

The relationship of blood pressure and self care behavior on the quality of life in elderly



Anak Agung Istri Trisia Angguningrat^{1*}, Ari Wibawa²,
Putu Ayu Sita Saraswati²

ABSTRACT

Background: Several factors, including blood pressure and self-care behavior, influence quality of life in the elderly. Self-care behavior involves taking action to improve and maintain one's health. This study aimed to determine whether there was a relationship between blood pressure and self-care behavior on the quality of life of the elderly in Bali.

Methods: This study used an analytical observational design with a cross-sectional approach. The sampling technique used was consecutive sampling. Data was collected by measuring blood pressure with a sphygmomanometer, while self-care behavior and quality of life were measured using a questionnaire instrument WHO Quality of Life-BREF for quality of life and exercise self care agency scale for self care. This study was conducted in Pejeng Village, Tampaksiring District, Gianyar Regency, on April 7, 2023, in the Pejeng 1 State Elementary School classroom.

Results: Based on the non-parametric Spearman rho analysis test, the values obtained were $p = 0.016$ and 0.018 ($p < 0.05$) and the coefficient $r = 0.361$ and 0.356 . Based on the R test, the values obtained are $r = 0.612$ and r square = 0.375 . Based on the T-test, the values of $t = 2.180$ and 3.331 , t table = 2.01954 , and $p = 0.035$ and 0.002 . Based on the multicollinearity test, the variance inflation factor value is 1.159 . The tolerance value in this study is 0.863 .

Conclusion: There was a relationship between blood pressure and self-care behavior on the quality of life of the elderly in Bali.

Keywords: blood pressure, elderly, quality of life, self-care behavior.

Cite This Article: Angguningrat, A.A.I.T., Wibawa, A., Saraswati, P.A.S. 2024. The relationship of blood pressure and self care behavior on the quality of life in elderly. *Physical Therapy Journal of Indonesia* 5(1): 52-56. DOI: 10.51559/ptji.v5i1.188

¹Bachelor and Professional Program of Physiotherapy, Faculty of Medicine, Universitas Udayana, Denpasar, Bali, Indonesia;

²Department of Physiotherapy, Faculty of Medicine, Universitas Udayana, Denpasar, Bali, Indonesia.

*Corresponding author:

Anak Agung Istri Trisia Angguningrat;
Bachelor and Professional Program of Physiotherapy, Faculty of Medicine, Universitas Udayana, Denpasar, Bali, Indonesia;
trisiaangguningrat@gmail.com

Received: 2024-01-23

Accepted: 2024-04-20

Published: 2024-05-27

INTRODUCTION

The elderly, often abbreviated as the elderly, is the final stage of a life phase or human life cycle. Individuals aged 60 years or more can be said to be elderly.¹ Old age is often seen as a golden age because not everyone can reach that stage of life. The Indonesian Ministry of Health states that the elderly are very vulnerable to various acute diseases due to health problems due to decreased body immunity. The Ministry of Health stated that Indonesia has entered the "Aging Population" as shown by the 2020 population census, which showed an increase in the elderly population from 7.59% to 9.78% in 2010, which indicates progress, especially in the health sector.^{2,7}

Aging is a stage of life characterized by a decline in the function of several human body organs.³ The aging process is characterized by the body becoming increasingly susceptible to various diseases that can lead to death.⁴ Increasing age can cause changes in the structure and function

of cells, tissues and organ systems.^{5,6} The World Health Organization (WHO) identifies the elderly as a vulnerable group who are susceptible to infection and susceptible to physical and mental decline. This setback can cause a decrease in the quality of life of the elderly.⁷

The World Health Organization's Quality of Life states that quality of life is related to hopes, goals, standards, and levels of concern.⁸ WHO also states that quality of life is the level of satisfaction and well-being with various events and conditions that have been experienced during the life of an elderly person caused by illness and treatment.⁹ Meanwhile, as commonly known by the general public, quality of life is closely related to achieving an ideal human life or in accordance with what they want. A scientist defined quality of life as the degree of satisfaction with achieving or receiving something during one's current.^{10,17,23} Elderly people tend to experience a decrease in their quality of life

because they are easily attacked by diseases, one of which is problems experienced by the elderly in the cardiovascular system, such as blood pressure disorders.¹¹

