

***THE ASSOCIATION OF PHYSICAL FUNCTIONAL CAPACITY AND SLEEP QUALITY IN  
THE ELDERLY AT GOTONG ROYONG HOSPITAL***

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***ABSTRACT***

**Introduction:** Old age is a period that indicates a process of physical, mental, and social deterioration over time. There are several things that concern health in old age, one of which is functional status which is a major health problem in the elderly. A person's ability to perform daily activities can be assessed by their functional capacity. Physical functional capacity can be measured using the six-minute walk test (6MWT). There have been many studies that discuss the 6MWT, but none have specifically looked for the relationship between physical functional capacity and sleep quality in the elderly. **Purpose:** This study was conducted with the aim of knowing the relationship between physical functional capacity and sleep quality in the elderly at Gotong Royong Hospital. **Methods:** This study used an analytic observational research design with a cross sectional approach. Data were collected from demographic questionnaires, Pittsburgh Sleep Quality Index (PSQI), and direct 6MWT measurements. Data analysis in this study used univariate and bivariate analysis. **Results:** In this study, the results obtained  $p = 0.000$  ( $p < 0.05$ ) indicate that there is a significant relationship between physical functional capacity and the quality of sleep of the elderly at Gotong Royong Hospital. **Conclusion:** There is a relationship between physical functional capacity and elderly sleep quality at Gotong Royong Surabaya Hospital.

**Keywords:** *Physical functional capacity, sleep quality, six-minute walk test, and Pittsburgh Sleep Quality Index.*

***ABSTRAK***

**Pendahuluan:** Usia lanjut merupakan suatu periode yang menunjukkan adanya suatu proses kemunduran fisik, mental, dan sosial berdasarkan waktu. Terdapat beberapa hal yang menyangkut kesehatan pada usia lanjut, salah satunya adalah status fungsional yang merupakan masalah kesehatan utama pada lansia. Kemampuan seseorang untuk melakukan aktivitas sehari-hari dapat dinilai dari kapasitas fungsionalnya. Kapasitas fungsional fisik dapat diukur menggunakan six - minute walk test (6MWT). Penelitian yang membahas mengenai 6MWT sudah banyak, namun belum ada yang secara spesifik mencari hubungan antara kapasitas fungsional fisik terhadap kualitas tidur pada lansia. **Tujuan:** Penelitian ini dilakukan dengan tujuan untuk mengetahui hubungan antara kapasitas

fungsiional fisik terhadap kualitas tidur pada lansia di RS Gotong Royong. Metode: Penelitian ini menggunakan desain penelitian observasional analitik dengan pendekatan cross sectional. Data diambil dari kuesioner demografi, Pittsburgh Sleep Quality Index (PSQI), dan pengukuran 6MWT secara langsung. Analisis data pada penelitian ini menggunakan analisis univariat dan bivariat. Hasil: Pada penelitian ini didapatkan hasil  $p = 0,000$  ( $p < 0,05$ ) yang menandakan bahwa terdapat hubungan yang signifikan antara kapasitas fungsiional fisik terhadap kualitas tidur lansia di Rumah Sakit Gotong Royong. Simpulan: Terdapat hubungan antara kapasitas fungsiional fisik terhadap kualitas tidur lansia di Rumah Sakit Gotong Royong Surabaya. **Kata Kunci:** Kapasitas fungsiional fisik, kualitas tidur, six-minute walk test, dan Pittsburgh Sleep Quality Index.

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## INTRODUCTION

The Elderly is a period that shows a process of physical, mental, and social decline based on time. The number of elderly people is increasing along with the high life expectancy. An increase in the elderly population can cause health problems due to the aging process<sup>1</sup>. Health problems that often occur in the elderly are sleep disturbances. Research conducted in Iran stated that 86.2% of 390 elderly people with an average age of 60 years and over experienced sleep disturbances and more than half of the elderly needed about 20 minutes to start sleeping<sup>2</sup>. According to the World Health Organization (WHO), in the United States, the prevalence of sleep disorders in the elderly was around 67% in 2010<sup>3</sup>. In Indonesia, the number of elderly people who experience sleep disorders is 63%<sup>4</sup>.

