THE EFFECTIVENESS OF THE MC. KENZIE EXTENSION METHOD ON THE LOW BACK PAIN IN ELDERLY

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ABSTRACT

Introduction. There are many changes happened because aging to the musculoskeletal system, some of them are limitedness movement, muscle stiffen and finally cause low back pain. One of the nurse intervention to reduce low back pain (LBP) is doing back exercise: Mc. Kenzie Extension Exercise Method. The aim of this study was to evaluate the effect of Mc. Kenzie Extension Exercise to elderly with the low back pain in Hisosu Binjai Resident Home. Method. The research design was quasi experiment with the pre –post test group approach. The sample of this study were recruited with consecutive sampling as much as 28 people. This study used The Pain Numerical Rating Scale to evaluate levels of pain intensity perceived by the patient. The data was analyzed by Paired sample t-test with significance α <0.05. Result. The study found that there was significant differences of the low back pain (p< 0.05). The results of this study will contribute to better management of this population. In addition, compare the other back exercise include William Flexion of elderly in Hisosu Binjai Resident Home is recommended.

Key words: back exercise, elderly, low back pain, mc. kenzie extension

INTRODUCTION

The process of aging could be caused physical problems such as physically-biologically, mentally, economically and socially. A variety of change in elderly occurred on a musculoskeletal system, include porous bones (osteoarthritis), enlargement of joints, shift a tendon, limited motion, depletion of intervertebral discuss and muscular weakness that happened on aging process.

The bone reached its peak in age of 35 years, after it happened, bone losses thorough gradually. In the elderly, the structure of collagen less able to absorb the energy. So muscle does and power also reduced. Loss occurs the number of muscle fiber due to atrofimiofibril with the replacement of tissue fibrous that start to develop in the life in the fourth (Smeltzer, et al. 2013).

One of the problems that often occurs in elderly is the low back pain (Bandiyah, 2009). Approximately 11.0 %, the elderly lessen their physical activities after pension, although daily activity need many muscles. We often met in the community parents who have elderly prefer was in the house care grandchild than exercise, because they assumed that exercises spent many times.

Overall they are fear if the exercise will result in pain even worse due to the bone is not as strong as before.

According to Borenstein (2001); Hoogendoorn et al., (2000) stated that many risk factors that caused the low back pain such as the worker who spent all their time by interesting duty, holder and lift up heavy goods, smoker, obesity and activities which often do by sitting, and this factor will be influenced by aging process.

Low back pain (LBP), perhaps more accurately called lumbago or lumbosacral pain, occurs below the 12th rib and above the gluteal folds. LBP is one of the most common health problems all over the world (Waheed A, 2003; Sakiru & Hanifa, 2010).

Low back pain can be caused by a variety of problems with any parts of the complex, interconnected network of spinal muscles, nerves, bones, discs or tendons in the lumbar spine. Among changes in lumbar spine structures, age-related to degeneration of intervertebral disk cartilages and intervertebral joints are common causes of low back pain. Pain may be underreported because some elderly patients incorrectly believe that pain is a normal process of aging.

The lumbar spine structures that involved in development of low back pain are intervertebral disk cartilages, intervertebral
joints, tendons, and muscles. When the sensory receptors in these structures receive nociceptive stimulation, they trigger a pain reaction in the pain sensation system, including both at the peripheral and the central levels. Inappropriate posture, irregular movement of the lumbar vertebrae, and reduced or imbalanced muscle strength enhance the nociceptive stimulation. Motion restriction due to pain leads to the contracture of intervertebral joints and the atrophy of the other lumbar spine structures, resulting in a vicious circle of pain (Yamamoto, 2003).

Epidemiology data about low back pain in Indonesia is nothing yet. Approximately 40% of Central Java society has over 65 years old who ever had low back pain (Sadeli & Tjahjono, 2004). The more number of low back pain is around 46 years old and over 60 years old (Wulandari, 2013). The research of Community Oriented Program for Control of Rheumatic Disease (COPORD) of Indonesia showed that the prevalence of low back pain about 18.2% for men and 13.6% for women. The incidence based on patients visiting to some hospitals in Indonesia about between 3-17% (Sadeli & Tjahjono, 2004).

Low back pain recently was rated by the Global Burden of Disease Study as one of the 7 health conditions that most affect the world’s population, and it is considered a debilitating health condition that affects the population for the greatest number of years over a lifetime. Low back pain also is associated with high treatment costs (Murray & Lopez, 2013).

The elderly people are one of a people community who has potential become facilitate people so that need to create a physical and non physical condition. More elderly who have low back pain handle it with resting, drink some traditional treatment or let it so. Elderly people often get pain on their low back if not taking muscle stretching as soon as possible by stretching so the joint will be small and resulting pain.

In reducing of low back pain on patients is recommended with conservatice therapy (Lumbantobing, 2008). By this exercise therapy on low back case had became routinility treatment for every practitioners in physiotherapy, but a nurse also can do the therapy. Nurse as role model in society have big role in obiligitate the pain through non pharmacology approach. Intervention that include non pharmacology approach, such as giving good exercise (Misriani, 2004).

