



The Development of ULIN Massage Therapy for Female Exercise

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Abstract. This research aims to produce a model of ULIN massage therapy for female exercisers to relieve stress. This research was development research with stages: preliminary study and data collection, planning, product draft development, expert validation, product testing, revision, and evaluation. The ADDIE research and development method was used to evaluate the experimental testing process of product development. The development research subjects involved 3 therapists and 3 validators who have skills and understanding related to exercise therapy and/or exhaustion recovery experts. The pre-experimental one-shot case study consisted of 25 people for small-scale trials and 50 people for large-scale trials. The experimental method was used to test the effectiveness of the product on 50 female athletes aged 18–50 in Yogyakarta Province. This study was conducted at the massage therapy clinic at the Vocational Laboratory, Yogyakarta State University, Wates. The instruments used to collect data were expert validator sheets, trial test sheets, and stress scale to assess the levels of chronic, non-specific arousal. The results showed that the model of ULIN massage therapy for female exercisers for reducing stress was valid. The results of validation by judgment experts and therapists were in the good category. Product quality from small-scale and large-scale tests was categorized as high. The results of the product effectiveness test on 50 female exercisers showed a significant reduction in stress levels. The conclusion of this study was that a model of ULIN massage therapy was valid and effective for handling stress.

Keywords: Female Exercisers, Massage Therapy, Stress, ULIN

1. Introduction

Massage therapy is one of the oldest forms of treatment that nowadays is popularity as part of complementary and drug-free approaches (1). For thousands of years in all over the world Massage has been used for relaxation and smooth's the mood (2). Massage has been defined as a systematic form of touch the soft tissues with palm and fingers for the purpose of promoting health and well-being (1). According to Field T et al (2005) (3), massage makes the increase of artery, vein, and local blood stream and stroke volume. Improve the defecation and inhibit pain mechanism. Increase the serotonin and dopamine and decrease cortisol and heal the awareness. Massage therapy cause the stimulus of central nerve system and decrease the heartbeat and respiration and therefore reason the calmness feel (4). In a meta-analysis research

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A. M. Sholikhah et al. (eds.), *Proceedings of the International Seminar of Sport and Exercise Science (ISSES 2024)*, Advances in Health Sciences Research 81,
https://doi.org/10.2991/978-94-6463-593-5_4

(n=17) shows that massage therapy makes the decrease of depression signs (5). Massage therapy promotes psychosocial relaxation and relieve stress. In addition, this therapy has been reported to improve immune function (6) . Massage therapies have been reported to produce beneficial physiological effects such as vasodilation, an increase in skin temperature, body relaxation (3). In addition, massage also has been proposed to promote psychosocial relaxation and relieve stress. According to Weerapong et al (2005) (2), investigated a reduction in anxiety and an improvement in mood state also cause relaxation (psychological mechanisms) after massage. The majority of research in the psychological area has reported that massage provided positive effects on anxiety (2).

According to Moyer et al (2004) major effects of massage therapies were reductions of trait anxiety and depression (1). Prolonged stress and associated tension can create anxiety, physical pain, and discomfort. Anxiety can trigger stress. A typical intended outcome of massage is the relieving stress (7) (Sarah & John, 2002). There are many different forms of massage therapy (more than 80 type) with diverse settings that used by different groups in various occupations (8). This massage technique can help athletes heal muscle strains and keep their muscles in optimal condition with a reduced risk of injury. Massage therapy is frequently used in rehabilitation settings and with athletes (8).

Female exercisers are women who engage in physical exercise as part of their regular routine or for various purposes such as fitness, health, recreation, or sport. They participate in a wide range of activities aimed at improving their physical fitness, strength, flexibility, and overall well-being. Female exercisers may have diverse motivations for engaging in physical activity, including improving fitness and health, managing weight, relieving stress, enhancing mood, boosting self-confidence, and enjoying social interactions. They may also face unique challenges and considerations related to exercise, such as hormonal fluctuations, pregnancy and postpartum considerations, and societal expectations regarding body image and athleticism (Undang-Undang Republik Indonesia Nomor 3 Tahun 2005 Tentang Sistem Keolahragaan Nasional, 2005; Husdarta, 2010) (9).

