



## The Effectiveness of Exercise on Sleep Quality in the Elderly: Literature Review

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### ABSTRACT

**Introduction:** Insomnia in the elderly can cause weakness, dizziness, and fatigue. In addition, the psychological impact of poor sleep quality is anxiety, irritability, disturbed concentration, and stress which can increase the risk of suicide. Poor sleep quality can cause nursing problems Sleep Pattern Disorders. One of the interventions that can be given is education on rest activities, namely physical activity or sports

**Method:** The method used to achieve a literature review. The literature search was conducted on the PubMed, Science Direct, Google Scholar

**Result:** The results of 10 articles on the types of exercise used include aerobic exercise, elderly exercise, sports, low-intensity and high-intensity physical activity. most articles do exercise for 30 minutes, 2-7x a week, for 3 weeks. The quality of sleep in the elderly has increased after doing sports exercises with an ap value <0.05.

**Conclusion:** Exercise can be an alternative to improve sleep quality in the elderly

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### 1. Introduction

Sleep quality is the ability of each individual to sleep, and to produce the amount of rest that suits his needs. Sleep is defined as a physiological process that is important for maintaining optimal health (Hastuti et al., 2019). Changes in poor sleep quality can affect a person's well-being and quality of life. Approximately 20-50% in Indonesia, especially in people aged 65 years, say they have difficulty starting to sleep. The prevalence in Indonesia itself, difficulty sleeping in the elderly is high, which is approximately 67%. (Hindriyastuti and Zuliana, 2018). Things like that can happen because as a person ages, the amount of REM ( *Rapid Eye Movement* ) and SWS ( *Slow Wave Sleep* ) sleep decreases for the elderly (Hastuti et al., 2019).

The impact that arises due to poor sleep quality is that the elderly are unable to restore their physical condition properly, causing feelings of weakness, dizziness, drowsiness and fatigue. In addition, the psychological impact of poor sleep quality is anxiety, irritability, disturbed concentration, and stress which can increase the risk of suicide. With this poor sleep quality, the elderly can experience changes in functional performance that will affect their relationships with others on social aspects (Ni Kadek Risa Astria, 2016).

This poor sleep quality can cause nursing problems with Sleep Pattern Disorders (DPP PPNI Pokja SDKI Team, 2017). Nurses have a role in overcoming sleep pattern disorders by providing the main intervention, namely sleep support, and activity/rest education (DPP PPNI Pokja SIKI DPP Team, 2018). One of the educational interventions for resting activities is physical activity or sports. Sports exercises have various types, such as *aerobic* exercise, elderly exercise, sports, low-intensity and high-intensity physical activity.

### 2. Methods

The method used to achieve this goal is *literature review*. Literature search was conducted on the *PubMed*, *Science Direct*, *Google Scholar* electronic database with the keywords *Physical Activity OR exercise AND Sleep Quality OR Sleep Disorder AND Aged Elderly*. In the initial search, we found 4,547 ( *Pubmed* n = 3,945, *Science Direct* n = 516, *Google Scholar* n = 86) then filtered from 2016-2021 (

Pubmed n = 3,795, Science Direct n = 414, Google Scholar n = 45), Articles has been screened based on the full text (n = 20), articles were issued (n = 10) with the reasons: There is no discussion of sleep quality in the elderly (adolescents), Journal articles obtained (n = 10). After going through the selection process and quality assessment, 10 articles were obtained that met the requirements, 4 articles used a *quasi-experimental design*, 4 *randomized controlled trials*, 1 *cross sectional*, and 1 *systematic review*. The results of the selection of articles can be seen in Figure 1 below.

