Influence of myofascial release technique toward changes in pain level among non-specific low back pain patients

Muhammad Sawali¹, Djohan Aras¹, Nurhikmawaty¹
¹Physiotherapy Study Program, Faculty of Medicine, Hasanuddin University, Makassar
nurhikmawatyhasbiah@med.unhas.ac.id

Abstract. Non-specific low back pain is a condition causes pain in the lower back that cannot be found in a specific disorder included mechanical pain, joint pain, postural pain, muscle strain, ligament sprain and muscle spasm. This study aims to determine the effect of myofascial release technique toward changes in pain level in non-specific low back pain patients. The study was used quasi-experimental design using time-series experimental design. The study population were all non-specific low back pain patients seeking treatment at Physiotherapy Poli of Bontang Hospital. The samples were 20 patients who met the inclusion criteria. The data was analysed using Wilcoxon test with SPSS program. The result showed that highest number of non-specific low back pain patients were aged ≥45 years old. The study also showed changes in pain level on post-test 1 and post-test 2 was high than pre-test. The pain level before and after given Myofascial Release Technique showed significant changes with pre-post 1 and pre-test 2= 0.000 with 95% confidence level. Based on Wilcoxon test with pre-post 1 and pre-post 2=0.000<0.05 had shown there was an effect of Myofascial Release Technique on changes in the pain level with non-specific low back pain.

1. Introduction
The low back pain is defined as pain in the lumbar or gluteal region with or without radicular pain to the lower extremities [1]. The low back pain (LBP) among cause of disability globally and affected nearly 80% of adult population in their lives times [2,3,4]. Nonspecific LBP is a condition causes lower back pain which cannot be found in specific diseases such as cancer, nerve irritation, fracture and infection. In additions, non-specific LBP are included with mechanical pain, joint and postural pain, muscle strain, ligament sprain and muscle spasm [5].

Pransky et al. found low back pain prevalence increased five times over period of 15 years [6]. Meanwhile, the prevalence of low back pain in men is 8.2% and 13.6% of women in Jawa island. The low back pain prevalence in Bontang regional is 47% which dominated by 59.6% of women. The pain can occur in non-specific low back pain patients due to changes in tissue structure in lumbar region that stimulates the pain receptors in the body and given signal to the brain perception.

The pain is cause by interference with the fascia and decreased nociceptor activation. The fascia is connective tissue layer surrounding muscle, bone, vein, nerve and organ within the body. Myofascial release technique is therapeutic manual on Myofascial which expected to improve fascial. The ability of fascial movement enhancement have impact on the improvement surrounding tissue movement [7].
MacDonald et al. (2014) stated Myofascial release technique (MRT) is capable of lowering pain in muscle injury [8]. Castro-Sanchez et al. (2011) found MRT can be complementary treatment for pain relief [9]. In additions, Ajimsha et al. (2013) stated effective MRT to reduce pain in chronic low back pain [10]. This study aims to determine the effect of myofascial release technique toward changes in pain level in non-specific low back pain patients.

2. Methodology
The study was conducted at Bontang Regional General Hospital. This location was selected due to socioeconomic background of respondents. The study used quasi-experimental research with time-series experimental.

The study population were all non-specific low back pain patients undergone the treatment at Bontang Regional General Hospital. There were 20 samples who met the inclusion criteria and willing to be respondents in this study.

The data was collected through primary data and used normality test with SPSS program. Besides, the Wilcoxon test also used for not normally distributed. The data was represented in form of tables and narratives.

3. Result and Discussion

3.1. Result
In Table 1, there were 13 respondents (65%) aged more than 45 years old and 7 respondents (35%) were aged less than 45 years old. Meanwhile, 10 male respondents (50%) and 10 female respondents (50%) had involved in this study. In additions, 8 respondents (40%) were housewives and 7 respondents (35%) were retired. There were 14 respondents (70%) had body weight less than 60 kg and 6 respondents (30%) had body weight more than 60 kg.

| Characteristic | F  | %   |
|----------------|----|-----|
| Age            |    |     |
| <45 years old  | 7  | 35  |
| ≥45 years old  | 13 | 65  |
| Gender         |    |     |
| Male           | 10 | 50  |
| Female         | 10 | 50  |
| Employment     |    |     |
| Teacher        | 1  | 5   |
| Housewives     | 8  | 40  |
| University student | 1  | 5   |
| Operator       | 2  | 10  |
| School student | 1  | 5   |
| Retired        | 7  | 35  |
| Body weight    |    |     |
| <60 kg         | 14 | 70  |
| ≥60 kg         | 6  | 30  |

Meanwhile, normality test showed pre-test, post-test 1 and post-test 2 obtained significant value $p=0.000 < 0.05$, $p=0.009 < 0.05$ and $p=0.012 < 0.05$. 

