Correlation between Physical Activity and Sleep Quality among Elderly in Padjaran, Peterongan

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ABSTRACT

Sleep quality is a sleeping experience of person and got freshness after awakened. Sleep quality among elderly were influenced by several factors such as physical activity. Physical activity with high frequency will influence nerves sympathetic so it will make somebody feels not asleep, otherwise the appropriate activities can influence the parasympathetic nerves so it will make the body become relaxed than make asleep. The aims of this research was to know the relationship of physical activity with the sleep quality among elderly. Cross sectional study used for research method, 62 elderly in Pajar village were to being respondent in this research. Sleep quality was measured by using a Pittsburgh Sleep Quality Index (PSQI) questionnaire. Moreover, the level of physical activity was measured by The General Practice Physical Activity Questionnaire (GPPAQ questionnaire. The results of this research found the level of physical activity was at moderate level (23%) and the respondent got good quality of sleep. In conclusion, physical activity with moderate level can influenced quality of sleep. These results can be used to improve sleep quality elderly who experience sleep disturbances.

Keywords: Physical activity Sleep quality Elderly

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I. INTRODUCTION

Leading with up of age among people and especially among elderly people so the quality of sleep will decrease also, this caused by decreasing the organ function of elderly and this correlated with the aging process (Susan & Sonia, 2010). There are several factors that can affect the quality of sleep especially quantity of physical activity, if a person had heavy physical activity so it will make a person get difficult to sleep and due to increased body temperature so in the end will make a person feels uncomfortable. However, if somebody had little or enough physical activity so it will make comfortable when getting a rest and in the end it will provide a sense of comfort (Kozier, 2010).

Sleep disturbance is a common problem for elderly. According to World Health Organization (WHO) in 2010, about 67% of the hundred million elderly in the United States reported that elderly people experienced sleep disturbances, an estimated 20% - 50% experienced sleep disorders and 17% experienced serious sleep disorders. Meanwhile, according to MOHRI (2010), about 750 elderly suffered sleep disturbance in every year. Moreover, about 35% - 45% experienced sleep disorder in moderate level, and about 17% experienced serious sleep disorder.

The result of preliminary study was conducted on February 20, 2016 at Pajar village of Peterongan sub-district of Peterongan Jombang and found that the data from register book of pre-elderly and elderly at Pajar village, the number of elderly who attendance at posyandu elderly on 20 February 2015 counted 64 people from total who lives in Pajaran village about 73 people. Moreover, from interview data conducted on 20 February 2015 there were 64 elderly who join posyandu and the researchers interviewed 10 people because many elderly people are home. 6 out of 10 people
interviewed showed signs of sleep disorder, such as: insomnia, frequent waking at night, hypertension, excessive sleepiness during the day, difficulty sleeping, dizziness, frequent night sweats. Physical activity is often carried out in the Pajaran village is gymnastics elderly, which is held every Tuesday and Saturday.

Sleep disorder in the elderly was caused by not reaching stage of sleep Rapid Eye Movement (REM) because often awake (Mehmet & Roizen, 2009). In addition, sleep disorders can be caused by biological factors (a certain disease that can not sleep well) and psychological factors (anxiety, stress, fear, emotional tension) (Erliana, 2008). Severe sleep disorder will affect sleep quality. Poor sleep quality can lead to serious disruptions like including insomnia, sleep apnea, narcolepsy, sleep deprivation, cardiovascular disease such as coronary heart disease, and heart rhythm disorders (Marieke et al., 2011; Jasvinder, 2011; Maria et al., 2008).

To anticipate impact of sleep disorders, it is necessary to handling regulate better sleep quality like elderly gymnastics, which can stimulate sympathetic nerves and increase the sympathetic nerves that can affect the quality of sleep (Rahayu, 2008). Aerobic exercise from low to moderate intensity can affect the decreasing body temperature during sleep, making it more easily drowsy (Kamrani et al., 2014). Gymnastics elderly and aerobic exercise are classified in physical activity, where there are many other physical activity that can affect the quality of sleep and not many who do research on this.

Kamrani et al. (2014) has conducted a study about the effect of aerobic exercise with low and moderate intensity on sleep quality. Stiyowati (2015) also conducted a research and found that has influence of elderly gymnastics to the fulfillment of sleep quality. Based on the above description of the researcher, want to examine related to the best physical activity to maintain the quality of sleep in the elderly.