The blood pressure disorder that most often occurs in the elderly is high blood pressure, also known as hypertension.¹² Hypertension is a non-communicable disease that is currently a world health priority. Hypertension is a disorder that occurs in the cardiovascular system or blood vessels, resulting in the supply of oxygen and nutrients carried by the blood being hampered from reaching the body tissues that need them.¹³ A person is declared to have hypertension if there is an increase in blood pressure above normal, namely 140/90 mmHg.¹⁴ Apart from hypertension, low blood pressure often attacks the elderly. Low blood pressure or hypotension occurs when blood pressure is lower than the normal limit because the heart, brain, and other organ systems do not receive sufficient blood supply. Usually,

people who suffer from hypotension have blood pressure below 90/60mmHg. Low blood pressure can cause problems such as blurred vision, confusion, dizziness, drowsiness, weakness and fainting.¹⁵

Self-care behavior involves taking action to improve and maintain one's health. An elderly person who has blood pressure problems, both high and low, can take care of themselves by complying with medication, consuming low-sodium foods, doing physical exercise, and minimizing unhealthy habits such as smoking and alcohol consumption.¹⁶ Based on data from an interview with a member of the elderly association in Bali, it was revealed that approximately half of the elderly population experienced blood pressure disorders, causing a decrease in quality of life.¹⁷ In addition, it was noted that some elderly people show a nonchalant attitude towards their health. Adverse incidents will threaten the health of the elderly in Bali if they are not treated immediately.¹⁸ Therefore, researchers are interested in raising the relationship of blood pressure and self-care behavior on the quality of life of the elderly in Bali. This study aimed to determine whether there was a relationship between blood pressure and self-care behavior on the quality of life of the elderly in Bali.

METHODS

The research design used in this study is an analytic cross-sectional study with measurements of variables carried out only once at a time; an observational analytical design is a research design that studies the dynamics of the relationship between variables by approaching, observing, or collecting, data at once at a certain time. This research has conducted in Pejeng Village, Tampaksiring District, Gianyar Regency, on April 7, 2023, in the Pejeng 1 State Elementary School Classroom. According to the screening assessment, the inclusion criteria included individuals willing to be a research sample by signing a letter of agreement to be a research sample until the research ends. The sample does not have a leg disability or does not use a walking aid. Elderly people with low, normal, and high blood pressure. Elderly aged 60-85 years. The exclusion criteria included individuals

with comorbidities such as diabetes mellitus with wounds. In this study, the research subjects were elderly aged 60-85 years in Pejeng Tampaksiring Village with random sampling who met the inclusion and exclusion criteria of as many as 44 elderly. This study used WHO Quality of Life-BREF (WHOQOL-BREF) to evaluate quality of life of patients.

The analysis used descriptive analysis, which is statistics used to analyze data by describing or illustrating the data that has been collected as it is without the intention of making general conclusions or generalizations. Data analysis included univariate, bivariate, and multivariate analyses. Univariate analysis is an examination carried out on a single variable. This research examined gender, age, blood pressure, self-care behavior, and quality of life in the elderly. In this study, bivariate analysis to determine whether there was a relationship or not used the Spearman rho correlation test method. The Spearman Rho test is a type of non-parametric statistical test that uses two variables, where the data scale for the two variables is ordinal and functions to measure the strength and direction of the relationship between two variables, which is then analyzed to determine the distribution of the data and can be used to analyze descriptive. Multivariate analysis is a statistical method that allows research of one or more of two variables simultaneously. Using this analysis technique, you can analyze the differences or relationships between several variables and other variables simultaneously.

RESULTS

Based on table 1 shows that the age range that meets the inclusion criteria is 60-85 years. The age variable consists of individuals classified as elderly, with the age range 60 to 70 years representing 68.19% and the age range 71 to 85 years representing 31.81%. There were 31 female research subjects, covering 70.45% of the total, and 13 male subjects, covering 29.55%. The educational history of respondents who did not attend school was 11 people with a percentage of 25%, 14 people had education up to elementary school with a percentage of 31.8%, education up to junior high school was 3

people with a percentage of 6.8%, education up to high school was as many as 4 people with a percentage of 9.1%, education up to Diploma as many as 6 people with a percentage of 13.6%, education up to Bachelor as many as 5 people with a percentage of 11.4% and Education up to Masters as many as 1 person with a percentage of 2.3%. A total of 40 elderly people experienced hypertension, and that is, 20 people with a percentage of 45.5% had grade I hypertension, and 20 people with a percentage of 45.5% had grade II hypertension. A total of 4 people did not have hypertension, of which 2 people had normal blood pressure with a percentage of 4.5%, and 2 people had pre-hypertension blood pressure with a percentage of 4.5%.