Table 1. Respondents characteristics distribution.
Table 2. Normality test.

| VAS       | Shapiro-Wilk Statistic | df  | Sig. |
|-----------|------------------------|-----|------|
| Pre-test  | 0.780                  | 20  | 0.000|
| Post-test 1 | 0.864                 | 20  | 0.009|
| Post-test 2 | 0.870                 | 20  | 0.012|

Table 3 shows that pre-test had obtained mean of 5.30 with standard deviation of 0.657. Minimum and maximum of pre-test were 4 and 6. In additions, post-test 1 had mean of 3.15 with standard deviation of 0.813. The mean and standard deviation of post-test 2 were 1.30 and 0.831. The minimum and maximum of post-test 1 were 2 and 5.

Table 3. Statistic descriptive.

| VAS       | Mean | Standard deviation | Minimum | Maximum |
|-----------|------|--------------------|---------|---------|
| Pre-test  | 5.30 | 0.657              | 4       | 6       |
| Post-test 1 | 3.15 | 0.813              | 2       | 5       |
| Post-test 2 | 1.30 | 0.801              | 0       | 3       |

Furthermore, Wilcoxon test showed negative ranks on all sampled with mean rank 10.50 and sum of ranks of 210.00.

Table 4. Wilcoxon Signed Ranks.

| N                  | Sum of ranks |
|--------------------|--------------|
| Post-test1-Pre-test | 20^a         | 10.50        | 210.00    |
| Post-test 2-Pre-test | 0^b         | 0.00        | 0.00      |
| Ties               | 0^c          |             |           |
| Total              | 20           |             |           |

The statistical test showed significant correlation in pre-post 1 and pre-post 2 with significance value of $p=0.000<0.05$.

Table 5. Statistical test.

|                  | Pre-post 1 | Pre-post 2 |
|------------------|------------|------------|
| Z                | -4.011     | -4.088     |
| Asymp Sig. (2-tailed) | 0.000     | 0.000     |

Table 6 shows that the pre-test had minimum and maximum of 4 and 6. There was significant correlation between pre-test and post-test with $p=0.005<0.05$. The post-test 1 and post-test 2 had median of 3.15 and 1.30. Meanwhile, there was influence between pre-test and post-test 2, $p=0.000<0.05$. The minimum and maximum in post-test 1 were 2 and 5, while post-test 2 had minimum and maximum of 0 and 3.
Table 6. Influence test.

| VAS     | Minimum | Maximum | Median | Sig. |
|---------|---------|---------|--------|------|
| Pre-test | 4       | 6       | 5.30   | 0.005 |
| Post-test1 | 2       | 5       | 3.15   |       |
| Pre-test | 4       | 6       | 5.30   | 0.000 |
| Post-test2 | 0       | 3       | 1.30   |       |

3.2. Discussion
Non-specific low back pain included mechanical pain, joint and postural pain, muscle strain, ligament sprain and muscle spasm [5]. In this study, number of respondents suffered non-specific low back pain was aged 45 years. The result suggested low back pain usually occurred between 20 years and 40 years age and will re-appeared in age between 40 years old and 80 years old and increased with age [6,11].

The gender distribution did not explain that more male respondents than women or vice versa. There was equal number of male respondents and female respondents in this study. In previous study also found uncertainty on number of respondents based on gender [6,12].