According to the Central Bureau of Statistics of Indonesia, compared to the prior year in 2017, the percentage of female workers in 2019 slightly rose from 55.4% to 55.5% (Subdirektorat Statistik Ketenagakerjaan, 2019) (10). Increasing the number of female workers in sport area of their productive age may cause fatigue, stress and difficult to focus, which is a problem in work health and safety that may lead to injury and accidents. The management of work health and safety is important to achieve healthy, safe, and productive workers. Fatigue is caused by several factors, including job demands, type of work, work environment (noise, lighting, heat stress, vibration), changes in the biological clock of workers, and the need to adapt to their work (Beers T, 2017; Umami & Subagyo, 2014) (11). Research conducted on American workers stated 37.9% of the total workers experienced fatigue. Meanwhile, research conducted in Indonesia stated that the prevalence of fatigue in workers was high, reaching 65 percent (Ananda & Mustopa, 2023) (12). However, recent studies don't explore the effect of workload to the fatigue and sleep quality

Massage therapy was beneficial to help someone who suffers from pain in muscles, ligaments or joints. The statement above was reinforced by Graha & Priyonoadi (2009) that physiologically, massage therapy causes some effects such as: accelerating blood

circulation, decreasing the inflammation sign and making muscles relax, decreasing swelling, and positioning joints and create the positive mood to prevent the stress (13). Weerapong et al, (2005) (2) explained that massage was a manipulation done by muscles and connective tissue with various kinds of massage techniques to improve the function of joint movement, the recovery process, inhibit the pain stimulus in nerves, and improve muscle comfort. Massage is conducted in the body in various ways, such as 1) pressing, 2) trilling, 3) shaking, 4) stroking, and 5) squeezing, conducted manually or by using mechanical aids (14). Physiological massage was helpful to accelerate blood circulation, produce endorphins, and relax muscles. This statement was reinforced by Arovah (2009) to help: (1) reduce swelling in the chronic stage; (2) reduce pain perception; (3) reduce the pain and stiffness of nerves; (4) expand the range of joint movement, power, coordination, and function of muscles; and the last will trigger the dopamine hormone to create a happy mood (14).

Massage helps to alleviate the physical discomfort by relaxing the muscles, which in turn reduces overall physical stress. It enhances muscle recovery by improving blood circulation and reducing inflammation. This helps female exercisers recover more quickly from workouts, decreasing the physical stress on their bodies. Exercise and stress can both affect hormone levels. Massage has been shown to lower cortisol levels (the stress hormone) and increase the production of serotonin and dopamine, which are hormones associated with happiness and relaxation. This hormonal balance helps reduce stress. The mental relaxation provided by massage can be significant. Massage stimulates the release of endorphins, the body's natural painkillers and mood enhancers. This can create a feeling of euphoria and relaxation, counteracting the stress that can come from intense exercise routines (6).

Based on the observation to the female exercisers in a massage therapy clinic, Faculty of Vocational, Cosmetology Study Program, Yogyakarta State University conducted by the researchers obtain some findings such as: (1) the female exercisers who having heavy load activities get higher stress, because the extreme movement and get fatigues, (2) the female exercisers who get stress to choose complementary medication such as massage as the alternative for the minor injury recovery. Finally, researchers want to develop a new massage therapy model called Ulin Massage to relieve female exercisers, which is assessed according to the DASS questionnaire scale. We hypothesized that ULIN massage would reduce the level of stress on female exercisers (15).