II. METHOD

Cross sectional study used for research method, 62 elderly in Pajaran village were to being respondent in this research. Sleep quality was measured by using a Pittsburgh Sleep Quality Index (PSQI) questionnaire. Moreover, the level of physical activity was measured by The General Practice Physical Activity Questionnaire (GPPAQ questionnaire)

This study was conducted after obtaining permission from the place of study and approval of respondents. Respondents who have signed the approval letter then given a questionnaire of PSQI and GPPAQ. Researchers explain and help how to fill out the questionnaire. Uncompleted questionnaire will be returned to the respondent for immediate completion than return back to the researcher.
III. RESULT AND DISCUSSION

3.1 Results

Table 1

Demographic data of the participant in Padjaran Village, Peterongan

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Frequency (N)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. 45 – 59 Year</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>b. 60 – 74 Year</td>
<td>33</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>c. 60 – 74 Year</td>
<td>18</td>
<td>29</td>
</tr>
<tr>
<td>2</td>
<td>Frequency of activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. No have activity</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>b. &lt; 1 hour</td>
<td>22</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>c. &gt; 1 hour to &lt; 3 hours</td>
<td>23</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>d. &gt; 3 hours</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>Consumption foods</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Tofu and Tempe</td>
<td>29</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>b. Kale vegetable</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>c. Spinach vegetable</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>d. Egg</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Past disease history</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. No have a problem</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>b. Hypertension</td>
<td>18</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>c. Rheumatoid Arthritis</td>
<td>32</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>d. Diabetes Miletus</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 5.1 shows the results of the demographic data. The highest age criteria at the age of 60 - 74 years were 33 people (53%), the longest activity criteria for activity duration more than 1 hour and less than 3 hours as many as 23 people (37%), most food habit criteria on eating habits know tempe 29% 47%), and the most common disease history of rheumatoid arthritis disease was 32 (52%).

Table 2

Distribution of the level of physical activity among elderly in Pajaran Village, Peterongan

<table>
<thead>
<tr>
<th>No</th>
<th>The level of physical activities</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>In Active</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Moderately Inactive</td>
<td>22</td>
<td>36</td>
</tr>
<tr>
<td>3</td>
<td>Moderately Active</td>
<td>23</td>
<td>37</td>
</tr>
<tr>
<td>4</td>
<td>Active</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>62</td>
<td>100</td>
</tr>
</tbody>
</table>

From table 2 found that most of elderly had moderate level of physical activities as many as 23 people (37%).
Table 3

Distribution of the level of sleep quality among elderly in Pajaran Village, Peterongan

<table>
<thead>
<tr>
<th>No</th>
<th>Sleep quality</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poor</td>
<td>34</td>
<td>55</td>
</tr>
<tr>
<td>2</td>
<td>Good</td>
<td>28</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>62</td>
<td>100</td>
</tr>
</tbody>
</table>

From table 2 found that most of elderly had poor level of sleep quality as many as 34 people (55%).

Table 4

The Correlation between physical activity and sleep quality among elderly in Pajaran Village, Peterongan

<table>
<thead>
<tr>
<th>Sleep quality</th>
<th>The level of physical activity</th>
<th>In Active</th>
<th>Modately Inactive</th>
<th>Modately Active</th>
<th>Active</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>Poor</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>14</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Good</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td>21</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>4</td>
<td>22</td>
<td>35</td>
<td>23</td>
<td>37</td>
</tr>
</tbody>
</table>

*Spearman Correlation Test* $\rho = 0.002, r = -0.386$

Table 4 shows that 15 the elderly who have active level of physical activity experienced poor sleep quality, while at moderate active activity level from 23 respondents 14 people experienced better sleep quality than those who experienced poor sleep quality. Then the data analysis used is spearmean test and the results obtained $\alpha = 0.002 <0.005$ which means the accepted hypothesis means there is a relationship level of physical activity with sleep quality elderly, whereas for the correlation coefficient value in this study of -0.386 which means the correlation strength in this study is weak but there is still a relationship. Negative correlation strength means the worse a person's quality of sleep means the higher the activity is done and vice versa.

3.2 Discussion

The Level of Physical Activity Among Elderly in Pajaran Village, Peterongan

Based on Table 2 shows that the level of physical activity among elderly in Pajaran village was mostly at moderate level as many as 23 people or 37%.

Physical activity is movement of part of body and it need energy to do it, such as walking, doing homework, gardening, raising grandchildren, cycling and also gymnastics (Triwibowo & Puspitasari, 2012). Some studies mentioned that physical activity should be done at least 10 minutes. Some factors were related with physical activities such as age, food and activity duration. Especially, age was importance factor that influence of physical activities. While the length of activity should adjust to a person's ability so the activity will accordance with the ability of somebody to do it. (National Institute on Aging, 2015).

The level of physical activity was at moderate active level. Possibly reason it was caused by age, this can see at the results of this study found that 50% of the respondent was aged 60 - 74 years old. In the elderly stage should be maintain the activities like regularly doing the activity like usually, it does not mean that at the elderly stage should be reduced or...
restricted but should be done with regularly. This is to maintain motor function and the immunology.