Thirty-one elderly people had poor self-care behavior, with a percentage of 70.5%; 9 people, with a percentage of 20.5%, had sufficient self-care behavior; 3 people, with a percentage of 6.8%, had good self-care behavior, and 1 person, with a percentage of 2, 3% have very good self-care behavior. There are 13 elderly people, with a percentage of 29.5%, who have a very poor quality of life. As many as 27 people, with a percentage of 61.4% have a poor quality of life; as many as 3 people, with a percentage of 6.8% have a moderate quality of life, as many as 1 person, with a percentage 2.3% have a good quality of life and none had a very good quality of life.

Table 2 shows a significant relationship between blood pressure and the quality of life of the elderly in Bali as evidenced by the p -value = 0.016 ($p < 0.05$), and the correlation coefficient value is 0.361 and is positive. A positive value indicates a unidirectional relationship with a sufficient level of correlation because the value is between 0.25 – 0.50. Table 2 also shows a significant relationship between self-care behavior and the quality of life of the elderly in Bali, as evidenced by the p -value = 0.018 ($p < 0.05$), and the correlation coefficient value of 0.356 and positive. A positive value indicates a unidirectional relationship with a sufficient level of correlation because the value is between 0.25-0.50. Based on Table 2, the correlation value between blood pressure and self-care behavior is 0.218, which means the relationship is very weak, with a p -value = 0.156 ($p > 0.05$), which means there is

Table 1. Frequency Distribution of Subject Characteristics

Characteristics	Category	n (percentage (%))
Ages	60-70	30 (68.19)
	71-85	14 (31.81)
	Total	44 (100)
Gender	Female	31 (70.5)
	Male	13 (29.5)
	Total	44 (100)
Educational history	No school	11 (25)
	Elementary school	14 (31.8)
	Junior high school	3 (6.8)
	Senior high school	4 (9.1)
	Diplomas	6 (13.6)
	Bachelor's degree	5 (11.4)
	Masters	1 (2.3)
	Total	44 (100)
Blood pressure	Normal	2 (4.5)
	Pre hypertension	2 (4.5)
	Grade I hypertension	20 (45.5)
	Grade II Hypertension	20 (45.5)
	Total	44 (100)
Self care behavior	Lack	31 (70.5)
	Enough	9 (20.5)
	Good	3 (6.8)
	Very good	1 (2.3)
	Total	44 (100)
Quality of life	Very poor	13 (29.5)
	Poor	27 (61.4)
	Moderate	3 (6.8)
	Good	1 (2.3)
	Very good	0 (0)
	Total	44 (100)

Table 2. The Relationship of Blood Pressure and Self Care Behavior to the Quality of Life of the Elderly

Variables	Blood pressure	Self care behavior	Quality of life
Blood pressure	Correlation	0.218	0.361
	p-value	0.156	0.016
Self care behavior	Correlation	0.218	0.356
	p-value	0.156	0.018
Quality of life	Correlation	0.361	0.356
	p-value	0.016	0.018

Table 3. R-test for the correlation between blood pressure and self care behavior to the quality of life of the elderly

Variables	R	R square	Adjusted R square
Blood pressure and self care behavior on quality of life	0.612	0.375	0.345

Dependent variable: Quality of life

no significant relationship between blood pressure and self-care behavior.

Table 3 shows a significant relationship between blood pressure and the quality of life of the elderly in Bali as evidenced

by the p -value = 0.016 ($p < 0.05$), and the correlation coefficient value is 0.361 and is positive. A positive value indicates a unidirectional relationship with a sufficient level of correlation because the value is

between 0.25 – 0.50. Table 3 also shows a significant relationship between self-care behavior and the quality of life of the elderly in Bali, as evidenced by the p -value = 0.018 ($p < 0.05$) and the correlation coefficient value of 0.356 and positive. A positive value indicates a unidirectional relationship with a sufficient level of correlation because the value is between 0.25-0.50. Based on Table 3, the correlation value between blood pressure and self-care behavior is 0.218, which means the relationship is very weak, with a p -value = 0.156 ($p > 0.05$), which means there is no significant relationship between blood pressure and self-care behavior.