2. Method

Study design, settings and participants

This study used a research development method with ADDIE model in order to develop ULIN massage model to overcome stress problems after work in female exercisers at Sleman Regency. This research was conducted from January 2024 to Mei 2024 in Sleman Regency, Special Region of Yogyakarta, Indonesia. The expert judgement involved 3 therapists and 3 validators who have skills and understanding related to

massage therapy. The pre-experimental one-shot case study consisted of 25 people for small-scale trials and 50 people for large-scale trials. The experimental method was used to test the effectiveness of the product on 50 female exercisers in Yogyakarta Province. Sampling was carried out by taking into account the inclusion and exclusion criteria that had been set, and the total number of samples was 50 female exercisers with a variety of personal backgrounds. The sample inclusion criteria in this study were women between the ages of 18 and 50, doing regular sports activities, being married, and having a job. The sample exclusion criteria in this study were that they were women over 50 years old, did not do regular sports activities, were not married, and did not have a job. Everyone in the sample received an invitation to join the study and a questionnaire via social media. They were asked to answer the self-item test via Google Form for 60 minutes of one-day observation.

Research Procedure

The procedures of development conducted in this study adapts to the ADDIE steps: 1) the preliminary study and data collection was conducted by finding out the source of problems in the field and also finding out the solution to solve them. The researchers conduct the interview with the therapist as an expert, healthy expert, female exercisers and data collection, and then it was conducted. 2) the study was planned by making the model or method adjusted to the theory in obtaining the valid and effective results as the solution of the problems faced, therefore 3) the draft of massage therapy treatment was developed which consisted of 3 kinds of manipulation namely fiction, petrissage and traction, and joints reposition with 10 movements with duration was 60 minutes. 4) The draft was validated by three experts which consisted the expert of learning therapy material, the expert of sports health. The validation result has been revised to perfect the products so it was decent to be tested. 5) The small scale stest to examine the model draft whether it was accepted by the respondent by using questionnaires to collect the data. The data obtained will be a revision to the further test stage. 6) The big-scale test was conducted similarly to the previous, the difference was in the quantity of the samples. After through various processes of design, then 7) it was composed in the form of practical guidance which contained preparation guidance, the implementation and model evaluation in the form of guidebook. 8) The effectivity test was the

further test on the product (ULIN massage model) to see the achievement of stress relieving on female exercisers (16) (Laws et al, 2013).

Instruments

Depression Anxiety and Stress Scale (DASS) questionnaire Depression, Anxiety and Stress Scale is containing of 42 questions and tree self-report scale to assess the negative emotional state. Each of the depression, anxiety and stress scales are contains of 14 items. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of involvement, anhedonia, and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The Stress scale assesses the levels of chronic non-specific arousal. Gamma coefficients that represent the loading of each scale on the overall factor (total score) are 0.81 for depression, 0.84 for anxiety, and 0.77 for stress. Reliability of the three scales is considered adequate and test-retest reliability is likewise considered adequate with 0.76 for depression, 0.80 for anxiety and 0.82 for stress (15). However, this study focused on how the massage therapy that was developed able to relieve stress for female exercisers and consisted of 14 questions with three rating scales (1-4). Score 1 means respondent did not apply to me at all, score 2 applied to respondent to some degree, or some of the time, score 3 applied to respondent to a considerable degree or a good part of time, and score 4 applied to respondent very much or most of the time (16).

Statistical Analysis

The data collected from the instruments were analyzed to examine the relationships between dependent and independent variables. The high values of Cronbach's alpha suggested that the instruments had good reliability level and a good internal consistency of the scales. This means that the items within each scale are closely related and consistently measure the same construct. For investigating the influence of workload to fatigue and sleep quality, data analysed using path coefficient analysis. Furthermore, the inter-item correlation matrix provided insights into the relationships between the variables. Direct and indirect associations among variables were examined to evaluate a model by proposing a predetermined set of relationships based on theoretical, empirical, and

general knowledge. All data analyses were conducted using the SPSS software.