Back exercise is exercise that give great use. Back exercise that do routinility in long time will progress the power of muscle actively, so that called as active stabilizition. The progress of muscle power also have effect to progress immun of the body toward movement or loaded statistically and dynamically. One of back exercise that do is by Mc. Kenzie extension.

Mc. Kenzie Extension Exercises is one of back exercise that use body movement eminent by extension. The main goal of extension exercise is strengthen of extensor muscles of back. According to theory, extension exercise can assist to decrease pain with decrease intradiscal pressure (Starkey & Johnson, 2006). Giving of practice of Mc. Kenzie Extension can decrease low back pain for elderly because the effect of muscle spasm, so that can decrease low back pain.

According to Dachlan (2009), back exercise which taken in a month (3 times in a week) show that there is meaningful difference toward the decrease of pain with method of Mc. Kenzie Extension. Meanwhile, the result of Santoso, et.al (2002) explained that method by Mc. Kenzie Extension needs 6 times theraphy minimally to reduce the low back pain of worker.

The principle on exercise therapy by Mc Kenzie Extension is to repair body posture and reduce lumbar hyperlordosis, muscle spasm decreasing through relax effect, avoid stiff intervertebral joint and checking the bad posture.

Back exercise is an easy movement, because it just having 6 moving and in every method spends 15 - 20 minutes. This method can do in 3 times in a week (Sa’adah, 2012) or 2 times in a day (Permana & Wahyuni, 2010). Beside easy to imitate, this exercise does not need sophisticated tools, cheap cost, special place, and it can do by ourselves based on Standard Operating Procedure (SOP). Back exercise also give influence toward the muscle bend progress, elastical bone and it can be reducing of low back pain.

This method, unlike other therapeutic methods, aims to make the patients as independent of the therapist as possible and thus capable of controlling their pain through postural care and the practice of specific exercises for their problem. It encourages patients to move the spine in the direction that
is not harmful to their problem, thus avoiding movement restriction due to kinesiophobia or pain (Mc Kenzie, 2003).

Due to the Mc. Kenzie Extension never been observed, this study was very important. The objectives of the study was to evaluate the effectiveness of Mc. Kenzie Extension Exercise to elderly with the low back pain in Hisosu Binjai Resident Home.

MATERIALS AND METHODS
The research design was quasi experiment with the pre–post test group approach.

This study was carried out between February and June 2015, at Resident Home in Hisosu Binjai, North Sumatera. The sample of this study were recruited with consecutive sampling as much as 28 people.

Inclusion criteria include: never got same therapy, pain intensity before doing research was minimum of moderate (Appley & Salomon, 1986), able to speak Indonesia, willing to followed research program completely for two weeks and low back pain did not accompanied with neurological disturbance. Patients will be excluded if they have any contraindication to physical exercise include evidence of nerve root compromise (ie, one or more moving, reflex, or sensation deficits), serious spinal pathology (eg, fracture, tumor, inflammatory and infectious diseases), serious cardiovascular and metabolic diseases, previous back surgery.

The measurement to evaluate pain by using Numeric Rating Scale (NRS) and has been translated into Indonesia language. NRS can be access by online on http://www.partnersagainstpain.com/indexpc.aspx?sid-12&aid=7692. The Pain Numerical Rating Scale is a scale that assesses the levels of pain intensity perceived by the patient using an 10-point scale (0 to 10), in which 0 represents “no pain ” and 10 represents the “worst possible pain.

Approval for the research was obtained from the university. Next the patients will be interviewed by the researcher, who will determine eligibility. Eligible patients will be informed about the objectives of the study and asked to sign a consent form. The patient’s sociodemographic data and medical history will be recorded. Anonymity of the participants and the confidentiality of their information were assured throughout the research process.

The participants received 15 sessions of 15-20 minutes each (3 sessions per week for 5 weeks). Before and after the intervention, the participants will be instructed to select the average of pain intensity based on the rating scale.

IBM SPSS Statistics 21 was used for statistical analyses. To answer question, descriptive and were generated for studied variables. Descriptive statistic (mean, SD, percentase) were used to answer age, sex and life style of smoking in elderly at Hisosu Binjai Resident Home. Before we doing the inferential statistic (Paired sample t-test), first doing normality data by Shapiro Wilk Test. According to the result of Shapiro Wilk test, data were normally distributed. The effectiveness of Mc. Kenzie Extension in elderly was analysed using by Paired sample t-test with significance $\alpha <0.05$.

RESULTS AND DISCUSSION
Based on the study, the mean of age were 67.85 (SD = 4.160) (table 1). Of the whole sample, the majority (57.14%) were male and 42.86% were female. Meanwhile 53.57% were smoker and 46.43% were no smoker (table 2). There was significantly differences Mc. Kenzie Extension in elderly (p<0.05) (table 3).