This is in accordance with research Wojtek et al. (2009) which explained that the elderly is recommended to perform activities at least 60 minutes a day, due to one goal to train muscle strength in the elderly.

**Sleep Quality among Elderly Pajaran Village of Peterongan, Peterongan**

Based on table 5.3 shows that the sleep quality among elderly in Pajaran village was bad with the number of respondents 34 people or 55%.

Sleep quality is a state of sleep that undertaken an individual who produces freshness and fitness when awakened (Khasanah, 2012). Sleeping need of human was depends on the level of development stage. Generall, the person who aged 40-60 years are required sleep about 7 hours per day. However, for person who aged 60 years and above are required sleep about 6 hours per day (Setyowati, 2015). Changes in the quality of sleep in the elderly is caused by the physical abilities of the elderly are declining. Physical abilities decrease due to decreased organ abilities, such as heart, lungs, and kidneys. Decreased organ abilities result in immune and body immunity are also affected (Kozier, 2010).

From the description above most of the respondents experienced poor sleep quality and a small percentage of respondents who experienced good sleep quality, where good sleep quality were influenced by activities that are not too heavy, and enough of the rest. While poor sleep quality is likely caused by lack of rest and excessive activity or even rarely activity and often awakened at night so that most elderly compiled Pajar experience poor sleep quality. Often the elderly waking up at night may be due to the result of wanting to urinate, this is due to reduced muscle strength in the urinary tract resulting in frequent elderly want to urinate. From the description above most of the respondents experienced poor sleep quality and a small percentage of respondents experienced quality good sleep, where good sleep quality is likely to be influenced by less severe activities, and enough rest. While poor sleep quality is likely caused by lack of rest and excessive activity or even rarely activity and often awakened at night so that most elderly compiled Pajar experience poor sleep quality. Often the elderly wake up at night may be due to the result of wanting to urinate, this is due to reduced muscle strength in the urinary tract which resulted in frequent urge to urinate elderly.

Based on the results of research Owen & Matthews (2007), with the number of 521 samples all respondents female sex. It was mentioned that the most common problem of sleeping problem was waking up at night (92%).

**The correlation between physical activity and sleep quality among elderly in Pajaran Village, Peterongan**

Data analysis with Spearman statistic test showed result 0.002 <0.05 which hypothesis was accepted, it means there is relation of level of physical activity with sleep quality among elderly.

Physical activity is one of the factors that affect the sleep quality. Physical activity was affects 3 things, it are affecting one's mental, thermoregulation effects, and circadian rhythms (Veqar & Hussein, 2012; Weinert, 2007). But not always physical activity can maintain the sleep quality and this is in accordance with the theory Kozier (2010) which states that excessive physical activity can cause a person difficult to sleep.

From the description above shows that physical activity was influenced sleep quality, especially for elderly, where elderly people who do too much physical activity or less of...
physical activity will make difficult to sleep. However, if doing activities with regularly and normal with physical function so it will make more comfortable.

This was accordance with the results of research by Veqar & Hussein (2012) where found the excessive activity can stimulate the sympathetic nerves that result, the heart beats faster, blood pressure increases, and breathing also increased, thus causing elderly do not feel sleepy. However, the activity is not excessive can stimulate the parasympathetic nerves that result in decreased metabolism, pulse, blood pressure, and increased melatonin secretion, resulting in drowsiness.

IV. CONCLUSION

62 elderly were assessed in this study and most of the level of physical activity was at moderate level as many as 23 people (37%). This is influenced by most of elderly have daily work on 1-3 categories of activity and it was done for less than 1 hour. The activities are commonly elderly gymnastics, walking, cycling, and keep his grandson. Moreover, most of the elderly experienced poor sleep quality as many as 34 people (55%). Most elderly people who experience bad sleep often wake up at night. Most elderly people wake up because they want to bathe, and feel hot.

From the research that has been done to the relationship of the level of physical activity with the quality of elderly sleep, it was found that at the level of moderate activity physical activity in 14 respondents (23%) respondents menagali good sleep quality more than the poor quality of sleep but at the level of physical activity active all the respondents who numbered 15 respondents (24%) experienced poor sleep quality, which means that physical activity can affect the quality of elderly sleep.

V. RECCOMENDATION

For the next researcher, the questionnaire should be adjusted to the condition of the field before doing the research. For elderly who experience poor sleep quality, it is recommended to participate in elderly Posyandu in Pajaran village, such as elderly gymnastics and recitation. Many studies that examined the elderly gymnastics and pengajian are can improve the quality of elderly sleep. For the development of nursing science can provide input to improve insight and knowledge about hubugan level of physical activity with the quality of sleep elderly.

VI. REFERENCES


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