Table 1. Grid of Feasibility Test Instrument for Therapy & Health Experts

Aspect	Indicator	Sub Indicator
Therapy and Health	Theory	Movement therapy
		Principles of practice
	Benefits and Purpose	Safety to move
		Ease of movement
The practicality of doing the move		
		Overall modification

Types of initial data obtained on study this was qualitative data and quantitative data. Instrument in study this that was use test validity from expert Theory with sheet validation. Test try scale small and test try scale big use sheet questionnaire while quantitative data obtained in the effectiveness test with do it *pretest* and *posttest* on stress. The validation questionnaire sheet aims to measure the model developed. This assessment questionnaire sheet uses a Likert scale with 4 alternative choices, namely Very Good, Good, Fairly Good and Poor. The instrument grid for therapy and health experts presented in Table 1. The instrument used by media experts was viewed from the aspect of image, video, and narrative with three indicators, six sub indicators in 10 questions. The instrument grid for material experts presented in Table 2.

Table 2. Grid of Feasibility Test Instrument for Media Video Experts

Aspect	Indicator	Sub Indicator
Media Video	Image	Represent the information
		Image quality
	Video	Represent the information
Video quality		
Narrative	Narrative	Narrative accuracy
		Use the clear letters

The instrument trial was carried out on a small scales test of 25 people and a large scales trial of 50 people, this trial was reviewed from the material aspect and video quality by answering 10 questions presented in Table 3.

Table 3. Grid of Feasibility Test Instrument for Trial Test

Aspect	Indicator	Sub Indicator
Ulin Massage Model	Theory	Movement therapy
		Principles of practice
	Video	Narrative accuracy
		Image quality
	Benefits and Purpose	Safety to move
		Ease of movement
The practicality of doing the move		
Overall modification		

The data obtained at the expert validation stage, small-scale trials, and large-scale trials were in the form of very poor, good enough, good, and very good statements which are converted into quantitative data on a scale of 4, namely with a score from 1 to 4. The steps in data analysis include: (a) collecting rough data, (b) scoring, (c) the scores obtained are then converted into qualitative data. Whereas quantitative data from *pretest* and *posttest* on stress. Test the effectiveness of the product using the experimental method one group pretest posttest. For analyze the data used test n on parametric *wilcoxon signed rank test* with using a significance level of 5% obtained probability value (p) that can be used to prove the hypothesis that there was or was not a significant effect. The results of the data show a significant difference if the p value <0.05. The clearer criteria can be seen in Table 4.

Table 4. Categorization of Validation Score

Formula	Category
$X < (\mu - 1.0\sigma)$	Low
$(\mu - 1.0\sigma) X < (\mu + 1.0\sigma)$	Moderate
$(\mu + 1.0\sigma) X$	High

Source: Sudijono (2012)

Information:

X = number score subject.

$$\text{ideal mean} = [(X \times 4) + (X \times 1)]$$

$$\text{standard deviation} = 1/6 [(X \times 4) - (X \times 1)]$$

3. Result and Dicsussion

Product Development

Product assessment begins with the validation stage. The validation of the ULIN massage model for female exercisers to relieve stress was carried out by 3 experts. The validation data from therapy expert, healthy expert and media expert was listed in Table 5.

Table 5. The Result of Expert's Validation

Validator	Score	Maximum Score	Percentage	Category
Therapy Expert	34	40	85%	High
Health Expert	35	40	87.5%	High
Media Expert	33	40	82.5%	High
Total	102	120	85%	High

The initial draft of the ULIN massage model for female exercisers to relieve stree was validated. Based on the results of the assessment of experts on the initial draft of the ULIN massage model, all questionnaire items received a good rating, the data obtained was then entered into the good category. The validation data from the experts showed a total value of more than 80 percents which means the ULIN massage model with massage for female exercisers is in the high category. However, the results of this expert validation still need to be improved. The health expert's rating scale on items about safety, comfort, and practicality got a score of 4 or in the very good category. The scores on the items of ease, accuracy and modification overall get good categories, while the items on clarity of orders and duration of handling time were still in the good enough category. This shows the lack of clarity of orders on each treatment item, both massage therapy and exercise therapy. The items of duration and time have not been listed for each item of handling so that with time, the overall duration of handling can be known. Input data and suggestions on the validation of health sports experts include: increasing the intensity of treatment and adding exercise motion.

