

CORRELATION OF PHYSICAL FUNCTIONAL CAPACITY TO SLEEP QUALITY IN THE ELDERLY AT GOTONG ROYONG HOSPITAL

Calista Sekar Langit Acintya Sugiyanto^{1)*}, Steven²⁾, Ari Christy³⁾

*Corresponding author's email: calistasekarl@gmail.com

<https://doi.org/10.33508/jwmj.v6i1.5375>

ABSTRACT

Introduction: Old age is a period that shows a process of physical, mental, and social decline based on time. Several things concern health in the elderly, one of which is functional status which is a major health problem in the elderly. A person's ability to carry out daily activities can be assessed from their functional capacity. Physical functional capacity can be measured using the six-minute walk test (6MWT). There are many studies discussing 6MWT, but none has specifically looked at the relationship between physical functional capacity and sleep quality in the elderly.

Objective: This research was conducted to determine the relationship between physical functional capacity and sleep quality in the elderly at Gotong Royong Hospital.

Method: This research uses an analytical observational research design with a cross-sectional approach. Data were taken from demographic questionnaires, the 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 were $p = 0.000$ ($p < 0.05$) which indicates that there is a significant relationship between physical functional capacity and the sleep quality of the elderly at the Gotong Royong Hospital.

Conclusion: There is a relationship between physical functional capacity and the sleep quality of the elderly at the Gotong Royong Hospital in Surabaya.

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

¹⁾ Student at Faculty of Medicine, Widya Mandala Catholic University Surabaya

²⁾ Department of Tropical Medicine, Faculty of Medicine, Widya Mandala Catholic University Surabaya

³⁾ Department of Internal Medicine, Faculty of Medicine, Widya Mandala Catholic University Surabaya

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 higher life expectancy. The increase in the elderly population can cause health problems due to the aging process.¹ A frequent health problem in the elderly is sleep disorders. Research conducted in Iran stated that 86.2% of 390 elderly people with an average age of 60 years and over experienced sleep disorders and more than half of the elderly needed about 20 minutes to start sleeping². According to the World Health Organization (WHO), in the United States, the prevalence of sleep disorders in the elderly was around 67% in 2010.³ In Indonesia, the number of elderly people who experienced sleep disorders was 63%.⁴

There are several things related to health in the elderly, including functional status which is the main health problem in the elderly. A person's ability to carry out daily activities can be assessed from their functional capacity. If one or more systems have a problem, then 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.⁵ In the elderly, physical functional capacity can be measured using

the six-minute walking test (6MWT). 6MWT can interpret estimates of distance traveled and maximum oxygen consumption in a person.^{6,9}

Physical functional capacity is the body's performance using oxygen and is a benchmark for 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, we are interested in researching the relationship between physical functional capacity and sleep quality in the elderly at Gotong Royong Hospital.

METHOD

This research uses an analytical observational method with a cross-sectional design, the sampling technique uses nonprobability sampling, namely the purposive sampling method.

This research began with data collection using a questionnaire to determine physical functional capacity by assessing the Six Minutes Walking Test (6MWT) and sleep quality scores using the Pittsburgh Sleep Quality Index (PSQI) which met the inclusion and exclusion

criteria. The data obtained will be analyzed using the Spearman Rank correlation test in the Statistical Product and Service Solution (SPSS) application.

RESULT

Table 1. General Characteristics of Respondents

Characteristics	Freq (n)	Percentage (%)
Age		
60-70 years old	76	86,4%
70-80 years old	12	13,6%
Gender		
Male	33	37,5%
Female	55	62,5%
Physical Functional Capacity		
Good	17	19,3%
Moderate	23	26,1%
Bad	48	54,6%
Sleep Quality		
Good	38	43%
Bad	50	57%
Occupation		
Employed	22	25%
- Self-employed	10	11,3%
- Security	2	2,4%
- Housewife	10	11,3%
Unemployed	66	75%
Medical Record		
With Illness	35	39,8%
- Hypertension	13	14,8%
- Diabetes Mellitus	10	11,3%
- Rolemic	7	7%
Hypercholesterolemia		
- Falling Risk	5	5,7%
Other Illness	53	60,2%

Based on Table 1, respondents aged 60 - 70 years are the respondents with the highest frequency, namely 76 respondents (86.4%), 55 respondents (62.5%) are female, poor physical functional capacity is the highest number, namely 48 respondents (54.6%), the highest frequency of poor sleep quality was 50 respondents (57%). The majority

of unemployed were 66 respondents (75%), and 35 respondents (39.8%) had a history of previous illness.

Table 2. Distribution of Physical Functional Capacity Based on Age

Variable	Age		Total
	60-70 y/o	70-80 y/o	
Physical Functional Capacity	Bad	9 (69%)	48 (54.5%)
	Moderate	3 (23%)	23 (26.1%)
	Good	1 (8%)	17 (19.3%)
Total	75 (100%)	12 (100%)	88 (100%)

Based on Table 2, elderly people who have the poor physical functional capacity get more at the age of 70 - 80 years, namely 69% compared to those aged 60 - 70 years, namely 52%, elderly people who have moderate physical functional capacity get more at the age of 60 - 70 years old, 27%, compared with those aged 70 - 80 years, namely 23% and elderly people who have good physical functional capacity are more likely to be found at the age of 60 - 70 years, 21% compared with those aged 70 - 80, namely 8%.

Table 3. Distribution of Physical Functional Capacity Based on Age

Variable	Gender		Total
	Male	Female	
Physical Functional Capacity	Bad	29 (53%)	48 (54.5%)
	Moderate	10 (18%)	23 (26.1%)
	Good	16 (29%)	17 (19.3%)
Total	100%	100%	100%

Based on Table 3, poor physical functional capacity is found more in men, namely 58%, compared to women, namely 53%, moderate physical functional capacity is found more in men, namely 39%, compared to women, namely 18%, and low Good functioning was found to be more common in women, 29%, compared to men, 3%.