In additions, 6 times of Myofascial release technique was more effective than 3 times of Myofascial release technique. The decrease in pain among respondents due to effect of Myofascial release technique given to the elongation so the restrictive could be corrected and prevented. The release of adhesion resulted in the improvement of physiological nature of Myofascial in form of increased metabolism that stimulated circulation (increased metabolism reaction0, fibroelastic activation in the healing process. Hence, increment viscoelasticity of Myofascial, inhibiting Acetylcholine and cell transmitter, decreased interleukin and parasympathetic activation which lead to decrease in pain level. Thus, similar to the fact that effect from above can reduce the pain level [13-15].

4. Conclusion
In conclusion, there was effect of Myofascial Release technique on changes of pain level among non-specific low back pain patients. The Myofascial Release technique had reduced pain level before and after given Myofascial Release technique of 3 times and 6 times. In additions. 6 times of Myofascial Release technique was more effectiveness than 3 times of Myofascial Release technique in reducing pain levels among non-specific lower back pain patients.

References
[1] Mattila, V. M., Kyröläinen, H., Santtila, M., & Pihlajamäki, H. (2017). Low back pain during military service predicts low back pain later in life. *PLoS ONE*, 12(3), e0173568. doi: 10.1371/journal.pone.173568
[2] Chou, L. et al. (2018). People with low back pain perceive needs for non-biomedical services in workplace, financial, social and household domains: a systematic review. *Journal of Physiotherapy*, 64(2018), 74-83. doi: https://doi.org/10.1016/j.jphys.2018.02.011
[3] Sheeran, L., Coales, P., & Sprakes, V. (2015). Clinical challenges of classification based targeted therapies for non-specific low pain: what do physiotherapy practitioners and managers think? *Manual Therapy*, 20(2015), 456-462. doi: http://dx.doi.org/10.1016/j.math.2014.11.008
[4] Castro-Sánchez, A.M., Lara-Palomo, I.C., Matarán-Peñarrocha, G.A., Fernández-Sánchez, M., Sánchez-Labraca, N., & Arroyo-Morales, M. (2012). Kinesio taping reduces disability and pain slightly in chronic non-specific low back pain: a randomised trial. *Journal of Physiotherapy*, 58, 89-95.
[5] Balaquè, F., Mannion, A. F., Pellisé, F., & Cedraschi, C. (2012). Non-specific low back pain.
[6] Pransky, G., Borkan, J.M., & Bart, W. (2013). Primary care research on low back pain. *Journal of Spine*, 38, 148-156.

[7] Aboodarda, S.J., Spence, A. J., & Button, D. C. (2015). Pain pressure threshold of a muscle tender spot increases following local and non-local rolling massage. *BMC Musculoskeletal Disorder*, 16, 265.

[8] Macdonald, G.Z., Button, D.C., Drinkwater, E. J., & Behm, D.G. (2014). Foam rolling as a recovery tool after an intense bout of physical activity. *Medicine and Science in Sport and Exercise*, 46(1), 131-142.

[9] Castro-Sánchez, A. M. (2011). Benefits of massage-myofascial release therapy on pain, anxiety, quality of sleep, depression, and quality of life in patients with fibromyalgia. *Evidence-based Complementary and Alternative Medicine*, 2011.

[10] Ajimsha, M.S., Daniel, B., & Chithra, S. (2014). Effectiveness of myofascial release in the management of chronic low back pain in nursing professionals. *Journal of Bodywork and Movement Therapies*, 18(2), 273-281.

[11] Casazza, B.A. (2012). Diagnosis and treatment of acute low back pain. *American Family Physician*, 85(4), 343-350.

[12] Lim, S. S. et al. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 380(9859), 2224-2460.

[13] Werenski, J. (2011). The effectiveness of Myofascial release technique in the treatment of Myofascial pain. *Journal of Musculoskeletal Pain*, 23, 2735.

[14] Meltzer, K.R., Cao, T.V., Schad, J.F., King, H., Stoll, S.T., & Standley, P. C. (2010). In vitro modelling of repetitive motion injury and myofascial release. *Journal of Bodywork and Movement Therapies*, 14(2), 162-171.

[15] Standley, P.R., & Meltzer, K. (20080. In vitro modelling of repetitive motion strain and manual medicine treatments: potential roles for pro-and anti-inflammatory cytokines. *Journal of Bodywork and Movement Therapies*, 12(3), 201-203.

*Lancet*, 379(9814), 482-491.