The validation of the ULIN massage model for female exercisers to relieve stress was forwarded to media experts. Based on the results of the

media expert's rating scale assessment of the initial draft of ULIN massage therapy model was included in the category norm. The validation data from the material expert shows a total value of 33 which means that ULIN massage was in the high category. Getting a score in terms of letter accuracy and ease of understanding on the video gets a score of 4 in the very good category. Screen quality assessment items, narration, music, colour and overall presentation got a score of 3 or good category. The lowest score on image quality and volume of narration with a fairly good value category. This makes the improvements made by researchers as material for revision in product improvement. The quality on some screens was still not good and the volume is still not adjusted. After the experts read the draft and observe the implementation of the model through the media, the experts then write suggestions for improvement on the suggestion sheet. The following are various inputs can be seen in Table 6.

Table 6. Suggestion and Advise from the Experts

Validator	Suggestion and advise
Expert 1	The unit of time is attached in the time instruction of each therapy to calculate the effectiveness.
Expert 2	Adding the intensity description and duration and purpose of massage therapy and exercise therapy. Adding the rolling move and pronation/supination.
Expert 3	The high and low narration volume is adjusted to make the clear sound. The quality of the pictures should be improved to make better vision.

There were several inputs from experts on the draft of developing a ULIN massage model for female exercisers to relieve stree. The input from expert 1 that ULIN massage could be in simple procedure. The purpose of this input was to make time efficiency. The input from expert 2, the implementation program, include the intensity of handling. The purpose of increasing the intensity was so that the subject knows the intensity of each treatment, for example in flexibility exercise therapy with low intensity but moderate-intensity strength training with resistance. The input from expert 3, the zoomed-in image on the video looks unclear and blurry. Researchers should take pictures by bringing the camera closer to the display so that the image quality was still good if the magnification was still not appropriate. In addition, another input was the volume of the

narration. This means that the entire volume of the narration must be adjusted so that the sound level was the same from the beginning to the end of the video.

After receiving validation from experts and making improvements according to input from experts, the researchers conducted a small-scale test of the draft ULIN massage model to relieve stress, with 25 female exercisers. These respondents were instructed to provide an assessment toward video of ULIN massage procedure at their respective homes according to the instructions in the guidebook. After small-scale test and product revisions have been carried out, then proceed to large-scale test. A large-scale test was carried out on Mei 2024 at the Massage Laboratory, Cosmetology Study Program, Universitas Negeri Yogyakarta, Wates. Then, subjects were given a questionnaire in response to the product. After filling out the questionnaire of complaints experienced, the subject also filled out a questionnaire related to aspects of the product being developed. Based on the assessment of the large-scale test of the product, all questionnaire items from the respondents received a good rating and there was an increasing percentage from expert validation tests, as well as small- scale tests as presented in Table 7.

Table 7. Respondent Assessment of Product ULIN Massage

Respondent	N	Mean	SD	Percentage	Category
Small Scale Test	25	3.2	0.4640	82.5%	High
Field Scale Test	50	3.6	0.4611	87.5%	High

In the large-scale test, the suggestions were obtained as product improvements, including packaging improvements. Overall, the final product is packaged properly and easy to be implemented in daily life. The second wish is to add a video of movement manipulation techniques, as an example of a basic explanation of effleurage, petrissage and friction movements. The results of the data analysis above describe the feasibility of the product being developed. In general, the validator gets a good assessment of the product. From the respondents' point of view, the product was very helpful in relieving stress. After the feasibility test was

complete then the product will be tested for effectiveness on 50 female exercisers as the field testing.