Table 1. The Characteristics in Elderly with Low Back Pain

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Min-Max</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>28</td>
<td>67.85</td>
<td>4.160</td>
<td>60-74</td>
<td>65.33 – 70.36</td>
</tr>
</tbody>
</table>

The findings of this study were consistent with those of these previous studies. Among changes in lumbar spine structures, age-related degeneration of intervertebral disk cartilages and that of intervertebral joints are common causes of low back pain. Aging is a well known risk factor of LBP as degenerative changes in the spine and disc. (Yamamoto, 2003).
This study inconsistent with Cho, et al (2012) explained that The lifetime prevalence of LBP was 61.3%, with women having a higher prevalence. The point and 6-month prevalences were also higher among women. Some studies have shown that males are at greater risk for low back pain, while other studies suggest that females are more likely to develop this type of pain. Women who have had two or more pregnancies have a higher risk of developing low back pain.

This study consistent with Miranda et al. (2003) showed an association between smoking and LBP among subjects over 50 years old. In addition, another study showed an association between smoking and decreased bone mineral density in women.

Former smokers had a higher prevalence of low back pain compared with never smokers, but a lower prevalence of low back pain than current smokers. In cohort studies, both former (OR 1.32, 95% CI, 0.99-1.77) and current (OR 1.31, 95% CI, 1.11-1.55) smokers had an increased incidence of low back pain compared with never smokers (Shiri, et al, 2010). According to the latest numbers available (2007), if you are a smoker, you are 2.7 times more likely to develop lower back pain than if you didn’t smoke. The researchers found that women who smoked complained more often of back pain than women who didn’t smoke in both groups, not just the scoliosis group. It’s not completely understood how cigarette smoking affects the back. One theory is that nicotine causes vasoconstriction, or narrowing of the blood vessels, that provide nutrition to the discs’ cells. If the nutrients can’t reach the cells, this leads to malnutrition of the disc and they can become damaged more easily. Malnourished tissues also can't heal themselves as quickly or as well as healthier, nourished cells. Nicotine is also known to thicken the walls of the blood vessels. This has the same effect of narrowing the blood vessels, slowing down blood flow. One of the by-products of cigarettes is carbon monoxide, an extremely poisonous gas. Carbon monoxide is also blamed for the increase in lower back pain. When you smoke, the carbon monoxide attaches itself to your hemoglobin, the part of your blood cells that carry oxygen to the tissues throughout your body. This burden on the hemoglobin takes up space, keeping much-needed oxygen from reaching the discs in your back. Like vasoconstriction, this causes malnutrition to the cells (Anonim, 2016., Shiri, et al, 2010).

### Table 2. The Characteristic in Elderly with Low Back Pain

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16</td>
<td>57.14</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
<td>42.86</td>
</tr>
<tr>
<td>Life Style of Smoking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoker</td>
<td>15</td>
<td>53.57</td>
</tr>
<tr>
<td>No Smoker</td>
<td>13</td>
<td>46.43</td>
</tr>
</tbody>
</table>

This study was consistent by Permana & Wahyuni (2010), in which about giving stretching *Mc. Kenzie Extension* for women worker who as wrapper jamu in PT. X Semarang, explained that there is a significant difference between fressing back after and before taking therapy by *Kenzie Extension* (p < 0.05). According to Dachlan (2009), explained that there is significant influence by giving back exercise method by Mc. Kenzie extension toward the decreasing of low back pain (p < 0.05).

### Table 3. The Mc. Kenzie Extension Exercise of Elderly with Low Back Pain

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>SE</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain intensity before Mc. Kenzie intervention</td>
<td>28</td>
<td>5.08</td>
<td>0.862</td>
<td>0.239</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain intensity after Mc. Kenzie intervention</td>
<td>28</td>
<td>3.23</td>
<td>0.832</td>
<td>0.231</td>
<td></td>
</tr>
</tbody>
</table>

The McKenzie method is an active therapy that involves repeated movements or sustained positions and has an educational component with the purpose of minimizing pain and disability and improving spinal mobility (Mc. Kenzie & May, 2003).

The average decreasing of low back pain caused the result of extensor back muscle strengthen through Mc. Kenzie Extension exercise so that reducing the pain. It has related to muscle work, the more muscle strengthen, the
more muscle having contraction and in contrary. The muscle do their function with couple because when agonist muscle in contraction so antagonist muscle in other way in relax. If this is not happen, the two muscle will dragging each other blocking the movement, and resulting and the pain (Greenburg & Michele, 2016).

The main goal of this extension exercise is to strengthen extensor back muscles. The mechanism of McKenzie extension exercise in low back pain reduce is by reducing the pressure on posterior annulus fibrosus through extension movements. Theoretically, extension exercise can help to reduce pain with reducing intradiscal pressure (Starkey & Johnson, 2006). This method also provides patients with tools to promote their autonomy in managing the current pain and even future recurrences.

CONCLUSION
The study found that there was significant differences of lower back pain in elderly (p < 0.05).

The results of this study will contribute to better management of this population. In addition, compare the other back exercises include William Flexion of elderly is recommended in Hisosu Binjai Resident Home.

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REFERENCES


