

## Conference Paper

# The Relationship Between Physical Activity and Sleep Quality in the Elderly in the Malang City Community

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**Abstract.**

The elderly have been more susceptible to being exposed to COVID-19. Decreased sleep quality in the elderly is caused by psychological, environmental and physiological factors so that the function of neurotransmitters decreases and substances to stimulate sleep (e.g., norepinephrine) also decrease. Physical activity is beneficial for sleep quality and has a positive impact on onset and total sleep time. This study aimed to determine the relationship between physical activity and sleep quality in the elderly in the Malang community. This was a cross-sectional study with a total sample of 65 people recruited through purposive sampling. Physical activity was measured using the Global Physical Activity Questionnaire and sleep quality was measured using the Pittsburgh Sleep Quality Index questionnaire. The results showed that there was a significant correlation between physical activity and sleep quality.

**Keywords:** physical activity, sleep quality, elderly

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## 1. Introduction

Pandemic condition the elderly are more susceptible to being exposed to infectious diseases caused by the ever acute respiratory syndrome coronavirus (COVID-19) so that a policy is issued to stay at home and limit other physical activities, namely body movements resulting from contraction of skeletal muscles which increases energy use. Decreased sleep quality in the elderly is caused by psychological, environmental and physiological factors so that the function of neurotransmitters decreases and substances to stimulate sleep (norepinephrine) also decrease [1]. Physical activity is beneficial for sleep quality, regular physical activity has a positive impact on total sleep time and onset latency

The results of the 2010 census stated that the number of elderly people aged 60 years and over reached 8.5 percent in Malang City. Approximately 6.2 million – 7.76 million elderly people experience a decrease in sleep quality

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Lack of sleep can cause puffy eyes, pale face, weak body, susceptible to disease due to decreased endurance [2]. Measurement of sleep quality was carried out using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. PSQI has been validated with a good global score

Based on [3] and supported by Garfield and Kumarni (2016), who said that the level of physical activity had a positive impact on sleep duration, physical activity was beneficial for sleep quality. Regular physical activity has a positive impact on total sleep time and onset latency.

Physical activity is a body movement that results from the contraction of skeletal muscles which increases energy consumption. Physical activity is divided into; light physical activity, moderate physical activity, and strenuous activity. Physical activity in the elderly was measured using the Global Physical Activity Questionnaire (GPAQ). GPAQ is a valid and reliable questionnaire [4]

## 2. METHOD

The research design used in this study was analytic observation. The approach applied in this research is cross sectional with sampling technique using purposive sampling

with a sample of 65 people who were taken using the Purposive Sampling technique by measuring physical activity using the Global Physical Activity Questionnaire (GPAQ) and measuring sleep quality using the Pittsburgh Sleep Quality Index (PSQI) Questionnaire in collecting research data.

## 3. RESULT

The results obtained by researchers can be concluded that there is a very strong and significant relationship between physical activity and sleep quality in the elderly in the community.

## 4. DISCUSSION

Based on several studies that have been done factors that can affect the quality of sleep, one of which is physical activity. From the results of statistical tests, it was found that respondents who were active in their physical activities had the opportunity to get good sleep quality by 3.5 times compared to respondents who were not active in their physical activities because someone who experienced fatigue would usually get

optimal sleep, especially in the elderly who experienced fatigue. from physical activity. On the other hand, if fatigue is caused by excessive physical activity that is tiring or with stress, it will cause difficulty falling asleep. Because the more tired a person is, the shorter their REM sleep will be, where there is a progressive decrease in NREM sleep stages 3 and 4, even some of them are elderly who have almost no stage 4 or deep sleep [1].

Physical activity in the moderate-heavy category is a physical activity that requires greater energy and strength, so that the elderly experience fatigue when doing active physical activity, which makes the elderly faster to sleep because when the body is tired the hypothalamus ability is reduced, causing a person to be sleepy. SCN photoreceptor neurons are activated when light enters the retina of the eye. SCN will stimulate the pineal gland to secrete melatonin which causes drowsiness. During the day the pineal is not active but when the sun has set and it is getting dark the pineal begins to produce melatonin, which is released into the blood. When trying to sleep, closing your eyes, taking a relaxed position and being in a dark room, and a comfortable temperature will stimulate the Reticular Activation System. (SAR) mengalami penurunan, kemudian Bulbar Synchronizing Region (BSR) takes over, causing sleep as a result of the release of [5].

Light physical activity in the elderly or lack of active physical activity causes the elderly to often sleep during the day because there is no activity to do so that makes the elderly feel bored and stressed that can arise both from daily activities, external pressures, and individual pressures experienced the elderly, thus triggering the stress hormone (cortisol hormone) to increase which can affect the circadian rhythm or biological clock of living things that regulate the human sleep cycle to become irregular which causes the sleep patterns of the elderly to change so that the sleep quality of the elderly becomes poor.

Physical activity will reduce stress hormones such as cortisol and increase endorphins and serotonin. Endorphin hormones are produced by the pituitary gland in the hypothalamus as natural pain relievers and help improve sleep and mood and reduce stress. Serotonin plays a role in sleep physiology, namely in the homeostatic mechanism where the Bulbar Synchronizing Region (BSR) located in the pons and medulla oblongata releases serotonin which causes drowsiness and then causes sleep. Physical activity can also stimulate thoughts and emotions in brain centers resulting in improvements in mood due to -wave activity in the brain associated with relaxation. Physical activity improves body temperature regulation which will lead to better sleep [6].

Sleep quality in the elderly is a condition that a person is not aware of because the individual's perception of the environment decreases or is lost, in that condition

a person can be awakened again with sufficient stimulation. Changes in sleep quality in the elderly occur due to shortening of Rapid Eye Movement (REM) sleep stages, another decrease also occurs in Non Rapid Eye Movement (NREM), the elderly almost do not have stage 4 or deep sleep, where normal sleep in the elderly is in Non Rapid Eye Movement (NREM) 3 and 4. Decreased sleep quality in the elderly is caused by decreased distribution of norepinephrine which is a substance to stimulate sleep, this occurs due to changes in the neurological system which physiologically decreases the number and size of neurons in the central nervous system, so that the function of neurotransmitters in the neurological system decreases [1].

## 5. CONCLUSION

The results researchers can be concluded that there is a very strong and significant relationship between physical activity and sleep quality in the elderly.

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