The Effectiveness of ULIN Massage

The product effectiveness test was carried out after the product test was completed and revised according to the suggestions and input from the product test. The effectiveness test was carried out at the Physical Therapy Clinic, Faculty of Sport Science. Pretest data collection was carried out on April 2024, totalling 50 people.

Table 8. Data Analysis of Stress

Data	Mean	SD	N-Gain	Significancy (p<0.05)	Category	Effectivity (%)
Pre Test	52.32	2.92	0.9	0.003	Significant	66.32
Post Test	17.62	2.54				

After taking pre-test data, the 50 female exercisers were given treatment ULIN massage and then they were expected to give assessment to the ULIN massage video according to the instructions in the guidebook. The post-test was conducted on May 2024, after the respondents had ULIN massage model for 3 times. The results of the calculation of stress from 50 female exercisers could be seen in Table 8.

The test results obtained that ULIN massage models were stated to be significant with $p < 0.05$, so this model is effective for the management of stress. In other words, the experimental group by participate in ULIN massage therapy sessions enjoyed of these benefits for decrease of stress signs. These results were consistent with the findings of Moyer et al (2004) ⁽¹⁾. Physical contact has a very important role in reducing stress. During the massage there is contact between body of massage client and masseur hands. Hemmings et al (2000), studied the effects of massage on both physiologic and perceived recovery in eight amateur boxers (17). The investigators designed a testing protocol to examine if massage performed between bouts of simulated boxing matches would help to improve physiologic variables such as heart rates and blood lactate and glucose levels, performance, and the athlete's perception of recovery. These findings provide some support for the psychological benefits of massage, and Moraska (2005) was review sport massage researches and

results from published literature supported of massage to benefit athletic recovery and performance (18).

From the results obtained, the massage therapy model uses a combination of manipulation with friction techniques, effleurage techniques, suppression (petrissage) for muscle relaxation (19). This movement was carried out independently so that it was safe and comfortable to handle because the massage pressure and withdrawal during joint repositioning can be controlled independently. The massage therapy model consists of 10 massage movements. This is reinforced by the research by Madenci et al (2012) which explains that massage therapy treatment that is done independently has been proven to be significantly (p -value <0.05) in relieving stress (19).

The process of stress-relieving female exercisers from overload activities needs massage therapy treatment. The development of this product focuses on how the ULIN massage model can relieve the stress of female exercisers who have an overload activities. This therapy was used to increase muscle strength by receiving a given resistance, which triggers the dopamine hormone. This can be proven from the results of product development effectiveness tests that have been carried out by testing the effectiveness of the ULIN massage model on female exercisers through the pre-test and post-test stages and processing them using SPSS to obtain significant effectiveness values. Based on the explanation above, the ULIN massage model was feasible in terms of accuracy, safety, convenience, and comfort and was effective in relieving stress. This explains why the product developed by the researcher can be accepted as a form of stress relief. The final product of this development research is in the form of guiding books and a video ULIN massage model.

4. Conclusion

The validation and testing of the ULIN massage model for female exercisers to relieve stress demonstrated promising results. Initial validation by experts in therapy, health, and media rated the model highly, although suggestions for improvement were provided. These included adding intensity descriptions, improving video quality, and adjusting narration volume. Subsequent small- and large-scale tests with participants showed high satisfaction and effectiveness, with the large-scale test further refining the product based on feedback. The

effectiveness test conducted on 50 female exercisers revealed a significant reduction in stress levels, with the ULIN massage model proving effective in managing stress. The final product, comprising guiding books and instructional videos, was deemed accurate, safe, convenient, and comfortable, making it a viable solution for stress relief through self-administered massage and exercise therapy.