There are several things related to health

in the elderly, including functional status which is a major health problem in the elderly. The ability of a person to carry out daily activities can be assessed from their functional capacity. If one or more systems have a problem, the functional capacity will be affected.

In the elderly, physical functional capacity is considered poor due to a decrease in the ability to carry out daily activities. In the elderly, physical functional capacity can be measured using the six-minute walking test (6MWT). 6MWT can interpret the approximate mileage and maximum oxygen consumption in a person<sup>6,9</sup>.

Physical functional capacity is the body's performance using oxygen and is a benchmark in assessing a person's capacity, increasing the intensity of physical activity, and maintaining it. There are several studies regarding functional capacity using 6MWT, but none

have specifically discussed and examined the relationship between physical functional capacity and sleep quality in the elderly. Therefore, based on the background above, I am interested in researching the relationship between physical functional capacity and sleep quality in the elderly at Gotong Royong Hospital.

**METHODS**

This study used an analytical observational method with a cross sectional design, the sampling technique used non probability sampling, namely by purposive sampling method. This study begins with data collection using a questionnaire to determine physical functional capacity by assessing the Six Minutes Walking Test (6MWT) and sleep quality values using the Pittsburgh Sleep Quality Index (PSQI) that meet the inclusion and exclusion criteria. The data obtained will be analyzed using the Spearman Rank correlation test on the Statistical Product and Service Solution (SPSS) application.

**RESULTS**

**Table 1.** General characteristics of respondents.

Characteristics	Frequency	Percent age (%)
<b>Age</b>		
60 – 70 years	76	86,4%
70 – 80 years	12	13,6%
<b>Gender</b>		
Male	33	37,5%
Female	55	62,5%
<b>Physical Functional Capacity</b>		
Good	17	19,3%
Moderate	23	26,1%
Poor	48	54,6%
<b>Sleep Quality</b>		
Good	38	43%
Poor	50	57%
<b>Employed</b>		
Employed	22	25%
- Entrepreneur	10	11,3%
- Security	2	2,4%
- IRT	10	11,3%
Not working	66	75%
<b>Past History of Disease</b>		
Available	35	39,8%
- Hypertension	13	14,8%
- Diabetes Mellitus	10	11,3%

Based on table 1, respondents aged 60-70 years were the respondents with the highest frequency, namely 76 respondents (86.4%), 55 respondents (62.5%) were female, poor physical functional capacity was the highest number, namely 48 respondents (54.6%), the highest frequency of poor sleep quality was 50 respondents (57%). Not working is the most, namely 66 respondents (75%), and 35 respondents (39.8%) have a history of previous illness.

**Table 2.** Distribution of physical functional capacity by age.

Variabel	Age		
	60 - 70 years (%)	70 - 80 years (%)	Totally (%)
Physical Functional Capacity	Poor	39 (52%)	9 (69%) (54,5%)
	Moderate	20 (27%)	3 (23%) (26,1%)
	Good	10 (21%)	1 (8%) (19,3%)
<b>Totally</b>	75 (100%)	13 (100%)	88 (100%)

Based on table 2, the elderly at Gotong Royong Surabaya Hospital who have poor physical functional capacity get more at the age of 70 - 80 years, namely 69% compared to the age of 60 - 70 years, namely 52%, the elderly who have moderate physical functional capacity get more at the age of 60

- 70 years, namely 27% compared to the age of 70 - 80 years, namely 23%, and the elderly who have good physical functional capacity get more at the age of 60 - 70 years, namely 21% compared to the age of 70 - 80, namely 8%.

**Table 3.** Distribution of physical functional capacity by gender.

Variabel	Gender		
	Male (%)	Female (%)	Total (%)
Physical Functional Capacity	Poor	29 (53%)	48 (54,5%)
	Moderate	10 (18%)	23 (26,1%)
	Good	1 (3%)	17 (19,3%)
<b>Total</b>	<b>33 (100%)</b>	<b>55 (100%)</b>	<b>88 (100%)</b>

Based on table 3, poor physical functional capacity is found more in men, 58% than in women, 53%, in moderate physical functional capacity is found more in men, 39% than women, 18%, and good functional capacity is found more in women 29% than men, 3%.