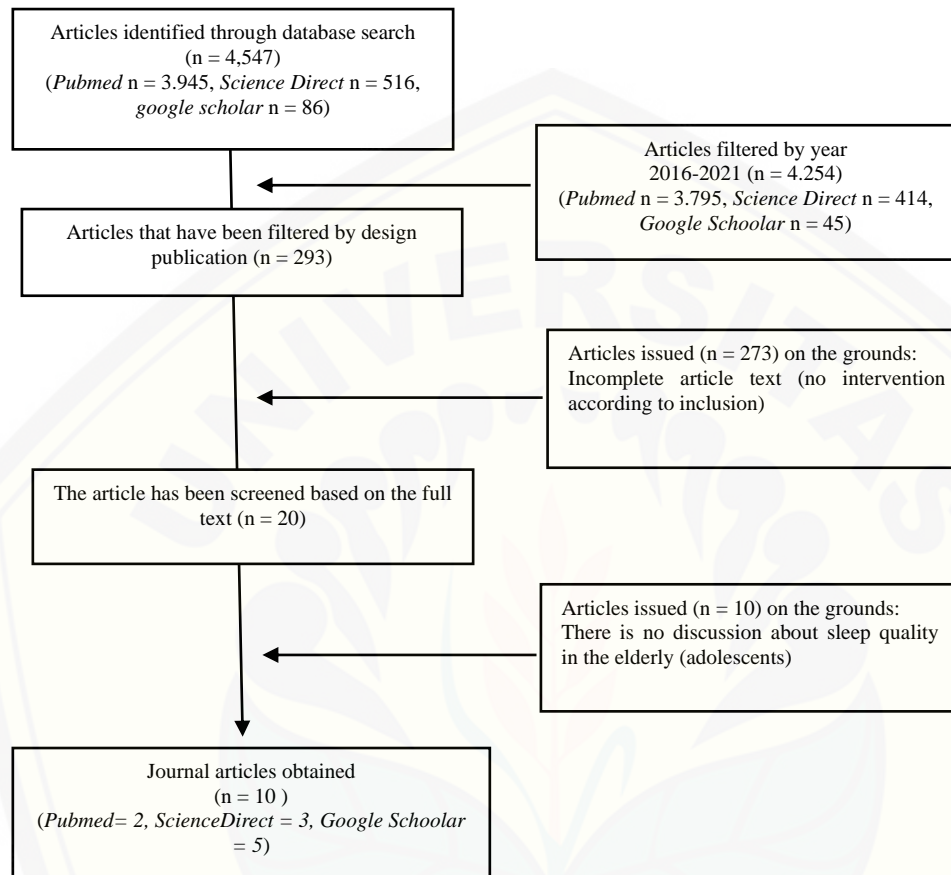


Figure 1. Flowchart

### 3. Results and Analysis

Participants in this study were elderly people from each location. Mean age 50 years with poor sleep quality with male and female gender.

TABLE 1  
Characteristics of Study Respondents

Author and Title	Characteristics of Study Respondents (age)	Characteristics of Study Respondents (gender)
<a href="#">Osama H-Al-Jiffri (2019 )</a>	61	No explained
<a href="#">Hsi-Chen (2020 )</a>	62	Male and Female
Ari, Elizabeth (202 0 )	55-75	Male and Female
<a href="#">Asfur (2 0 20 )</a>	60-75 years old	No explained
<a href="#">Kause et al (2019 )</a>	60-82 years old	Male and Female
<a href="#">Mass and Etc (2020 )</a>	60-74 years old	Male and Female
<a href="#">Seol et al (2021 )</a>	65-79 years old	female
<a href="#">Nislawaty (2017.)</a>	76-90 years old	No explained
<a href="#">Sullivan Bisson et al (2019 )</a>	50 years old	Male and Female
<a href="#">Frimpong et al (2021 )</a>	50 years old	No explained

TABLE 2  
Sports Training

Sports Exercise Type	Frequency	Percentage (%)
Aerobic exercise	2	20
Sports training	3	30
Elderly exercise	2	20
Low intensity physical activity	2	20
High intensity workout	1	10
<b>Amount</b>	<b>10</b>	<b>100</b>

Of the 10 articles reviewed, there were five types of sports exercise used, namely aerobic exercise, sports training, elderly gymnastics, low-intensity physical activity, and high-intensity physical exercise.

TABLE 3  
Exercise Exercise Duration

Number of Exercises per Week	Number of Articles	Percentage (%)	Number of Exercises Per Session	Number of Articles	Percentage (%)
2 times	2	20	30 Minutes / session	4	40
7 times	1	10	7 Mins / session	1	10
3 times	3	30	6 Minutes / session	1	10
Unknown	4	40	15-60 Minutes/session	1	10
			Unknown	3	30
<b>Amount</b>	<b>10</b>	<b>100</b>		<b>10</b>	<b>100</b>

The duration of the exercise in most articles is 30 minutes per session, performed 3 times per week. This result is in accordance with the statement of [Malik Ricky \(2001 9\)](#) that the recommended exercise is done regularly, regularly, for 15-30 minutes, and a good frequency of exercise is 2x a week or more. A good length of time in participating in sports can be adjusted to individual abilities. In the elderly, it takes about 20-60 minutes/session for 3x a week with the condition that the exercise provided is in accordance with the needs and abilities of each elderly.

TABLE 4  
Exercise Exercise Duration

Author	Exercise Exercise Duration	
	Minutes per session	Sessions per week
Osama H-Al-Jiffri (2019)	30	2
Hsi-Chen (2020)	7	7
Ari, Elizabeth (2020)	30	3
Asfur (2020)	6	Unknown
Kause et al (2019)	Unknown	3
Miasa et al (2020)	Unknown	3
Seol et al (2020)	30	Unknown
Nislawaty (2017)	Unknown	2
Sullivan Bisson et al (2019)	60	Unknown
Frimpong et al (2021)	30	Unknown