Table 4 shows that the T value of the blood pressure variable is 2.180 greater than the T table value, and the significance value is 0.035 smaller than $\alpha = 5\%$. This shows that blood pressure has a significant influence on quality of life. The self-care behavior variable shows a T value of 3.331, greater than the T table value, and a significance value of 0.002, smaller than $\alpha = 5\%$. This shows that self-care behavior has a significant influence on quality of life. Based on Table 4, the β value of the blood pressure variable is 0.290, and the self-care behavior variable is 0.443. This shows that the self-care behavior variable has a more dominant influence than the blood pressure variable. Based on the multicollinearity test, the variance inflation Factor (VIF) value is 1.159, which means that multicollinearity does not occur because it meets the requirements, it must be below 10. The tolerance value must be above 0.10 and the tolerance value in this study is 0.863, which means that multicollinearity does not occur because it meets the requirements.

DISCUSSION

This shows a significant relationship between blood pressure and self-care behavior on the quality of life of the elderly in Bali. Research that supports the results of this research is research conducted by Sumakul et al. (2017). His research discusses the relationship between blood pressure and quality of life, where the research results in a correlation or relationship between blood pressure and quality of life. In this study, the p -value = 0.014 was obtained, so it can be

Table 4. Multiple linear regression analysis for the correlation between blood pressure and self care behavior to the quality of life of the elderly

Variables	T	β	T-Table	P-value	Collinearity statistics	
					Tolerance	VIF
Blood pressure	2.180	0.290	2.01954	0.035	0.863	1.159
Self care behavior	3.331	0.443	2.01954	0.002	0.863	1.159

Dependent variable: Quality of life

said that there is a relationship between hypertension and quality of life. The relationship between hypertension and quality of life is because it can be seen from the perspective of physical and mental health that hypertension can disrupt the quality of life of the population. Elderly people with blood pressure tend to take medication to control blood pressure at normal levels. Elderly people who take medication often complain about this because they feel sick and cannot carry out their activities as before. This results in elderly people having a poor quality of life.¹⁸

The results of this research are also supported by research conducted by Anitarini Anitarini et al. (2022). This research states that there is no significant relationship between blood pressure and quality of life because this research includes the results of previous research, which are inconsistent. It states that blood pressure correlates with quality of life. The research was conducted by measuring the quality of life of the elderly. used the EQ-5D questionnaire, and the results showed that there was a relationship between hypertension and quality of life, namely that hypertension had a bad effect on a person's quality of life. explains that the physical changes experienced by the elderly do not always reduce their quality of life.¹⁹ Some elderly people with blood pressure problems still have a good quality of life despite functional decline. This can happen because elderly people can still interact with peers in their home environment.²⁰

Research Musyiami, D.T. (2020) corroborates the findings of this study. This study explores the correlation between self-care practices and quality of life in elderly people with hypertension. This research produces a p-value of 0.490, indicating that the results are insignificant because they are greater than 0.05. It can be concluded that there is an important

correlation between self-care practices and quality of life in elderly individuals with hypertension. Research shows that the high incidence of inadequate self-care contributes to reduced quality of life among the elderly. Elderly individuals may engage in poor self-care behaviors due to a lack of awareness in managing their illness.²¹

Research conducted by Musyiami, D.T. (2020) stated that self-care behavior, or self-care behavior, could influence the quality of life of the elderly because they remember that elderly individuals are frail and susceptible to various diseases. When you enter old age, self-care behavior is very important to prevent various diseases, just as when the elderly have contracted a disease, self-care behavior is very necessary. Because when self-care is not carried out to protect oneself, serious conditions will worsen. For example, elderly people with hypertension do not care about their condition or do not go to the doctor or take medication regularly, which results in uncontrolled blood pressure.²²

Putri, D.A. (2019) supports this research's results, which discuss the relationship between self-care agency and quality of life in elderly people with chronic diseases. This research showed that most self-care agencies were good at 65% and the quality of life at 67%. Shows a very strong and significant relationship between self-care agency and the quality of life of the elderly. A good self-care agency will influence healthy behavior and lifestyle, improving quality of life. Blood pressure disorders such as hypertension are classified as chronic diseases and elderly people with chronic diseases are stated to have self-care agency behavior that must be controlled. If the self-care agency is controlled or self-care is carried out well, the quality of life will improve because when the elderly take care of themselves, they will feel fitter and healthier, and their

lives will be more meaningful.