Table 4. Distribution of Sleep Quality Based on Age

Variable	Age			
	60-70 y/o	70-80 y/o	Total	
Sleep Quality	Bad	41 (55%)	9 (69%)	50 (57%)
	Good	34 (45%)	4 (31%)	38 (43%)
Total		75 (100%)	75 (100%)	13 (100%)

Based on Table 4, poor quality sleep is found more at the age of 70 - 80 years, namely 69% compared to the age of 60 - 70 years, namely 55%, and good quality sleep is obtained more at the age of 60 - 70 years, 45 % compared to 70 – 80-year-olds, namely 31%.

Table 5. Distribution of Sleep Quality Based on Gender

Variable	Age			
	Male	Female	Total	
Sleep Quality	Bad	19 (58%)	31 (56%)	50 (57%)
	Good	14 (42%)	24 (44%)	38 (43%)
Total		75 (100%)	33 (100%)	55 (100%)

Based on Table 5, men get more bad sleep quality, namely 58%, compared to women, namely 56%, and good quality sleep is more common in women, 44%, compared to men, 42%.

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

Variable	Physical Functional Capacity				
	Bad	Moderate	Good	Total	
Sleep Quality	Bad	40 (45.5%)	5 (5.7%)	5 (5.7%)	50 (57%)
	Good	8 (9%)	18 (20.4%)	12 (13.6%)	38 (43%)
Total		48 (54.5%)	23 (26.1%)	17 (19.3%)	88 (100%)

Based on Table 6, elderly people with poor physical functional capacity have poor sleep quality, namely (45.5%). Elderly people who have moderate physical functional capacity have poor sleep quality, namely (5.7%), and elderly people who have good physical functional capacity have poor quality sleep, namely (5.7%). Then, elderly people with poor physical functional capacity have good sleep quality, namely (9%), elderly people who have moderate physical functional capacity have good sleep quality, namely (20.4%), and elderly people who have good physical functional capacity. have good sleep quality, namely (13.6%).

DISCUSSION

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 frequency of poor sleep quality was also the highest,

50 respondents (57%). A total of 66 respondents (75%) did not work, and 35 respondents (39.8%) had a history of previous illnesses, 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 elderly people who have poor functional capacity can be caused by several factors, namely a history of previous illnesses such as hypertension and diabetes mellitus, and apart from that, some of them also have a history of falls. If we look at the questionnaire analysis, the poor sleep quality of the elderly is also associated with frequently waking up at night to go to the bathroom, loud noises, coughing, and feeling pain or cramps in the body.

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

In DM patients, glucose will be found in the urine which results in increased urination (polyuria).¹²

The highest number of elderly people at the Gotong Royong Hospital in

Surabaya have poor functional capacity, namely those aged 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.¹³ Research conducted by Potter and Perry states that the older a person is, the more physical functional capacity decreases. Elderly people aged over 70 years have poor functional capacity.¹⁴

Poor physical functional capacity is found more in men, namely 58%, compared to women, namely 53%. Theoretically, in Habut's research, gender differences can influence 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 fat distribution in men is less than in women, because in men the testosterone hormone works more, thus affecting protein synthesis which is useful for muscle mass. Bone mass decreases by 10% from peak bone mass at age 65 years and 20% at age 80 years.¹⁵

Poor sleep quality is more common at ages 70 - 80 years, namely 69%, compared to ages 60 - 70 years, namely 55%. In Jianfeng Luo et al's research in

China, the results showed that out of 1086 respondents, 41.5% of elderly people aged 60 - 80 years and over experienced sleep disorders¹⁶. Apart from that, research conducted by Putu Arysta Dewi showed that out of 15 respondents, 40% of elderly people aged 60 - 80 years and above had quite poor sleep quality.¹⁷

Men have more poor sleep quality, namely 58%, compared to women, namely 56%. Research conducted by Astaniah, Rahmayanti, and Setiawan shows that men have poor sleep quality, while women have better sleep quality.¹⁸

The results of the research show that there is 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 Spearman rank, the calculation results obtained are p-value = 0.000 ($p < 0.05$) with a correlation of $r = 0.74$, which shows a strong 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 - p-value of 0.005. Apart from that, research conducted by Fakihan also shows that there is a relationship between physical functional capacity and sleep quality in the elderly with a p - p-value of 0.007.^{19,20}

CONCLUSION

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

ACKNOWLEDGEMENTS

Thanks are shown to Dr. Steven, M. Ked. Trop and Dr. Ari Christy Sp. PD. for the discussion time that has been given

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/semnaslit>
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: 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 Daily Living (ADL) dengan Kualitas Tidur pada Lansia di PSTW Khusnul 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
14. M. Hubungan antara Aktivitas Fisik dengan Tingkat Keseimbangan [Internet]. 2021 [disitasi 2022 November 02];21(1).
15. Potter P, Perry A. *Buku Ajar Fundamental: Konsep, proses dan praktik*. Jakarta: EGC. 2010.
16. 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).\
17. 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.
 18. 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.
 19. 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.
 20. Fitri A. 2018. Hubungan aktivitas fisik dengan kualitas tidur pada lanjut usia di Desa Karangrejo Kecamatan Gabus Kabupaten Grobogan.
 21. Fakihan A. 2016. Hubungan Aktivitas Fisik Dengan Kualitas Tidur Pada Lanjut Usia. Universitas Muhammadiyah Surakarta.