionally, researchers found that physical massage was better suited to reducing lactate levels in men than in women, where lactate levels indicate fatigue.

Further research is needed to verify the acute effects of massage therapy on fatigue metabolism, as a literature review does not fully answer the question. The most effective massage techniques and frequency (duration) of sports massage are assigned to workers, including the nursing profession.

CONCLUSION

Fundamental Finding: Physical activity in nurses can cause fatigue problems. This review reports that when fatigue occurs, physical massage can be performed. The benefits of sports massage helps improve blood circulation, reduces muscle tension and elasticity, and reduces nervous tension and pain. **Implication:** It is believed that sports massage supplies oxygen to the muscles, and as it circulates in the blood, lactic acid is converted to pyruvic acid, generating ATP, and activating muscle metabolism. Therefore, researchers suggest that sports massage techniques can be used as an alternative to reduce nurse fatigue in providing health services to the community. **Limitation:** The review is only research published in the last 10 years. The limitation of the method used is that there is no quality analysis and risk assessment of bias. **Future Research:** Future writers should be able to create new subjects and conduct more bibliographic searches, it is hoped.

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