This research aligns with Gusty et al. (2020), which discusses self-care behavior and factors related to hypertensive patients in Padang. In this study, it was stated that someone with hypertension has poor self-care behavior or low self-care behavior. A person with hypertension must have self-care behavior, especially adherence to taking hypertension medication regularly to control hypertension. However, the elderly tend to be less aware of this, as explained in the study, that the elderly are not compliant in taking antihypertensive drugs due to a lack of understanding of the medication, less affordable drug prices, local culture and beliefs, the emergence of bad effects if taking the drug, access to health services and the use of traditional medicine.²³

Based on research conducted by Putri, R.D et al. (2013) with the title description of the quality of life in elderly people with normotension and hypertension in the work area of the Gianyar I Health Center for the period of November 2013. Hypertension is a disease that can influence a person's socioeconomic life and quality of life.²⁴ A person with blood pressure disorders can experience a decrease in quality of life because it can have a negative impact on vitality, social function, mental health, and psychological function. Individuals with blood pressure disorders such as hypertension are reported to experience symptoms such as headaches, depression, anxiety, and fatigue.²⁵ These symptoms are reported to affect a person's quality of life in various dimensions, especially physical health. A good quality of life can be achieved and maintained if patients can control their disease regularly. By carrying out routine and good treatment, clinical symptoms can be reduced, and the incidence of complications tends to decrease. This study concludes that the quality of life of hypertensive elderly is worse than that of

normotensive elderly.²⁶

Many limitations have been pointed out in the prior discussion of this work. Initially, a finite number of samples can be obtained even using a comprehensive sampling approach because they only allowed study in specific disciplines, the elderly were the main source of this. The quality of life for elderly hypertensive individuals in Bali is affected by a number of environment-related factors, including blood pressure and temperature, which researchers are yet unable to control.

CONCLUSION

Based on the results, blood pressure variables and self-care behavior correlated with quality of life among in elderly. Further study should evaluate the correlation by using the longitudinal study design.

ETHICAL CLEARANCE

Udayana University granted approval for this study, which is registered under registration number 410/UN14.2.2.VII.14/LT/2023. Additionally, informed consent from the survey participants was supplied, endorsing the sampling technique.

CONFLICT OF INTEREST

This study has no conflicts of interest.

FUNDING

This study received no grants from any institution.

AUTHOR CONTRIBUTIONS

AAITA prepared the concept of the study design, wrote the manuscript, and analyzed the data. AW, SS, and SA are directing the data collection and revision of the manuscript.