5. Reference

1. Moyer CA, Rounds J, Hannum JW. (2004). A meta-analysis of massage therapy research. *Psychological bulletin*, 130(1), 31-40.
2. Weerapong P, Kolt GS. (2005). The mechanisms of massage and effects on performance, muscle recovery and injury prevention. *Sports Medicine*, 35(3), 235-256
3. Field T, Hernandez-Reif M, Diego M, Schanberg S, Kuhn C. (2005). Cortisol decreases and serotonin and dopamine increase following massage therapy. *International Journal of Neuroscience*, 115(10), 1397-1413
4. Sherman KJ, Cherkin DC, Kahn J, Erro J, Hrbek A, Deyo RA, Eisenberg DM. (2005). A survey of training and practice patterns of massage therapists in two US states. *BMC Complementary and Alternative Medicine*, 5(1), 13.
5. Hou WH, Chiang PT, Hsu TY, Chiu SY, Yen YC. (2010). Treatment effects of massage therapy in depressed people: a meta-analysis. *The Journal of clinical psychiatry*, 71(7), 894-901.
6. Seyed MZ, Ehsan A, Ahmad EA, Amir R, Abolfazl S. (2015). The effect of massage therapy on depression, anxiety and stress in adolescent wrestlers. *International Journal of Sport Studies*, 5(3), 321-327.
7. Sarah B and John D. (2002). Therapeutic Massage as a Therapeutic Recreation Facilitation Technique. *Therapeutic Recreation Journal*, 36(4), 369-381.
8. Brownlee S, Dattilo J, 2002. Therapeutic massage as a therapeutic recreation facilitation technique. *Therapeutic Recreation Journal*, 36(4), 369-381. anxiety
9. Presiden Republik Indonesia. (2005). *Undang-Undang Republik Indonesia Nomor 3 Tahun 2005 Tentang Sistem Keolahragaan Nasional*. Indonesia.
10. Subdirektorat Statistik Ketenagakerjaan. (2019). *Labor Force Situation in Indonesia February 2019*. Jakarta. <https://doi.org/10.21002/jepi.2019.09>.
11. Beers T. (2017). Flexible schedules and shift work: replacing the “9-to-5” workday. Bureau of Labor Statistics, U.S. Department of Labor. *Mon Labor Rev*, 2(1), 33–40.

12. Ananda DE & Mustopa. (2023). Hubungan Shift Kerja, Lingkungan Fisik Kerja dan Beban Kerja dengan Kelelahan Kerja Karyawan Bagian Produksi di PT. Medifarma Tahun 2022. *Jurnal Kesehatan dan Kedokteran*, 2(1),76–82. <https://doi.org/10.56127/jukeke.v2i1.604>.
13. Fondy, T. (2016). *Sport Massage; Panduan Praktis Merawat dan Mereposisi Cedera Tubuh*. Jakarta: PT Gramedia Pustaka Utama.
14. Arovah, NI. (2009). *Diagnosis dan manajemen cedera olahraga*. Yogyakarta: FIK UNY.
15. Lovibond PF, Lovibond SH. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour research and therapy*, 33(3), 335-343.
16. Brown SJ, Child RB, Day SH, & Donnelly AE. (1997). Exercise-induced skeletal muscle damage and adaptation following repeated bouts of eccentric muscle contractions. *Journal of sports sciences*, 15(2), 215-222.
17. Hemmings B, Smith M, Graydon J, Dyson R. (2000). Effects of massage on physiological restoration, perceived recovery, and repeated sports performance. *British journal of sports medicine*, 34(2), 109-114.
18. Moraska A. (2005). Sports massage: a comprehensive review. *J Sports Med Phys Fitness*, 45(3), 370-380.
19. Harsanti S & Graha AS. (2014). Efektifitas Terapi Masase dan Terapi Latihan Pembebanan dalam Meningkatkan Range of Movement pasca Cedera Ankle Ringan. *Medikora*, 2(1), 23-32.

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