Effect of neural mobilization on pain level changes among myogenic low back pain patients

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Abstract. Low back pain is pain syndrome that occurs in lower back region which result of various causes due to wrong body position and repetitive motion. Neural mobilization is physiotherapy modality that aims to improve the neural tissue mobility (intraneural) and movement on the neural surface (extraneural). The study aims to determine the effect of neural mobilization toward changes in pain level among Myogenic low back pain patients. The study was used quasi experimental with experimental time series research design. The study was conducted at Bitung Hospital from April to May 2017. The samples were 20 patients who met the inclusion criteria. The paired t-test obtained pre-test and post-test with 3 times treatment was p=0.000 and pre-test and post-test with 6 times treatment had obtained p=0.000. These results suggested both 3 times and 6 times of treatment had an effect on the pain level. Mean of pre-test was 67.35, mean of post-test of 3 times treatments was 58.15 and mean of post-test with 6 times treatment was 45.75. Difference mean of pre-test and post-test with 3 times treatment was 9.2 and different mean of 3 times and 6 times treatment was 12.4. This study showed higher frequency of neural mobilization , decrease in the pain level which more significant for patients with low back pain.

1. Introduction
Low back pain is defined the pain location between lower back region which included the buttock creases [1,2]. Chronic low back pain is impact toward personal, social and economic and low back pain is leading cause of years lived with disability [3]. The low back pain had clinical classified into three categories such as specific spinal pathology, radicular pain and non-specific low bac pain [4]. According Indonesian Neuroscientific Association (PERDOSSI), there were 4,456 people (25% of total hospital visits) where 89 people (18.37%) had suffered low back pain. In North Sulawesi, 200 patients with low back pain visited at physiotherapy clinic in Bitung Hospital.

Nerve mobilization with slump technique method is handling pain method in low back pain which aims to restore mobility of nerve tissue and movement around nerve surface (mechanical interface), reducing the pressure that occurs on the nerves which restore the nerve function. The blow flow increase which reduce nociceptive impulse and release adhesions of nerve tissue and surrounding connective tissue [5]. Based on these considerations, the study aims to determine the effect of neural mobilization toward changes in pain level among Myogenic low back pain patients.
2. Methodology
The study was carried out at Bitung Hospital from April 2017 to May 2017. The study was used quasi-experimental with time-series design research design. The study population were all low back pain patients who had treatment at Bitung Hospital. The samples were 20 patients who met the inclusion criteria such as patients with positive slump test result and willing to be respondents.

Data was collected through primary data using Visual Analogue Scale (VAS) which performed 3 times which pain level measurement taken during pre-test and after 3 times and 6 times treatments. The data was analysed using Shapiro-Wilk test and paired t-test with SPSS program. The data was represented in form of table and narratives.

3. Result and Discussion

3.1. Result
Table 1 shows that 9 respondents (45%) were aged between 50 years and 59 years old and 5 respondents were aged between 30 years and 39 years. Meanwhile, there were 12 female respondents (60%) and 8 male respondents involved in this study. In additions, 9 respondents (45%) were civil servant and 3 respondents (15%) were teachers. There were 13 respondents (65%) had body weight above 60 kg and 7 respondents had body weight under 60 kg.

| Characteristics        | N  | %    |
|------------------------|----|------|
| Age (years)            |    |      |
| 30-39                  | 5  | 20   |
| 40-49                  | 6  | 30   |
| 50-59                  | 9  | 45   |
| Total                  | 20 | 100  |
| Gender                 |    |      |
| Male                   | 8  | 40   |
| Female                 | 12 | 60   |
| Total                  | 20 | 100  |
| Employment             |    |      |
| Teacher                | 3  | 15   |
| Housewives             | 2  | 10   |
| Trader                 | 1  | 5    |
| Private employee       |    |      |
| Retired                | 1  | 5    |
| Civil servant          | 9  | 45   |
| Farmer                 | 1  | 5    |
| Total                  | 20 | 100  |
| Body weight            |    |      |
| Under 60 kg            | 7  | 35   |
| Above 60 kg            | 13 | 65   |
| Total                  | 20 | 100  |