**Table 4.** Distribution of sleep quality by age.

Variabel	Age		
	60 - 70 years (%)	70 - 80 years (%)	Total (%)
Quality of Sleep	Poor	9 (69%)	50 (57%)
	Good	4 (31%)	38 (43%)
<b>Total</b>	<b>75 (100%)</b>	<b>13 (100%)</b>	<b>88 (100%)</b>

Based on table 4, poor sleep quality was found to be more at the age of 70 - 80 years, namely 69% compared to the age of 60 - 70 years old, namely 55%, and in good sleep quality there are more at the age of 60 - 70 years, namely 45% compared to the age of 70 - 80 years, namely 31%.

**Table 5.** Distribution of sleep quality by gender.

Variabel	Gender		
	Male (%)	Female (%)	Total (%)
Quality of Sleep	Poor	31 (56%)	50 (57%)
	Good	14 (42%)	38 (43%)
<b>Total</b>	<b>33 (100%)</b>	<b>55 (100%)</b>	<b>88 (100%)</b>

Based on table 5, poor sleep quality was found to be more in men at 58% compared to women at 56%, and in good sleep quality was found to be more in women at 44% than men at 42%.

**Table 6.** Spearman Rank Statistical Test Results of Physical Functional Capacity on Elderly Sleep Quality at Gotong Royong Surabaya Hospital.

Variabel	Physical Functional Capacity				
	Poor	Moderate	Good	Total	
Quality of Sleep	Poor	40 (45,5%)	5 (5,7%)	5 (5,7%)	50 (57%)
	Good	8 (9%)	18 (20,4%)	12 (13,6%)	38 (43%)
<b>Total</b>	48 (54,5%)	23 (26,1%)	17 (19,3%)	88 (100%)	

Based on table 5.6, elderly people with poor physical functional capacity have poor sleep quality, as many as (45.5%). Elderly who have moderate physical functional capacity have poor sleep quality, as many as (5.7%), and elderly who have good physical functional capacity have poor quality, as many as (5.7%). Then in the elderly with poor physical functional capacity who have good sleep quality, as many as (9%), elderly who have moderate physical functional capacity have good sleep quality, as many as (20.4%), and elderly who have good physical functional capacity have good sleep quality, as many as (13.6%).

**DISCUSSION**

Respondents aged 60-70 years were the respondents with the most frequency, namely 76 respondents (86.4%), 55 respondents (62.5%) were female, the highest number of poor physical functional capacities was 48 respondents (54.6%), and the frequency of poor sleep quality was also the highest, namely 50 respondents (57%). As many as 66 respondents (75%) did not work, and 35 respondents (39.8%) had a history of previous illness, namely, 13 respondents (14.8%) had a history of hypertension, 10 respondents (11.3%) had a

history of diabetes mellitus, 7 respondents (8%) had a history of hypercholesterolemia, and 5 respondents (5.7%) had a history of falls. The results of the questionnaire analysis show that the elderly who have poor functional capacity can be caused by several factors, namely a history of previous illnesses such as hypertension and diabetes mellitus, and besides that some of them also have a history of falls. When viewed from the questionnaire analysis, poor sleep quality in the elderly is also associated with frequent awakenings at night to go to the bathroom, noise, coughing, and feeling pain or cramps in the body.

In patients with diabetes mellitus there will be a decrease in the quality of sleep, this is because the patient will often wake up at night to urinate and sometimes feel pain or tingling in the hands and feet, causing poor sleep quality<sup>11</sup>.

In DM patients, glucose will be found in the urine which increases urination (polyuria)<sup>12</sup>.

The elderly at the Surabaya Gotong Royong Hospital who have the poorest functional capacity are at the age of 70-80 years (69%).