TABLE 4  
Article Research Results

Author	Tools
Osama H-Al-Jiffri (2019)	<i>Pittsburgh sleep quality index (PSQI)</i>
Hsi-Chen (2020)	<i>Pittsburgh sleep quality index (PSQI)</i>
Ari, Elizabeth (2020)	<i>Pittsburgh sleep quality index (PSQI)</i>
Asfur (2020)	<i>Pittsburgh sleep quality index (PSQI)</i>
Kause et al (2019)	<i>Pittsburgh sleep quality index (PSQI)</i>
Miasa et al (2020)	<i>Pittsburgh sleep quality index (PSQI)</i>
Seol et al (2021)	<i>Pittsburgh sleep quality index (PSQI)</i>
Nislawaty (2017)	<i>Pittsburgh sleep quality index (PSQI)</i>
Sullivan Bisson et al 2019)	<i>Pittsburgh sleep quality index (PSQI)</i>
Frimpong et al (2021)	<i>Polysomnography (PSG)</i>

There are two types of measuring instruments used to measure a person's sleep quality, namely the *Pittsburgh Sleep Quality In Dex* (PSQI) and 1 article using the *Poly Somnography* (PSG) recording instrument in [Frimpong et al \(2021\)](#).

TABLE 5  
Sleep Quality Before and After Exercise

Author	Before	After	Decrease difference
Osama H-Al-Jiffri (2019)	5.14	3.25	1.89
Hsi-Chen (2020)	6.22	3.20	3.02
Ari, Elizabeth (2020)	11.6	7.4	4.2
Asfur (2020)	6.0	4.0	2.0
Kause et al (2019)	8.50	3.39	5.11
Miasa et al (2020)	6.0	3.2	2.8
Seol et al (2021)	14.2	4.2	10
Nislawaty (2017)	15.33	5.79	9.54
Sullivan Bisson et al (2019)	5.37	3.28	2.09
Frimpong et al (2021)	5.56	3.82	1.74

After exercise, 8 out of 10 articles stated that the respondent's sleep quality was at a score of <5 ( good sleep quality ), while 2 articles were still at a score of >5 ( poor sleep quality ) however, the average score had decreased from 15.33 and 11.6 to 5.79 and 7.4.

TABLE 6  
The Effectiveness of Sports Exercise on the Value of Sleep Quality Bad

Author	Statistical test results
Osama H-Al-Jiffri (2019)	p < 0.001
Hsi-Chen (2020)	p = 0.035
Ari, Elizabeth (2020)	P = 0.000
Asfur (2020)	p = 0.001
Kause et al (2019)	p = 0.000
Miasa et al (2020)	p = 0.005
Seol et al (2020)	p = 0.011
Nislawaty (2017)	p = 0.000
Sullivan Bisson et al (2019)	p < 0.01
Frimpong et al (2021)	p = 0.002

results of the statistical test as a whole have a p value of < 0.05, which means that each type of exercise given has an influence on the sleep quality of the elderly.

#### 4. Discussion

The quality of sleep in the elderly aged over 50 years has decreased ([Harisa et al 2022](#)). To improve the quality of sleep in the elderly, exercise intervention can be carried out as for the types of exercise that can be used to improve sleep quality in the elderly, namely *aerobics*, exercise, elderly exercise, low and high intensity physical activity. This happens because after doing these sports exercises can make the elderly body feel more fit and relaxed ([Miasa et al., 2020](#)). For a good duration of time participation in sports can adjust to individual abilities. In the elderly, it takes about 20-60 minutes/session for 3x a week with the condition that the exercise provided is in accordance with the needs and abilities of each elderly. After doing sports exercises to determine whether the elderly sleep quality is good or bad, measurements can be made using the *Pittsburgh Sleep Quality In Dex* (PSQI) and *Poly Somnography* (PSG) measuring instruments, both of these measuring instruments have the same validity, only that polysomnography has an effect on someone because there are many complaints of frequent skin irritation caused by the sensor adhesive attached to the body during the test, while the PSQI measuring instrument has the advantage of



being easy to do and valid. Improved sleep quality after being given exercise training is caused because exercise can stimulate a decrease in sympathetic nerve activity and increase parasympathetic activity, so that it can have a positive effect on sleep quality for the elderly (Asfur, 2020).

## 5. Conclusion

This type of exercise can be done by respondents 3 times a week with a duration of 30 minutes per session. The quality of sleep of the elderly after being given exercise training experienced a difference compared to before being given exercise training.

Before exercising, the elderly had poor sleep quality (score > 5) and after being given exercise training, the quality of sleep was good (score < 5). There are 2 articles that are still in the category of poor sleep quality but have experienced a significant decrease in sleep quality scores. The results of statistical tests in 10 journals showed that there was an effect of exercise training on sleep quality in the elderly with a p value of <0.05, which means that exercise is effective in improving the quality of sleep in the elderly. From the conclusions above, it shows that participants who take part in sports training with proper management will have a positive impact on controlling sleep quality to overcome nursing problems with sleep pattern disorders.

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