There were 9 respondents (45%) had strong pain level and 11 respondents (55%) had medium pain level during pre-test. In post-test 1, 17 respondents (85%) had medium pain and 3 respondents (15%) had low pain during post-test 1. In post-test 2, there were 13 respondents (65%) had low pain and 7 respondents (35%) had medium pain.
Table 2. Pain level distribution before and after given nerve mobilization.

| VAS          | Strong pain | Medium pain | Low pain |
|--------------|-------------|-------------|----------|
| Pre-test     | N(45)       | N(55)       | N(0)     |
| Post-test 1  | 0(0)        | 17(85)      | 3(15)    |
| Post-test 2  | 0(0)        | 7(35)       | 13(65)   |

Table 3 shows that pre-test had minimum and maximum of 55 and 79 with mean of 67.35. The post-test 1 had mean of 58.15 with standard deviation of 58.15. The minimum and maximum were 32 and 58 for post-test 1. Meanwhile, post-test 2 had mean of 45.74 with standard deviation of 7.340. The statistical test showed there was significant different between pre-test and post 1 toward pain level among myogenic low back patients, p=0.000. In additions, there was significant different between pre-test and post-test 2 toward pain level with p=0.000. The difference mean between pre-test and post-test 1 was 9.2 and pre-test and post-test 2 was 12.4.

Table 3. Effect of giving slump technique toward pain level.

| VAS          | Minimum-maximum | Mean±SD      | P*   | Difference mean |
|--------------|------------------|--------------|------|-----------------|
| Pre-test     | 55-79            | 67.35±7.081  |      |                 |
| Post-test 1  | 47-68            | 58.15±6.604  | 0.000| 9.2             |
| Post-test 2  | 32-58            | 45.75±7.340  | 0.000| 12.4            |

3.2. Discussion

In this study, the highest number of respondent had age range between 50 years and 59 years which elder people had high exposed with low back pain because ability to control muscles and spinal tissue decreased with age. Furthermore, majority respondents were female with total of 12 respondents (60%) since differences in both muscle tissue structure in men than female. Besides, the body weight also affected low back pain especially high body weight had more risk than less body weight in experienced low back pain [6].

In additions, this study found highest number of respondents were worked as civil servant since need to sit with static body position for long time. The bad body position for long time also resulted low back pain. In this study, there was significant correlated of nerve mobilization toward changes in the pain level. This result also found mean in pre-test and post -test 1 was decreased from 67.35 to 58.15 after 3 times treatment and decreased to 45.75 after 6 treatments.

Cleland et al. (2005) stated neural mobilization had significant effect in reducing the pain level in non-radicular low back pain [7]. Besides, difference mean of pre-test and after given 3 times treatment was 9.2 and after 6 times treatment was 21.6. These results showed higher nerve mobilization frequency lead more significant reduction in the pain level. Sarkari et al. (2007) found high nerve mobilization frequency had significant effect toward pain level among low back pain patients [8].

The incorrect position during moving or doing activities can cause low back pain. The long back muscles contraction caused ligament can stretch out excessively lead the muscles becoming spasm and stiffness in the vertebral canal. An effect on neutral network which neural network decreased in the elasticity. In additions, blood vessel flow in the muscles and nerve tissue become blocked and impaired blood flow resulted in reduced oxygenation tissue and decreased nutrient distribution to the muscles and nerves.

The neural mobilization was physiotherapy handling methods that focused on improving the neural network elasticity and tissue around the nerves. The neural mobilization served to extend the muscles in the lower back which muscle spasm decreased and followed by reduced emphasis on the neural
network. The gross movement restored between neural tissue with surrounding muscle tissue lead normal with the nerve elasticity.

4. Conclusion
In conclusion, more effective toward pain level among low back pain patients with more nerve mobilization frequency. The physiotherapist in the hospital can choose nerve mobilization modality to reduce pain in the myogenic low back pain patients.

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