The decline in the musculoskeletal system in the elderly causes a decrease in flexibility, muscle, and joint strength, decreased cartilage function, and bone density which results in decreased physical ability so that the elderly experience a decrease in their functional capacity<sup>13</sup>. Research conducted by

Potter and Perry said that the higher a person's age, the more physical functional capacity decreases. The elderly who are over 70 years of age have the poor functional capacity<sup>14</sup>.

Poor physical functional capacity was found more in men, namely 58%, compared to women, namely 53%. Theoretically in Habut's research, gender differences can affect the physical functional capacity of the elderly. There are differences in physical functional capacity in elderly men when they enter old age. The amount of muscle mass and distribution of fat in men is less than in women because in men the hormone testosterone works more so that it affects protein synthesis which is useful for muscle mass. Bone mass decreases by 10% of peak bone mass at the age of 65 years and 20% at the age of 80 years<sup>15</sup>.

Poor sleep quality is found more at the age of 70-80 years, namely 69% compared to the age of 60-70 years, namely 55%.

In the study by Jianfeng Luo et al in China, it was found that out of 1086 respondents, 41.5% of elderly aged 60-80 years and over experienced sleep disturbances<sup>16</sup>.

In addition, research conducted by Putu Arysta Dewi showed that out of 15 respondents, 40% of elderly people aged 60-80 years and over had quite poor sleep quality<sup>17</sup>.

Poor sleep quality was found more in men, namely 58% compared to women, namely 56%. Research conducted by Astaniah, Rahmayanti, and Setiawan shows that sleep quality is quite poor in men while women have

better sleep quality<sup>18</sup>.

The results showed that there was a relationship between physical functional capacity and sleep quality in the elderly at the Gotong Royong Hospital in Surabaya. This is based on the results of statistical tests using the Spearman rank, the calculation results obtained  $p$  - value = ( $p < 0.05$ ) with a correlation of  $r 0.74$ , which indicates a strong close relationship. The results of this study are in line with research conducted by Fitri which shows that there is a relationship between physical functional capacity and sleep quality in the elderly with a  $p$ -value of 0.005. In addition, research conducted by Fakihan also shows that there is a relationship between physical functional capacity and sleep quality in the elderly with a  $p$ -value of 0.007<sup>19,20</sup>.

## CONCLUSIONS

Based on research conducted at Gotong Royong Surabaya Hospital, it can be concluded that there is a significant relationship between physical functional capacity and sleep quality in the elderly.

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## REFERENCES

1. Dewi AAI, Wahyuni N, Andayani NLP, Griadhi IPA. Hubungan Aktivitas Fisik dengan Kualitas Tidur pada Usia Lanjut di Desa Sumatera[Internet].