REFERENCES

- Ardiani H, Lismayanti L, Rosnawaty R. Faktor-faktor yang berhubungan dengan kualitas hidup lansia di kelurahan mugarsari kecamatan tamansari kota tasikmalaya tahun 2014. *Healthcare Nursing Journal*. 2019;1(1):42-50.
- Anitarini F, Ariyani AD, Sriyanti T. Hubungan tekanan darah dengan kualitas hidup lansia pemain musik gedogan di desa kemiren kabupaten banyuwangi. *Healthy*. 2022;10(2):50-55.
- Alfeus M. Buku terapi perilaku kognitif pada pasien hipertensi. Malang : Wineka Mediap.2018;2(3):10-15.
- Gusty RP, Merdawati L. Perilaku perawatan diri dan faktor-faktor yang berhubungan dengan pasien hipertensi di padang self-care behaviour practices and associated factors among adult hypertensive patients in padang. *Jurnal Keperawatan*.2020;11(1):51-58
- Hasan H, Maranatha RA. Perubahan fungsi paru pada usia tua. *Jurnal Respirasi*. 2019;3(2):52-57.
- Hayulita S, Bahasi A, Sari AN. Faktor dominan yang berhubungan dengan kualitas hidup lansia. *Healthcare Nursing Journal*.2018;5(2):42-46.
- Lutfiah F, Sugiharto S. Gambaran faktor-faktor yang mempengaruhi kualitas hidup lansia : scoping review. *Prosiding Seminar Nasional Kesehatan*.2021;3(1):1477-1485.
- Idu DMB, Ningsih OS, Ndorang TA, 2022. Faktor-faktor yang mempengaruhi perilaku self-care pada pasien hipertensi di wilayah kerja puskesmas lalang tahun 2022. *Wawasan Kesehatan*.2022;7(1):30-38.
- Jabani AS, Kusnan ABIMC. (2021) Prevalensi dan faktor risiko hipertensi derajat 2 di wilayah kerja puskesmas poasia kota kendari. *Jurnal Ilmiah Ilmu Keperawatan*. 2021;12(4):31-42.
- Jacob DE, Sandjaya S. Faktor faktor yang mempengaruhi kualitas hidup masyarakat Karubaga district sub district Tolikara propinsi Papua. *Jurnal Nasional Ilmu Kesehatan*.2018;1(1):10-18.
- Konita S, Azmi S, Erkadius E. Pola tekanan darah pada lansia di posyandu lansia kelurahan padang pasir padang januari 2014. *Jurnal Kesehatan Andalas*. 2015;4(1):269-273.
- Kholifah WAN, Suratini S. Hubungan self-care management dan kualitas hidup pada lansia dengan hipertensi. *Holistik Jurnal Kesehatan*.2023;17(2):181-188.
- Lee EJ, Park E. Self-care behavior and related factors in older patients with uncontrolled hypertension. *Contemporary Nurse*.2017;53(6):607-621.
- Musyiami DT. Hubungan self care behavior dengan kualitas hidup lansia hipertensi di pejaten giriwungu panggang gunungkidul yogyakarta. Universitas Aisyiyah Yogyakarta.2022;3(2):22-25
- Manangkot MV, Suindrayasa IM. Gambaran self care behaviour pada pasien hipertensi di puskesmas wilayah kota Denpasar. *Coping: Community of Publishing in Nursing*.2020; 8(4):410-415.
- Putri DA. Hubungan self care agency dan kualitas hidup pada lansia dengan penyakit kronis. *Healthcare Nursing Journal*.2019;3(2):20-24.
- Rosyana DP. Gambaran kualitas hidup pada lansia dengan normotensi dan hipertensi di wilayah kerja puskesmas gianyar i periode bulan november tahun 2013 (overview of quality of life in elderly with normotension and hypertension in the work area of gianyar health center i period november 2013). *E-Jurnal Medika Udayana*.2013;3(9):1-14
- Rohkuswara TD, Syarif S. Hubungan obesitas dengan kejadian hipertensi derajat I di pos pembinaan terpadu penyakit tidak menular (posbintu ptm) kantor kesehatan pelabuhan bandung tahun 2016.*Jurnal Epidemiologi Kesehatan Indonesia*.2017; 1(2): 13-18.
- Romadhon WA, Aridamayanti BG, Syarif AH, Sari GM, 2020. Faktor-faktor yang mempengaruhi self-care behavior pada klien dengan hipertensi di komunitas. *Jurnal Penelitian Kesehatan*.2020;2(11):30-37.
- Saelan GSA. Gambaran perilaku perawatan diri pada pasien gagal jantung, Fakultas Ilmu Kesehatan Universitas Duta Bangsa Surakarta.2021;3(1):43-49.
- Saputri YH, Prasetyo YB. Social character and self concept in old year age. *Jurnal Keperawatan*.2012;3(2):256-263.
- Sasmalinda L, Syafriandi H. (2013) Faktor-faktor yang mempengaruhi perubahan tekanan darah pasien di puskesmas malalo batipuh selatan dengan menggunakan regresi linier berganda. *Journal of Mathematics UNP*. 2013;1(2):36-40.
- Seftiani L. Hubungan kualitas hidup lansia dengan hipertensi di wilayah kerja puskesmas perumnasi kelurahan sungai beliung kecamatan pontianak barat. *ProNers*.2017;4(1):20-26.
- Sumakul GT, Sekeon SA, Kepel BJ. Hubungan antara hipertensi dengan kualitas hidup pada penduduk di kelurahan kolongan kecamatan tomohon tengah kota tomohon. *KESMAS: Jurnal Kesehatan Masyarakat Universitas Sam Ratulangi*.2017;6(3):20-27.
- Sang A, Djajakusli R, Russeng S. Hubungan risiko postur kerja dengan keluhan musculoskeletal disorders (MSDs) pada pemanen kelapa sawit. *PTJI*. 2013;2(2):1-14
- Warmadewi NKU, Adhitya IPGS, Griadhi IPA, Sutadarma IWG. Hubungan Indeks Massa Tubuh Dan Lingkar Perut Terhadap Foot Hyperpronation Pada Perempuan Dewasadi Desa Batuan, Sukawati, Gianyar.Majalah Ilmiah Fisioterapi Indonesia. 2019;7(3):18-27.



This work is licensed under a Creative Commons Attribution