- 2020;8(1):2303-1921.
2. Malakouti S, Foroughan M, Nojomi M, Ghalebani M, Zandi T. Sleep Patterns, Sleep Disturbances and Sleepiness In Retired Iranian Elders. *International Journal Of Geriatric Psychiatry* [Internet]. 2009;24(11): 1201-1208.
  3. Nurhidayati. 2016. Gambaran Pengetahuan Lansia Tentang Insomnia di Panti Sosial Tresna Werdha Budi Mulia 03 Margaguna Jakarta Selatan. Jakarta: Program Studi Ilmu Keperawatan Universitas Islam Negeri Syarif Hidayatullah Jakarta.
  4. Priyanto S dan Umami R. 2012. Hubungan Kualitas Tidur Dengan Fungsi Kognitif dan Tekanan Darah Pada Lansia di Desa Pasuuruhan Kecamatan Mertoyudan Kabupaten Magelang. Magelang: Prodi Keperawatan Fakultas Kesehatan Universitas Muhammadiyah Magelang.
  5. ERN Hidayati, A Suharti, Z Aha, HA Yusviani. 2021. Gambaran Kapasitas Fungsional Jantung-Paru pada Pasien COVID-19 Derajat Ssedang di Ruang Isolasi [Internet]. Available from: <http://jurnal.umj.ac.id/index.php/se mnaslit>
  6. Mubarak R. 2018. Efektivitas Latihan Berjalan terhadap Kapasitas Fungsional dan Fungsi Keseimbangan Pada Calon Jemaah Haji Dewasa Sehat. Jakarta: Universitas Indonesia.
  7. Brimah P, Oulds F; Rany Ooe, Ceide M, Dillon S, Awoniyi O, Nunes J, Louis GJ. Sleep Duration and Reported Functional Capacity among Black and White US Adults. *Journal of Clinical Sleep Medicine* [Internet]. 2013;9(6). Available from <http://dx.doi.org/10.5664/jcsm.2762>
  8. Chasanah N. 2017. Hubungan Kualitas Tidur dengan Kualitas Hidup pada Lansia di Kelurahan Karangasem Kecamatan Laweyan Surakarta. Surakarta: Muhammadiyah Surakarta.
  9. Rahmawati A. 2018. Hubungan Kualitas Tidur dengan Fungsi Kognitif pada Lansia. Medan: Universitas Sumatera Utara.
  10. Rosdianti Y, Herlina, Hasanah O. Hubungan Activity of DaiIy Living (ADL) dengan Kualitas Tidur pada Lansia di PSTW KhusnuI Khotimah Pekanbaru. *JOM FKp*.2018;5(2), 660-666.
  11. Kurnia J, Mulyadi, VR Julia. Hubungan Kualitas Tidur Dengan Kadar Glukosa Darah Puasa Pada Pasien Diabetes Mellitus Tipe 2 Di Rumah Sakit Pancaran Kasih GMIM Manado. E-

- journal Kedokteran [Internet]. 2017 [disitasi 2022 November 02];5(1).
12. Romadoni S, Septiawan CD. (2016). Kualitas Tidur Dengan Kadar Glukosa Darah Pasien Diabetes Mellitus Tipe 2 Di Rumah Sakit X Palembang. *J Kedokteran [Internet]*. 2016 [disitasi 2022 November 02];4(2):273–275.
  13. Ivanali K, Amir TL, Munawwarah M. Hubungan antara Aktivitas Fisik dengan Tingkat Keseimbangan [Internet]. 2021 [disitasi 2022 November 02];21(1).
  14. Potter P, Perry A. *Buku Ajar Fundamental: Konsep, proses dan praktik*. Jakarta: EGC. 2010.
  15. Habut, M. Y., Nurmawan, I. P. S., Wiryanthini, I. A. D. Korelasi Indeks Massa Tubuh dan Aktivitas Fisik terhadap Keseimbangan Dinamis pada Mahasiswa Fakultas Kedokteran Universitas Udayana. *Majalah Ilmiah Fisioterapi Indonesia [Internet]*. 2016 [disitasi 2022 November 02]; 2(1).
  16. Luo J, Zhu G, Zhao Q, Ghuo Q, et al. Prevalence and Risk Factors of Poor Sleep Quality among Chinese Elderly in an Urban Community: Results from the Shanghai Aging Study. *PLoS One*. 2013;8(11):1-7.
  17. Dewi, P. A, Ardani. Angka Kejadian Serta Faktor-faktor yang Mempengaruhi Gangguan Tidur (insomnia) pada Lansia di Panti Sosial Tresna Werda Warna Seraya Denpasar Bali. *J Medika Udayana*. 3(8):1-9;2014.
  18. Astaniah, S., Rahmayanti, D., & Setiawan, H. 2019. Gambaran *sleep hygiene* lansia di Panti Sosial Tresna Werdha Budi Sejahtera Provinsi Kalimantan Selatan. *Jurnal Kesehatan: April* 2019.
  19. Fitri A. 2018. Hubungan aktivitas fisik dengan kualitas tidur pada lanjut usia di Desa Karangrejo Kecamatan Gabus Kabupaten Grobogan.
  20. Fakihan A. 2016. Hubungan Aktivitas Fisik Dengan Kualitas Tidur Pada Lanjut Usia. Universitas Muhammadiyah Surakarta